ALAGAPPA UNIVERSITY

(A State University Established in 1985)

Karaikudi - 630003. Tamil Nadu, India

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

M.Phil., COMPUTER SCIENCE

REGULATIONS AND SYLLABUS

(For the candidates admitted from the Academic Year 2022 - 2023)

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M. Phil., COMPUTER SCIENCE

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[For the candidates admitted from the Academic Year 2022 – 2023 onwards]

ALAGAPPA UNIVERSITY

(A State University Accredited with "A+" grade by NAAC (CGPA: 3.64) in the Third
Cycle and Graded as Category-I University by MHRD-UGC)
Karaikudi -630003, Tamil Nadu.

The panel of Members-Broad Based Board of Studies

Chairperson: **Dr. T. MEYYAPPAN** Professor & Head i/c, Department of Computer Science Alagappa University, Karaikudi Teaching Experience: 31 years Research Experience: 16 years Area of Research: Big Data Analytics, Image Processing and Networks	
Foreign Expert: **Dr. ABDUL RAHAMAN WAHAB SAIT** King Faisal University, Saudi Arabia Teaching Experience: 19 years Research Experience: 10 years Area of Research: Web Mining, Big Data Analytics, Machine Learning	
Indian Expert: **Dr. P. KALAVATHY** Professor, Department of Computer Science & Applications Gandhigram Rural Institute, Gandhigram Teaching Experience: 21 years Research Experience: 16 years Area of Research: Data Mining, Digital Image Processing	
Indian Expert: **Dr. M. BALAMURUGAN** Professor, Department of Computer Science Bharathidasan University, Trichy Teaching Experience: 28 years Research Experience: 16 years Area of Research: Big Data Analytics, Computational Intelligence, Digital Image Processing	
Industry Expert: **Dr. R. GOKULAKRISHNAN** Joint Director, Software Technology Parks of India Ministry of Communication and IT Government of India, Chennai Teaching Experience: 7 years Industrial Experience: 14 Years Area of Research : Information Security, Historical Data Analysis and Nature based Algorithms	
Members: **1. Dr. A. PADMAPRIYA** Professor, Department of Computer Science, Alagappa University, Karaikudi Teaching Experience: 19 years Research Experience: 15 years Area of Research: Data Mining, Big Data Analytics, Information and Network Security, Communication Networks	
2. Dr. S. SANTHOSH KUMAR Assistant Professor, Department of Computer Science, Alagappa University, Karaikudi Teaching Experience: 19 years Research Experience: 14 years Area of Research: Data Mining, Machine Learning, Health Care Analytics, IoT	
Alumnus/Alumna: **Dr. P. GEETHA** Current Position : Associate Professor Type of Profession : Teaching Dr. Umayal Ramanathsn College for Women, Karaikudi Teaching Experience: 16 years Research Experience: 10 years Area of Research: Data Mining, Big Data Analytics	

Ex-Officio Member:
Dr. V. SIVAKUMAR
The Director
Curriculum Design & Development Cell,
Alagappa University, Karaikudi

M. Phil (Computer Science) - Programme Structure

S. No.	Course Code	Name of the course	Credits	Marks		
				Int.	Ext.	Total
SEMESTER – I						
1.	552101	**Core Course I** – Research Methodology	4	25	75	100
2.	552102	**Core Course II** – Advanced Computing Techniques	4	25	75	100
3.	552103	**Core Course III** – General Skills for Science	4	75	25	100
SEMESTER – II						
4.		**Core Course IV** – Specialization	4	25	75	100
5.	552999	**Core Course V** – Dissertation &Viva voce	8	50	150 (100 + 50)	200
		Total Marks	24	--	--	600

Core Course IV – Specialization: opt One paper from any one group		
Group	**Course Code**	**Name of the Course**
1	552551	A. Web Mining (or)
	552552	B. Text Mining
2	552553	A. Natural Language Processing (or)
	552554	B. Semantic Web and Ontology
3	552555	A. Bioinspired Computing (or)
	552556	B. Soft Computing
4	552557	A. Artificial Intelligence & Machine Learning (or)
	552558	B. Industry 4.0
5	552559	A. Edge & Fog Computing (or)
	552560	B. Advanced Cloud Computing

PROGRAMME: M. PHIL COMPUTER SCIENCE
Regulations (2022-2023)

1. Candidates for admission to the Master of Philosophy in Computer Science M.Phil.(Computer Science) programme is required to pass in any one of the following Examinations of any recognized University with a minimum of 60% marks in (minimum 55% marks for SC/ST candidates):
    M.Sc. Degree in Computer Science/Information Technology or M.C.A. or any qualification equivalent thereto.

2. The M.Phil.(Computer Science) programme is a one year programme consisting of two semesters. Each semester consists of minimum of 75 working days at the rate of 6 hours per day.

3. The course of study and the scheme of Examinations are shown in Appendix A.

4. The End-Semester / External Examinations are conducted in November and April of every academic year by the University in different courses according to the scheme given in Appendix A. A candidate will be permitted to appear for the Semester examination in a particular course at the end of each semester provided he/she secures not less than 75% of attendance in each course in that semester.

5. The revised curriculum is offered from the academic year 2022-2023 onwards.

6. Each student should take 24 credits to complete M.Phil. (Computer Science) programme.

7. Each theory course carries 4 credits with 75 marks in the End-Semester Examination and 25 marks in the Internal Assessment.

8. The End-Semester Examinations will be conducted for three hours duration.

9. Dissertation carries 8 credits. Dissertation carries 150 marks in the End-Semester Examination (100 marks for Dissertation Evaluation by External Examiner and 50 marks for viva-voce jointly awarded by both Internal and External Examiners) and 50 marks in the Internal Assessment (Dissertation monitoring and Evaluation by the Internal Examiner).

10. To pass in each course, a candidate is required to secure 40% marks in the Semester examinations and 40% marks in the Internal assessment and 50% marks in aggregate (marks in Semester Examination + marks in Internal Assessment).

11. A student is permitted to continue the programme from I to II semester irrespective of failure(s) in the courses of the previous semester. The candidate will qualify for the M.Phil. (Computer Science) degree only if the student passes all the courses within a period of THREE years.

12. Results will be declared after the completion of each End-Semester Examination and the marks/grades obtained by the candidates will be forwarded to them through the Head of the Department.
    a) A Candidate who has passed all examinations in the first attempt within one year of admission is declared to pass in First Class with Distinction provided the candidate secures more than 75% marks in the aggregate.
    b) A candidate who has passed all the examinations within one year of admission is declared to have passed in First Class provided the candidate secures not less than 60% in the aggregate.
    c) All other candidates who have passed all the examinations in the prescribed courses shall be declared to have passed in Second Class.

13. All the candidates who have passed the examinations in all the prescribed courses shall be eligible for the award of the Degree of Master of Philosophy in Computer Science namely M.Phil.(Computer Science).

14. The common CBCS regulations prescribed for the Departments by the Alagappa University will be followed in all respect.

1. Programme General Objectives- (PGO)

PGO-1	The program helps students learn how to solve technical problems in the competitive field of Computer Science.
PGO-2	Students in the M.Phil. program should be able to carefully judge and analyze different ways of doing research.
PGO-3	The program aims to give students a wide understanding of the philosophical approach to Computer Science.
PGO-4	Students can choose to focus on specific areas within Computer Science that interest them the most.
PGO-5	The program prepares students to handle the challenges that come with working in the fast world of Computer Science.
PGO-6	Students will learn how to figure out which research methods work best for solving problems in their field.
PGO-7	The program covers a broad range of topics in Computer Science to give students a well-rounded education.
PGO-8	Students will learn how to apply the theories and ideas they learn to real-world situations in Computer Science.
PGO-9	The program encourages students to think critically and come up with new ideas to tackle problems in their field.
PGO-10	By the end of the program, students should be able to adapt to the constantly changing world of Computer Science.

2. Programme Specific Objectives-(PSO)

PSO-1	Develop a comprehensive understanding of the fundamental principles and methodologies employed in conducting research.
PSO-2	Learn about the leading research areas in computer science namely Information Security, Information Theory and Coding, Medical Image Processing, Big Data Analytics and machine intelligence.
PSO-3	Study and analyze the concepts and their relevant research domains.
PSO-4	Selection of appropriate methods/techniques to solve the identifier search problem.
PSO-5	Model, implement and analyze the methodology to devise the solution.

3. Programme Outcome-(PO)

PO-1	Gain a broad understanding of Computer Science, , research methods, and the latest trends and a deep understanding in the area of specializations.
PO-2	Possess sound knowledge in Computer Science and interdisciplinary areas with Science, Technology and Management related to Information Systems and their applications in relevant fields.
PO-3	Helps to create a group of skilled people to build a strong scientific community.
PO-4	Emerge as professionals and teachers with strong analytical and synthesizing capability with innovative and creative thinking that can instill to student community to develop a strong scientific community
PO-5	Apply acquired knowledge and skills to solve real-world problems and make a positive societal impact.
PO-6	Demonstrate proficiency in scientific writing and publishing best practices.
PO-7	Exhibit motivation to pursue further education and research, including doctoral programs.
PO-8	Communicate research findings and ideas effectively through well-developed presentation skills.
PO-9	Engage in collaborative research projects and networking opportunities within the scientific community.
PO-10	Employ critical thinking skills to evaluate, analyze, and synthesize research findings.

II. Question Paper Pattern – Theory

M.Phil Computer Science

Time: 3 Hours   Max. Marks: 75

Answer all questions either (a) or (b)   (5 x 15 = 75 marks)

1. (a) or (b)
2. (a) or (b)
3. (a) or (b)
4. (a) or (b)
5. (a) or (b)
Each Question is represented from the same unit.

III. Dissertation Work

Dissertation Work	–	150 marks
Viva-Voce	–	50 marks
Total	–	200 marks

Semester–I			
Course Code: 552101	**Core Course – I** **RESEARCH METHODOLOGY**	**Credits :4**	**Hourse:5**
Objectives	➢ To introduce the basic concepts and methods of Scientific and Computer Science Research ➢ To gain insight about the research problems and their design ➢ To understand the importance of literature survey and research data ➢ To inculcate writing skills and make them write good scientific documentslike articles, reviews, and thesis ➢ To make the students aware of the various ethical issues and professional conducts		
UNIT – I	**Introduction to Scientific and Computer Science Research** Objectives-Significance-Motivation of Research, Types and Approaches, Quantitative Research Methods, Research Methods versus Methodology, Research Process, Criteria of Good Research. Significance & Status of Research in Computer Science. Steps in Research: Having grounding in Computer Science, Major Journals & Publication in Computer Science, Major Research Areas of Computer Science. Identification, Selection & Formulation of Research Problem. Developing a Research Proposal, Planning your Research, The Wider Community, Resources and Tools		
UNIT – II	**Research Problem and Design** Meaning and Selection of Research Problem, Meaning of Research Design, Need for a Research Design, Features of a Good Design. Important Concepts relating to Research Design. Different Research Designs, Basic Principles of Experimental Designs, Important Experimental Designs		
UNIT – III	**Research Data and Literature Survey** What is Data? Mathematical Statistics and Computer Science views on Data Analysis, Methods for Finding Associations: Regression and Pattern Recognition, Method for Aggregation and Data Visualization tools and Techniques, Finding out about your Research Area, Literature Search Strategy, Writing Critical Reviews, Identifying Venues for Publishing your Research		
UNIT – IV	**Writing Papers, Thesis and Review Process** Preparing and Presenting your Paper, The Conference View Process, Making use of the Referees' Reports, The Journal Review Process, Group Exercise in Reviewing Research Papers, Planning the Thesis, Writing the Thesis, Thesis Structure, Writing up Schedule, The Oral Examination and Viva Voce		
UNIT – V	**Ethical Issues and Intellectual Property** Ethics in General, Professional Ethics, Ethical Issues that Arise from Computer Technology, General Moral Imperatives, More Specific Professional Responsibilities, Organizational Leadership Imperatives. Intellectual Property Rights, Legislations covering Intellectual Property Rights in India		

Suggested Readings:	
Allen B.Tucker, jr. (Ed.),"*The Computer Science and Engineering Handbook*", CRC Press, Boca Raton, 1997. Angela Brew, Routledge Falmer, "*The Nature of Research: Inquiry in Academic Context*", Psychology Press, New York, 2001. Francis C. Dane, "*Research Methods*", Brooks/Cole Publishing Company, California, 1990. Juliet Corbin, Anselm Strauss, "*Basic of Qualitative Research*", 3rd Edition, SagePublications, New Delhi, 2008. Kothari C.R., Gaurav Garg, "*Research Methodology Methods and Techniques*", 3rd Edition,New Age International Publishers, Lucknow, 2014. Robin Levin Penslar (Ed.), "*Research Ethics Cases and Materials*", Indiana University Press, Bloomington, 1995.	
Outcomes	➢ Understand the basic concepts and methods of scientific and computer research ➢ Able to analyze a research problem and make a design ➢ Understand the importance of research data and literature survey ➢ Acquire skills to write scientific documents ➢ Exposed to ethical issues and intellectual property rights

Semester–I			
Course Code: 552102	**Core Course – II** ADVANCED COMPUTING TECHNIQUES	**Credits 4**	**Hours:5**
Objectives	- To introduce thrust areas in advanced computing - To understand the research domains - To gain knowledge about research trends in the field of Data Mining, Natural Language Processing, Algorithms, Intelligent Computing, Internet of Things and Cloud computing - To enable to confine the domain of proposed research - To determine the unsolved problem areas in computer science research		
UNIT – I	**Applications and Trends in Data Mining**: - Data Mining Applications – Data Mining System Products and Research Prototypes – Additional Themes on Data – Social Impacts of Data Mining - Trends in Data Mining		
UNIT – II	**Classical Approaches to Natural Language Processing:** Text Preprocessing - Lexical Analysis - Syntactic Parsing - Semantic Analysis- **Advanced topics in ontology engineering** -Ontology-Based Data Access- Ontologies and natural languages		
UNIT – III	**Applications of Computing**: Learning objectives – Introduction – Fusion Approach of Multispectral Images with SAR- Optimization of Travelling Salesman Problem using Genetic Algorithms		
UNIT – IV	**Intelligent Computing:** Introduction Definition of Computing, Conventional Computing vs. Intelligent Computing, Necessity of Intelligent Computing, Current trends in Intelligent Computing **Industrial Revolution:** Introduction – Causes–Industrial revolution in the past seventy years – New Industrial Revolutions – Advanced Industrial Economies – Globalization and Exploitation – Global Industry and the Environment.		
UNIT – V	**IoT:** The Paradigm, Concept of Things, IoT Hardware, IoT Protocols, IoT Architecture, enabling technologies of IoT, IoT Designing and its levels. **Cloud Computing:** Cloud Computing reference model, Overview of Virtualization: Introduction, Types of cloud, Cloud Platforms: Amazon Web Services, Microsoft Azure, Cloud Applications		

Suggested Readings:

Buyya Raj Kumar, Vecchiola Christian &Selvi S. Thamarai , *Mastering Cloud Computing, McGraw Hill Publication*, New Delhi, 2013.

Jiawei Han, Micheline Kamber, *Data Mining: Concepts and Techniques* Second Edition University of Illinois at Urbana-Champaign.

Konar, A. (2006). *Computational intelligence: principles, techniques, and applications*. Springer Science & Business Media.

Nitin Indurkhya and fred j. Damerau *Handbook of Natural Language Processing*, Second edition, Natural Language Processing (greyc.fr)

Maria Keet C., *An Introduction to Ontology Engineering*, 2020. OEbook.pdf (uct.ac.za)

Madisetti Vijay and BahgaArshdeep, *Internet of Things (A Hands-on-Approach),* 1st Edition, VPT, 2014

Sivanandam S.N., S.N. Deepa. 2011 *Principles of Soft Computing*, MCAKCA032-PRINCIPALES OF SOFT COMPUTING-SN SIVNANDAM AND DEEPA SN.pdf (its.edu.in)

Stearns, P. N. (2020). *The industrial revolution in world history*. Routledge.

Outcomes	➢ Understanding the advanced computing thrust areas
	➢ Identify the research domains and choose open research problems
	➢ Gain knowledge about research trends in the field of Data Mining, Natural Language Processing, Algorithms, Intelligent Computing, Internet of Things and Cloud computing
	➢ Able to formulate a research problem in the chosen domain of proposed research
	➢ Able to propose a solution method for the chosen research problem

Semester–I			
Course Code: **552103**	**Core Course – III** **GENERAL SKILLS IN SCIENCE**	**Credits :4**	**Hours:5**
Objectives	• To understand the basic concepts of Software • To learn about the theory of computation • To get exposure to network simulator and MATLAB • To understand the basics of Internet of Things • To improve the communication skills		
UNIT – I	**Introduction to Software Concepts:** Need of Open Sources – Advantages of Open Sources – Commercial Software – Freeware – Free Software – Open-Source Licenses – Category of OSS – OSS Tools – Applications. Operating System**:** The Linux operating system and its use both for desktops and as server software		
UNIT – II	**Theory of Computer Science:** Introduction to Formal Languages, Automata and Computability – Finite State Automata: Regular Expressions – Characterization, Properties and Decidability - Output and Minimization – DFA – NFA –Equivalence of NFA and DFA – Conversion of NFA to DFA.		
UNIT – III	**Research Tools: NS2**: NS2 Preliminaries – Simulations of TCP/IP – Routing and Network dynamics – Random Early Discard – LAN – Mobile Networks – How to work with trace files? **MATLAB:** First steps in MATLAB – Typing into MATLAB – Matrices – Basic Graphics – Basic Data Analysis – M-Files – Data Files.		
UNIT – IV	**Introduction to Internet of Things**: Introduction – Logical Design of IoT -Physical Design of IoT– IoT Enabling Technologies – IoT& Deployment Templates. **Domain Specific IoTs:** Introduction – Home Automation – Cities – Environment – Energy – Retail – Logistics – Agriculture – Industry – Health & Lifestyle.		
UNIT – V	**Communication Skills:** Understanding Communication – greeting and introducing – making requests – asking for and giving permission – offering help – giving instruction and directions – art of small talk – participating in conversation – making a short formal speech – Describing the people, place, events, and things. Telephone Skills: understanding and handling calls, leaving message and making request -Video Conferencing		

Suggested Readings:

Arshdeep Bahga, Vijay Madisetti, *Internet of Things* – Universities Press (INDIA) Private Ltd., 2015.

Andrew Knight, *Basics of MATLAB and Beyond*, Chapman &b Hall/CRC

Harry Chambers, *Communication Skills for Scientific and Technical professional*, Perseus, 2011.

Kogan Page – 2000, *Improve your communication skills*.

 Curriculum Development, Theory & Practice, Harcourt Brace and World Inc., 1962

Lecture Notes 2003-2004, Sophia – Antipolis (NS2 Manual), *NS Simulator for Beginners*

Mishra K. L. P., N. Chandrasekaran, *Theory of Computer Science: Automata, Languages and Computation*, 2006

Outcomes	➢ Able to understand the basic concepts of Software
	➢ Learn about the theory of computation
	➢ Exposure to software network simulator and MATLAB
	➢ Understand the basics of Internet of Things
	➢ Able to improve the communication skills

Semester–II			
Course Code 552551	**Core Course – IV: Specialization Group 1** **A. WEB DATA MINING**	**Credits:4**	**Hours:5**
Objectives	- To understand the basics of web mining - To learn about the supervised and unsupervised algorithms - To describe the steps involved in information retrieval and web search - To learn the basics of link analysis and web crawling - To get exposure to opinion mining and web usage mining		
UNIT – I	**Introduction to Web Data Mining** - Data Mining Foundations, Introduction – World Wide Web (WWW), A Brief History of the Web and the Internet, Web Data Mining-Data Mining, Web Mining. Data Mining Foundations – Association Rules and Sequential Patterns – Basic Concepts of Association Rules, Apriori Algorithm-Frequent Itemset Generation, Association Rule Generation, Data Formats for Association Rule Mining, Mining with multiple minimum supports – Extended Model, Mining Algorithm, Rule Generation, Mining Class Association Rules, Basic Concepts of Sequential Patterns, Mining Sequential Patterns on GSP, Mining Sequential Patterns on PrefixSpan, Generating Rules from Sequential Patterns.		
UNIT – II	**Supervised and Unsupervised Learning** - Basic Concepts, Decision Tree Induction – Learning Algorithm, Impurity Function, Handling of Continuous Attributes, Classifier Evaluation, Rule Induction – Sequential Covering, Rule Learning, Classification Based on Associations, Naïve Bayesian Classification, Naïve Bayesian Text Classification – Probabilistic Framework, Naïve Bayesian Model . Unsupervised Learning – Basic Concepts, K-means Clustering – K-means Algorithm, Representation of Clusters, Hierarchical Clustering – Single link method, Complete link Method, Average link method, Strength and Weakness.		
UNIT – III	**Information Retrieval and Web Search** - Basic Concepts of Information Retrieval, Information Retrieval Methods – Boolean Model, Vector Space Model and Statistical Language Model, Relevance Feedback, Evaluation Measures, Text and Web Page Preprocessing – Stopword Removal, Stemming, Web Page Preprocessing, Duplicate Detection, Inverted Index and Its Compression – Inverted Index, Search using Inverted Index, Index Construction, Index Compression, Latent Semantic Indexing – Singular Value Decomposition, Query and Retrieval, Web Search, Meta Search, Web Spamming.		
UNIT – IV	**Link Analysis and Web Crawling** - Link Analysis – Social Network Analysis, Co-Citation and Bibliographic Coupling, Page Rank Algorithm, HITS Algorithm, Community Discovery-Problem Definition, Bipartite Core Communities, Maximum Flow Communities, Email Communities. Web Crawling – A Basic Crawler Algorithm- Breadth First Crawlers, Preferential Crawlers, Implementation Issues – Fetching, Parsing, Stopword Removal, Link Extraction, Spider Traps, Page Repository, Universal Crawlers, Focused Crawlers, Topical Crawlers, Crawler Ethics and Conflicts.		

UNIT – V	**Opinion Mining and Web Usage Mining** - Sentiment Classification – Classification based on Sentiment Phrases, Classification Using Text Classification Methods, Feature based Opinion Mining and Summarization – Problem Definition, Object feature extraction, Feature Extraction from Pros and Cons of Format 1, Feature Extraction from Reviews of Format 2 and 3, Comparative Sentence and Relation Mining, Opinion Search and Opinion Spam. Web Usage Mining – Data Collection and Preprocessing- Sources and Types of Data, Key Elements of Web usage Data Preprocessing, Data Modeling for Web Usage Mining, Discovery and Analysis of Web usage Patterns - Session and Visitor Analysis, Cluster Analysis and Visitor Segmentation, Association and Correlation Analysis, Analysis of Sequential and Navigation Patterns.

REFERENCES:

Anthony Scime, *Web Mining: Applications and Techniques*, 2005, Ide Group Publications, ISBN 1591404169

Bing Liu, *Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data*, 2nd Edition, 2011, Springer Publications, 2011, ISBN 978-3-642-19459-7

Jiawei Han, Micheline Kamber, *Data Mining: Concepts and Techniques*, Second Edition, 2011, Elsevier Publications, ISBN: 9789380931913, 9380931913

Soumen Chakrabarti, Morgan Kaufmann Series in Data Management Systems, *Mining the Web: Discovering Knowledge from Hypertext Data*, 1st Edition, 2022

OUTCOMES	➢ Understand the basics of web data mining
	➢ Able to perform web mining from data found in websites
	➢ Learn the phases involved in information retrieval
	➢ Able to perform Opinion mining based on user surfing sequence
	➢ Able to perform link analysis and Web Page Ranking

Semester–II			
Course Code 552552	**Core Course – IV: Specialization Group 1**	**Credits:4**	**Hours:5**
	B. TEXT MINING		
Objectives	- To introduce Text mining concepts - To impart working knowledge on SAS Crawler - To understand the ways to import textual data - To learn about the parsing and extracting text from web - To give better understanding of data transformation in text mining		
UNIT – I	**Introduction to Text Analytics** - Overview of Text Analytics - Text Mining Using SAS Text Miner - Information Retrieval - Document Classification - Ontology Management - Information Extraction – Clustering - Trend Analysis - Enhancing Predictive Models Using Exploratory Text Mining - Sentiment Analysis		
UNIT – II	**Information Extraction** Using SAS Crawler - Introduction to Information Extraction and organization - SAS Crawler - SAS Search and Indexing - SAS Information Retrieval Studio Interface - Web Crawler - Breadth First - Depth First - Web Crawling: Real-World Applications and Examples - Understanding Core Component Servers - Proxy Server - Pipeline Server - Component Servers of SAS Search and Indexing - Indexing Server - Query Server - Query Web Server - Query Statistics Server - SAS Markup Matcher Server		
UNIT – III	**Importing Textual Data** into SAS Text Miner - Data Types, Roles, and Levels in SAS Text Miner - Creating a Data Source in SAS Enterprise Miner - Importing Textual Data into SAS - Importing Data into SAS Text Miner Using the Text Import Node - %TMFILTER Macro - Importing XLS and XML Files into SAS Text Miner - Managing Text Using SAS Character Functions		
UNIT – IV	**Parsing and Extracting** – Introduction - Tokens and Words – Lemmatization - POS Tags - Parsing Tree - Text Parsing Node in SAS Text Miner - Stemming and Synonyms - Identifying Parts of Speech - Using Start and Stop Lists - SpellChecking – Entities - Building Custom Entities Using SAS Contextual Extraction Studio		
UNIT – V	**Data Transformation** - Zipf's Law - Term-By-Document Matrix - Text Filter Node - Frequency Weightings - Term Weightings - Filtering Documents - Concept Links - Clustering and Topic Extraction - Singular Value Decomposition and Latent Semantic Indexing - Topic Extraction – Scoring - Content Management - Content Categorization - Types of Taxonomy - Statistical Categorizer - Rule-Based - Categorizer - Comparison of Statistical versus Rule-Based Categorizers - Determining Category Membership - Concept Extraction - Contextual Extraction - CLASSIFIER Definition - SEQUENCE and PREDICATE_RULE Definitions - Automatic Generation of Categorization Rules Using SAS Text Miner - Differences between Text Clustering and Content Categorization		

Suggested Readings:

ChengXiang Zhai (Author), Sean Massung (Author), *Text Data Management and Analysis:A Practical Introduction to Information Retrieval and Text Mining*, ACM Books, 2016, ISBN 197000116X, ISBN-13 : 978-1970001167

Dr. Goutam Chakraborty, Murali Pagolu, Satish Garla, *Text Mining and Analysis*, SAS Institute, 2014. ISBN: 9781612907871

Michael W. Berry (Editor), Jacob Kogan (Editor), *Text Mining: Applications and Theory*, Wiley, 2010, ISBN: 978-0-470-74982-1

Outcomes	➢ Able to understand the basics of text analytics
	➢ Able to perform Text Mining and Analysis
	➢ Able to perform concept extraction from textual data
	➢ Able to perform Clustering and categorization of text data

Semester–II			
Course Code **552553**	**Core Course – IV: Specialization Group 2** **A. NATURAL LANGUAGE PROCESSING**	**Credits 4**	**Hours:5**
Objectives	• To learn the fundamentals of natural language processing • To understand the word level analysis • To understand the use of CFG and PCFG in NLP • To understand the role of semantics of sentences and pragmatics • To apply the NLP techniques to IR applications		
UNIT – I	**Introduction:** Origins and challenges of NLP – Language Modeling: Grammar-based LM, Statistical LM - Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance		
UNIT – II	**Word Level Analysis:** Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.		
UNIT – III	**Syntactic Analysis:** Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing – Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs – Feature structures, Unification of feature structures.		
UNIT – IV	**SEMANTICS AND PRAGMATICS:** Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, sectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.		
UNIT – V	**DISCOURSE ANALYSIS AND LEXICAL RESOURCES:** Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Coreference Resolution – Resources: Porter Stemmer, Lemmatizer, Penn Treebank, Brill's Tagger, WordNet, PropBank, FrameNet, Brown Corpus, British National Corpus (BNC).		

Suggested Readings:

Breck Baldwin, *Language Processing with Java and LingPipe Cookbook*, Atlantic Publisher, 2015.

Daniel Jurafsky, James H. Martin, *Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech*, Pearson Publication, 2014.

Nitin Indurkhya and Fred J. Damerau, *Handbook of Natural Language Processing*, Second Edition, Chapman and Hall/CRC Press, 2010.

Richard M Reese, *Natural Language Processing with Java*, OReilly Media, 2015.

Steven Bird, Ewan Klein and Edward Loper, *Natural Language Processing with Python*, First Edition, OReilly Media, 2009

Tanveer Siddiqui, U.S. Tiwary, *Natural Language Processing and Information Retrieval*, Oxford University Press, 2008.

Outcomes	➢ Able to tag a given text with basic Language features
	➢ Design an innovative application using NLP components
	➢ Implement a rule-based system to tackle morphology/syntax of a language
	➢ Design a tag set to be used for statistical processing for real-time applications
	➢ Compare and contrast the use of different statistical approaches for differenttypes of NLP applications

Semester–II			
Course Code 552554	**Core Course – IV: Specialization Group 2** **B. SEMANTIC WEB AND ONTOLOGY**	**Credits 4**	**Hours 5**
Objectives	- To learn advanced and cutting-edge state-of-the-art knowledge and implementation in semantic web. - To learn the way of describing web resources using RDF. - To understand about how to query the semantic web using SPARQL fromRDF - To gain insights about the Web ontology languages - To understand about inferring relationships, reasoning as well as modeling practices of semantic web.		
UNIT – I	Semantic Web technologies – Layered approach – Semantic Modeling – Modelingfor Human Communication – Explanation and Prediction – Mediating Variability – Expressivity in Modelling		
UNIT – II	Describing Web resources – RDF – The Basics of the Semantic Web – RDF and Tabular data – Semantic Web Application Architecture – RDF Parser / Serializer – RDF store – Application Code – Data Federation – Linked Data		
UNIT – III	Querying the Semantic Web – SPARQL – RDF as a Tell and Ask system – SPARQL – Query Language for RDF – CONSTRUCT queries – Results – SPARQL Rules – Advanced features of SPARQL – RDF Schema – RDFS -Plus.		
UNIT – IV	Web Ontology Language – Requirements – The OWL Language – Logic and Inferences: Rules – Syntax – Semantics – Rule Interchange Format (RIF) – Semantic Web Rules Language (SWRL) – Rule Markup Language (RuleML)		
UNIT – V	Counting and Sets in OWL – Unions and Intersections – Cardinality – Disjoint Sets – Unsatisfiable classes – Inferring Class Relationships – Reasoning with Individuals and with Classes – Ontologies on the Web – Good and bad modelling practices		

Suggested Readings:

Allemang, D., & Hendler, J. (2011). *Semantic web for the working ontologist: effective modeling in RDFS and OWL*. Elsevier.

Antoniou, G., & Van Harmelen, F. (2012). *A semantic web primer*. MIT press.

Fisher, M., Blace, R., Hebeler, J., & Perez-Lopez, A. (2011). *Semantic web programming*. John Wiley & Sons.

Segaran, T., Evans, C., & Taylor, J. (2009). *Programming the semantic web: build flexible applications with graph data*. O'Reilly Media, Inc.

Yu, L. (2011). *A developer's guide to the semantic Web*. Springer Science & Business Media.

Outcomes	- Able to gain knowledge about advanced and cutting-edge state-of-the-art knowledge and implementation in semantic web. - Able to describe web resources using RDF. - Able to query the semantic web using SPARQL from RDF - Get exposure to Web ontology languages - Able to infer relationships, make reasoning as well as modeling practices of semantic web

Semester–II			
Course Code **552555**	**Core Course – IV: Specialization Group 3**	**Credits 4**	**Hours 5**
	A. BIO INSPIRED COMPUTING		
Objectives	• To gain insights into Nature Computing • To learn methods to solve problems by biological concepts • To study searching methods with a model of Swam intelligence • To understand the concepts of Immuno Computing • To learn and implement new natural materials based computing		
UNIT – I	**Introduction-** Nature to Nature Computing, Philosophy, Three Branches of Computing: A Brief Overview, Individuals, Entities and agents - Parallelism and Distributivity Interactivity, Adaptation Feedback - Self-Organization-Complexity, Emergence and Bottom-up Vs Top-Down- Determination, Chaos and Fractals.		
UNIT – II	**Computing inspired by nature-** Evolutionary Computing, Hill Climbing and Simulated Annealing, Darwin's Dangerous Idea, Genetics Principles, Standard Evolutionary Algorithm -Genetic Algorithms, Reproduction-Crossover, Mutation, Evolutionary Programming, Genetic Programming.		
UNIT – III	**Swarm intelligence-** Introduction - Ant Colonies, Ant Foraging Behavior, Ant Colony Optimization, SACO and scope of ACO algorithms, Ant Colony Algorithm (ACA), Swarm Robotics, Foraging for food, Social Adaptation of Knowledge, Particle Swarm Optimization (PSO)		
UNIT – IV	**Immuno computing-** Introduction- Immune System, Physiology and main components, Pattern Recognition and Binding, Immune Network Theory- Danger Theory, Evaluation Interaction Immune Algorithms, Introduction – Genetic algorithms, Bone Marrow Models, Forest's Algorithm, Artificial Immune Networks		
UNIT – V	**Computing with new natural materials-** DNA Computing: Motivation, DNA Molecule, Adleman's experiment, Test tube programming language, Universal DNA Computers, PAM Model, Splicing Systems, Lipton's Solution to SAT Problem, Scope of DNA Computing , Classical to DNA Computing.		

Suggested Readings

Floreano D. and Mattiussi C. (2008). *Bio-Inspired Artificial Intelligence: Theories, Methods and Technologies*. MIT Press, Cambridge, MA.

Leandro Nunes de Castro. (2007). *Fundamentals of Natural Computing, Basic Concepts, Algorithms and Applications.* Chapman & Hall/ CRC, Taylor and Francis Group.

Marco Dorrigo, Thomas Stutzle, *Ant Colony Optimization*, PHI,2005

Sam Jones. (2015). *Bio-Inspired Computing, Recent Innovations and Applications*. Publisher: CLANRYE INTERNATIONAL

Tao Song, Pan Zheng, Mou Ling Dennis, Wong and Xun Wang. (2019). *Bio-Inspired, Computing Models and Algorithms*.

Outcomes	➢ Gain insights into Nature Computing ➢ Have a good biological knowledge to solve problems ➢ Utilize searching methods with a model of Swam intelligence ➢ Understand the concepts of Immuno Computing ➢ Implement new natural materials based computing

Semester–II			
Course Code 552556	**Core Course – IV: Specialization Group 3** **B. SOFT COMPUTING**	**Credits:4**	**Hours:5**
Objectives	• To study and understand soft computing concepts • To apply fuzzy logic and genetic algorithm for solving real world problems • To understand the applicability of rough sets and Artificial Neural Networks • To learn about identifying patterns and implement search techniques • To describe the applications of soft computing		
UNIT – I	**Introduction** – Neural Networks – Scope of Neural Networks – Fuzzy Logic - Genetic Algorithm – Soft Computing; Artificial Neural Network: Fundamental Concept – Models of Artificial Neural Network (ANN). **Supervised Learning Neural Network:** Introduction – Perception Networks – Adaptive Networks – Back-Propagation Network – **Unsupervised Learning Networks:** Introduction – Kohonen Self-Organizing Feature Maps – Counter propagation Networks.		
UNIT – II	**Fuzzy Logic and GA:** Fuzzy Sets – Fuzzy Relation – Membership Functions – Defuzzification - Fuzzy Arithmetic – Fuzzy Measures – Fuzzy Rule Base Reasoning - Fuzzy Expert System – Fuzzy Decision making – Fuzzy Control Systems - Genetic Algorithm**:** Basic operators and Terminologies in GAs – General Genetic Algorithm – Working of Genetic Programming – Applications of GA.		
UNIT – III	**Rough Sets and ANN:** Information Systems – Decision Systems – Set Approximations – Properties of Rough Sets – Rough Membership – Reducts – ANN: Biological Neuron – Artificial Neuron – Characteristic of Bain – Computation in terms of Patterns – Perceptron – Neural Network Architecture –Activation Functions – Learning by Neural Net – Machine Learning Techniques.		
UNIT – IV	**Pattern Associators and Search:** Auto-associative Nets – Hetro-associative Nets – Hopfield Networks – Competitive Neural Nets - The MaxNet – Learning Vector Quantization – Elementary Search Techniques: Breadth First Search – Depth First Search – Best First Search – Hill Climbing - Hybrid Systems**:** Neuro Genetic Systems – Fuzzy Neural Systems.		
UNIT – V	**Applications of Soft Computing:** Image Fusion – Neural Network Classification – Optimization of Travelling Salesperson Problem using GA – GA based Internet Search Techniques – GA-Fuzzy Hierarchical Behavior Control - Representation of Genomes – GA to Quadratic Equation Solving – Fuzzy Logic Implementation to primitive operations of Classical Sets		

Suggested Readings:

Neuro-Fuzzy and Soft Computing, *A Computational Approach to Learning and Machine Intelligence*. PHI Learning Pvt. Ltd., New Delhi.

Rajasekaran S., GA.Vijayalakshmi Pai.(2011). *Neural Networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications*. PHI Learning Pvt. Ltd., New Delhi.

Sivanandam S.N., S.N.Deepa. (2014). *Principles of Soft Computing*. Wiley India Private Ltd. New Delhi.

Simon Haykin. (2013). *Neural Networks and Learning Machines*. PHI Learning Pvt. Ltd.,New Delhi. (Eastern Economy Third Edition)

Saroj Kaushik and Sunita Tiwari, McGraw Hill. (2018). *Soft Computing Fundamentals*, Techniques and Applications.

Udit Chakraborty, Samir Roy. (2013). *Soft Computing*. Pearson India.

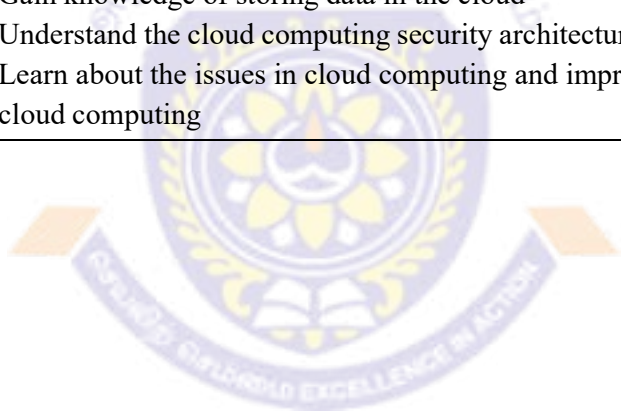| Outcomes	➢ Able to gain knowledge to solve Soft Computing Problems
	➢ Able to apply Fuzzy principles in uncertainty problems and GA in Search,Optimization problem
	➢ Understand the concepts of rough sets and ANN
	➢ Learn about pattern identification and search techniques
	➢ Gain insights into Nature Computing

	Semester–II		
Course Code 552557	**Core Course – IV: Specialization Group 4** **A. ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**	**Credits: 4**	**Hours :5**
Objectives	• To understand the basic concepts of Artificial Intelligence • To learn about knowledge representation to solve problems using AI • To study the basics about Machine Learning • To gain insights about statistical learning methods • To get introduce to inductive logic programming		
UNIT – I	Artificial Intelligence: Meaning and definition of artificial intelligence, Physical Symbol System Hypothesis, production systems, Characteristics of production systems; Breadth first search and depth first search techniques. Heuristic search Techniques: Hill Climbing, Iterative deepening DFS, bidirectional search. Analysis of search methods. A* algorithm, and their analysis. Introduction to Genetic Algorithms.		
UNIT – II	Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, logical consequences, syntax and semantics of an expression, semantic Tableau. Forward and backward reasoning. Proof methods, substitution and unification, conversion to clausal form, normal forms, resolution, refutation, deduction, theorem proving, in refencing, monotonic and non-monotonic reasoning. Introduction to Prolog.		
UNIT – III	Machine Learning: Preliminaries, what is machine learning; varieties of machine learning, learning input/output functions, bia, sample application. Boolean functions and their classes, CNF, DNF, decision lists. Version spaces for learning, version graphs, learning search of a version space, candidate elimination methods		
UNIT – IV	Statistical Learning, background, and general method, learning belief networks, nearest neighbor. Decision-trees, supervised learning of univariance decision trees, network equivalent of decision trees, over fitting and evaluation.		
UNIT – V	Inductive Logic Programming, notation, and definitions, introducing recursive programs, inductive logic programming vs decision tree induction.		
Suggested Readings: Andreas, C. Muller & Sarah Guido, *Introduction to Machine Learning with Python A guide for data scientists*, O'Reilly Dan W.Patterson, *Introduction to AI & Expert System*, PHI. Elaine Rich, Kevin Knight, *Artificial Intelligence*, Mc-GrawHill. Judith Hurwitz and Daniel Kirsch, *Machine learning for dummies*, IBM Limited ed Judith Hurwitz and Daniel Kirsch, *Machine learning for dummies*, IBM Limited ed Luger, *Artificial Intelligence,* Pearson Education Nils J. Nilsson, *Introduction to Machine learning* Russel & Norvig, *Artificial Intelligence: A Modern Approach*, Pearson Education			
Outcomes	➢ Students have good knowledge about AI and ML ➢ Able to represent knowledge for solving intelligent computing problems ➢ Able to understand statistical learning methods ➢ Able to implement inductive logic programming ➢ Able to apply AI concepts and ML concepts to solve real world problems		

	Semester–II		
Course Code 552558	**Core Course – IV: Specialization Group 4** **B. INDUSTRY 4.0**	**Credits:4**	**Hours:5**
Objectives	• To introduce next generation technologies to the students • To understand the basic concepts of Industry 4.0 • To give better understanding to manage and optimize all aspects of manufacturing processes and supply chain • To know the future professions in Industry • To gain insights about future professions in medicine and R&D		
UNIT – I	The Fourth Industrial Revolution - Historical Context - Profound and Systemic Change Drivers – Megatrends - Physical – Digital – Biological – Tipping points		
UNIT – II	Impact – Economy – Growth – Employment - The Nature of Work - Business - Consumer Expectations - Data-Enhanced Products - Collaborative Innovation - New Operating Models		
UNIT – III	National and Global – Governments - Countries, Regions and Cities - International Security – Society - Inequality and the Middle Class – Community - The Individual - Identity, Morality and Ethics - Human Connection - Managing Public and Private Information		
UNIT – IV	Overview of Future Professions in Industry - Outlines of the Context for Industry 4.0 - Future Professions in Industry - Map of Competences for Representatives of Future Professions in Industry -Future Professions in Agriculture - Future Outlines of Agriculture in the Agro-Industrial Complex 4.0 - Future Professions in Agriculture - Map of Competences for Representatives of Future Professions in Agriculture		
UNIT – V	Future Professions in Medicine - Future Outlines of Medicine at the Threshold of a Genetic Revolution - Future Professions in Medicine - Map of Competences for Representatives of Future Professions in Medicine - The Key Future Professions in R&D - The Future Outline of the R&D Sector in the Context of the Formation of the Innovation Economy - Future Professions in R&D - The Map of Competences for Representatives of Future Professions in R&D		

Suggested Radings:

Bruno S. Sergi, Elena G. Popkova, Aleksei V. Bogoviz, Tatiana N. Litvinova Volgograd,
  Understanding Industry 4.0: AI, the Internet of Things, and the future of work, Emerald
  Publishing Limited Howard House, Wagon Lane, Bingley BD16 1WA, UK First edition
  2019

Klaus Schwab, *The Fourth Industrial Revolution*, World Economic Forum, 2016.ISBN-13:
  978-1-944835-01-9 ISBN-10: 1944835016

Alasdair Gilchrist, *Industry 4.0: The Industrial Internet of Things*, Released June 2016
        Publisher(s): Apress, ISBN: 9781484220474

| **Outcomes** | ➢ Get introduced to the next generation technologies
 ➢ Able to know the Industry 4.0 technologies
 ➢ Able to know the advantages and benefits of applying Industry 4.0 techniques in various application domains
 ➢ Understand to manage and optimize all aspects of manufacturing processes and supply chain
 ➢ Gain insights about future professions in medicine and R&D |

Semester–II			
Course Code **552559**	**Core Course – IV: Specialization Group 5** **A. EDGE AND FOG COMPUTING**	**Credits:4**	**Hours:5**
Objectives	• To understand the principles, architectures of fog and edge computing • To understand the communication and management of fogs • To design and Implement Internet of Everything (IoE) applications through fog and edge computing architecture • To learn about optimization of Fog computing • To learn about the need for Fog and Edge computing middleware		
UNIT – I	Introduction-Relevant Technologies-Fog and Edge Computing Completing the Cloud-Hierarchy of Fog and Edge Computing-Business Models-Opportunities and Challenges		
UNIT – II	Introduction-Methodology-Integrated C2F2T Literature by Modeling Technique-Integrated C2F2T Literature by Use-Case Scenarios-Integrated C2F2T Literature by Metrics-Future Research Directions		
UNIT – III	Introduction-Background-Network Slicing-Network Slicing in Software-Defined Clouds-Network Slicing Management in Edge and Fog- Internet of Vehicles: Architecture, Protocol and Security-Seven layered model architecture for Internet of Vehicles- IoV: Network Models, Challenges and future aspects		
UNIT – IV	Preliminaries-The Case for Optimization in Fog Computing-Formal Modelling Framework for Fog Computing-Metrics-Further Quality Attributes-Optimization Opportunities along the Fog Architecture-Optimization Opportunities along the Service Life Cycle-Toward a Taxonomy of Optimization Problems in Fog Computing		
UNIT – V	Need for Fog and Edge Computing Middleware-Design Goals-State-of-the-Art Middleware Infrastructures-System Model-Proposed Architecture-Case Study Example. Lightweight container middleware for Edge Cloud Architecture – Background – Clusters for lightweight Edge Clouds – Architecture Management – IoT Integration – Security Management – Future Research Directions.		

Suggested Readings:

Bahga, A., & Madisetti, V. (2013). *Cloud computing: A hands-on approach*. Create Space Independent Publishing Platform.

Buyya, R., & Srirama, S. N. (Eds.). (2019). *Fog and edge computing: principles and paradigms*. John Wiley & Sons.

Mutumba Bilay, J., Gutsche, P., Krimmel, M., & Stiehl, V. (2020). SAP cloud platform integration.

Missbach, M., Staerk, T., Gardiner, C., McCloud, J., Madl, R., Tempes, M., & Anderson, G. (2016). *SAP on the Cloud* 1st edition. Heidelberg: Springer.

Vermesan, O., & Friess, P. (Eds.). (2014). *Internet of things-from research and innovation to market deployment* (Vol. 29). Aalborg: River publishers.

Outcomes	➢ The student will understand the principles, architectures of fog and edge computing ➢ Gain knowledge about the communication and management of fogs ➢ Able to design and Implement Internet of Everything (IoE) applications through fog and edge computing architecture ➢ Able to optimize fog architecture ➢ Understand the need for Fog and Edge computing middleware

Semester–II			
Course Code 552560	**Core Course – IV: Specialization Group 5** **B. ADVANCED CLOUD COMPUTING**	**Credits:4**	**Hours:5**
Objectives	- To understand the basics of cloud computing - To learn about the cloud technologies and virtualization - To gain knowledge of storing data in the cloud - To understand the cloud computing security architecture - To learn about the issues in cloud computing and improve quality of service in cloud computing		
UNIT – I	Introduction to Cloud Computing, Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits, and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS Cloud computing platforms: Infrastructure as service: Amazon EC2, Platform as Service: Amazon Beanstalk, Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing.		
UNIT – II	Introduction to Cloud Technologies, Study of Hypervisors Compare SOAP and REST Webservices, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization Multitenant software: Multi- entity support, Multi-schema approach, Multitenance using cloud data stores, Data access control for enterprise applications. Advanced Virtualization: Introduction to VSphere and the software – Defined Data Center creating virtual machines – VCenter Server – Configuring and managing – Virtual Networks Configuring and Managing Virtual storage – Virtual machine management – Resource management and monitoring		
UNIT – III	Data in the cloud: Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. Map-Reduce and extensions: Parallel computing, The Map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Mapreduce, Features and comparisons among GFS, HDFS etc, Map-Reduce model		
UNIT – IV	Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud, Cloud computing security architecture: Architectural Considerations – General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; Identity Management and Access control Identity management, Access control, Autonomic Security Cloud computing security challenges: Virtualization security management virtual threats, VM Security Recommendations, VM-Specific Security techniques, Secure Execution Environments and Communications in cloud.		
UNIT – V	Issues in cloud computing, implementing real time application over cloud platform Issues in Intercloud environments, QOS Issues in Cloud, Dependability, data migration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud computing environment. Cloud Middleware. Mobile Cloud Computing. Inter Cloud issues. A grid of clouds, Sky computing, load balancing, resource optimization, resource dynamic reconfiguration, Monitoring in Cloud. Cloud		

	computing platforms, Installing cloud platforms and performance evaluation Features and functions of cloud platforms: Xen Cloud Platform, Eucalyptus, OpenNebula, Nimbus, TPlatform, Apache Virtual Computing Lab (VCL), Enomaly Elastic Computing Platform.
Suggested Readings: Antohy T Velte, et.al *Cloud Computing: A Practical Approach*, McGraw Hill, 2009 Barrie Sosinsky, *Cloud Computing Bible,* Wiley India, 2011. Gautam Shroff, *Enterprise Cloud Computing*, Cambridge, 2010. Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper, *Cloud Computing for Dummies* (Wiley India Edition), 2009. Nick Marshall, Mike Brown, G. Blair Fritz, Ryan Johnson, *Mastering VMware vSphere 6.7,* Oct 2018. Ronald Krutz and Russell Dean Vines, *Cloud Security,* Wiley – India, 2010. Scott Granneman, *Google Apps,* Pearson, 2006. Tim Malhar, S.Kumaraswamy, S.Latif *Cloud Security & Privacy* (SPD, O'REILLY), 2009 Stefano Ferretti et.al., *QoS–aware Clouds*, IEEE 3rd International Conference on Cloud Computing, 2010.	
Outcomes	➢ Understand the basics of cloud computing ➢ Learn about the cloud technologies and virtualization ➢ Gain knowledge of storing data in the cloud ➢ Understand the cloud computing security architecture ➢ Learn about the issues in cloud computing and improve quality of service in cloud computing

The panel of Members-Broad Based Board of Studies

Chairperson: **Dr. T. MEYYAPPAN** Professor & Head i/c, Department of Computer Science Alagappa University, Karaikudi Teaching Experience: 31 years Research Experience: 16 years Area of Research: Big Data Analytics, Image Processing and Networks	
Foreign Expert: **Dr. ABDUL RAHAMAN WAHAB SAIT** King Faisal University, Saudi Arabia Teaching Experience: 19 years Research Experience: 10 years Area of Research: Web Mining, Big Data Analytics, Machine Learning	
Indian Expert: **Dr. P. KALAVATHY** Professor, Department of Computer Science & Applications Gandhigram Rural Institute, Gandhigram Teaching Experience: 21 years Research Experience: 16 years Area of Research: Data Mining, Digital Image Processing	
Indian Expert: **Dr. M. BALAMURUGAN** Professor, Department of Computer Science Bharathidasan University, Trichy Teaching Experience: 28 years Research Experience: 16 years Area of Research: Big Data Analytics, Computational Intelligence, Digital Image Processing	
Industry Expert: **Dr. R. GOKULAKRISHNAN** Joint Director, Software Technology Parks of India Ministry of Communication and IT Government of India, Chennai Teaching Experience: 7 years Industrial Experience: 14 Years Area of Research : Information Security, Historical Data Analysis and Nature based Algorithms	
Members: **1. Dr. A. PADMAPRIYA** Professor, Department of Computer Science, Alagappa University, Karaikudi Teaching Experience: 19 years Research Experience: 15 years Area of Research: Data Mining, Big Data Analytics, Information and Network Security, Communication Networks	
2. Dr. S. SANTHOSH KUMAR Assistant Professor, Department of Computer Science, Alagappa University, Karaikudi Teaching Experience: 19 years Research Experience: 14 years Area of Research: Data Mining, Machine Learning, Health Care Analytics, IoT	
Alumnus/Alumna: **Dr. P. GEETHA** Current Position : Associate Professor Type of Profession : Teaching Dr. Umayal Ramanathsn College for Women, Karaikudi Teaching Experience: 16 years Research Experience: 10 years Area of Research: Data Mining, Big Data Analytics	

Ex-Officio Member:
Dr. V. SIVAKUMAR
The Director
Curriculum Design & Development Cell,
Alagappa University, Karaikudi

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Educational qualification:

- B.Sc. Physics, April 1986
- M.Sc [Computer Applications], April 1988
- M.Phil Computer Science, June 2001
- M.B.A., May 2002
- Ph.D. Computer Science and Engineering, January 2011
- M.Tech. Computer Technology, April 2013

Professional experience:

- Lecturer, Department of Computer Applications, 8 years (1990-1998)
- Senior Scale Lecturer, 5 years (1998-2003)
- Selection Grade Lecturer, 3 years (2003-2006)
- Association Professor, 5 years (2006-2011)
- Professor, 11 years (Janurary 2011 onwards)
- Head i/c, (June 2022 to till date)

Honours and Awards:

- Best Citizens of India 2012 Award from International Publishing House New Delhi,2012
- 25 Years of unblemished service award, Alagappa University, 2015
- National Distinguished Researcher Award 2021 from International Multi Disciplinary Research Foundation, Vijayawada, 2021

Recent publications:

1. M. Karolin and T. Meyyappan, July 2021, "Authentic Secret Share Creation Techniques using Visual Cryptography with Public Key Encryption", Multimedia Tools and Applications, https://doi.org/10.1007/s11042-021-11202-6 SCIE, (IF: 2.101)
2. S. Suganya and T. Meyyappan, January 2020, "Performance Analysis of Kmeans and Kmediods Algorithm in Air Pollution Prediction", International Journal of Recent Technology and Engineering (IJRTE), DOI: 10.35940/ijrte.E6495.018520, (IF: 1.0)
3. B. Karthick and T. Meyyappan, 2020, "A Survey on the Role of Big Data Analytics in Business Decision Making", Journal of Design Engineering, Toronto, CANADA, ISSN:001-9342 Issue 8, pp. 9792-9798 SJR 0.101 (2020), SCOPUS
4. M. Karolin and T. Meyyappan, December 2019, "Image Encryption and Decryption using RSA algorithm with Share creation Techniques", IJEAT, ISSN: 2249-8958,Volume-9,Issue-2, (IF: 1.0).

5. RM. Vallikannu and T. Meyyappan, November 2019, "Prediction of Individual's Character in Social Media", International Journal of Mobile Network and Applications , Issue : 24, pp.1763– 1777, https://link.springer.com/article/10.1007/s11036-019-01388-3, SCIE 2.602

6. RM. Vallikannu, T. Meyyappan and SM. Thamarai, November 2019, "Predicting Tamil Movies Sentimental Reviews Using Tamil Tweets", International Journal of Computer Science, Science Publishers, USA, ISSN: 1552-6607(Online), 1549-3636(Print), pp. Volume 15, Issue 11, pp. 1638-1647, DOI: 10.3844/JCSSP.2019.1638.1647, SJR 0.17 (2019)

7. M. Veni and T. Meyyappan, October 2019, "Digital image watermark embedding and extraction using oppositional fruit fly algorithm", International Journal of Multimedia Tools and Applications (Springer), Volume 78, Issue 19, pp. 27491-27510 https://link.springer.com/article/10.1007/s11042-019-7650-0, SCIE 2.101

8. S. Suganya and T. Meyyappan, July 2019, "Forecasting and Prediction of air Pollution levels to Protect Human beings from health Hazard", International Journal of Scientific & TechnologyResearch(IJSTR),IJSTR©2020,www.ijstr.org, (IF: 4.29)

9. R. Mahesh and T. Meyyappan, June 2019, " Fuzzy based cell generalization to improve the data utility with minimal loss of information", International Journal of Intelligent and Fuzzy systems IOS Press Netherlands, Volume 37 (2019), pp. 217-225, DOI: 10.3233/JIFS-179079, SCIE, (IF: 1.637)

10. K. Lakshmi and T. Meyyappan, February 2019, "Compact in-memory representation of large graph databases for efficient mining of maximal frequent sub graphs", Concurrency Computat Pract Exper. 2019;e5243. Wiley, onlinelibrary.com/journal/cpe © 2019 John Wiley & Sons, Ltd. https://doi.org/10.1002/cpe.5243, SCI 1.536

11. Abdul Rahaman Wahab Sait, M.Arunadevi and T. Meyyappan, 2019, "A Survey on Techniques to Detect Malicious Activites on Web", International Journal of Advanced Computer Science and Applications(IJACSA), Vol. 10, No. 2, 2019 ISSN 21565570, 2158107X, Doi: 10.14569/IJACSA.2019.0100226, SCOPUS, ELSEVIER, SJR 0.193, (IF: 0.82)

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h- index: **14**

i10- index: **16**

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	Saudi Arabia	
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Email	: asait@kfu.edu.sa, rahamaan@gmail.com	

Educational qualification:

- Doctor of Philosophy (Computer Science) – Web Mining – Alagappa University- April – 2017.
- Master of Philosophy. (Computer Science), successfully completed in Periyar University, India, January 2007.
- Master of Science (Information Technology), successfully completed in Shanmuga Arts & Science College, University of Madras, India, April 2003.
- Bachelor of Science, successfully completed in Government Arts & Science College, University of Madras, India, April 2001.

Professional experience:

- 2 Years of experience in Vijay infotech, Pondicherry as a faculty from 2.11.2003 to 28.08.2005.
- 10 Months of experience in Kamalakshi Pandurangan College of pharmacy, Tiruvannamalai as a Lecturer – System Administrator from 14.10.2005 to 31.07.2006.
- 1 ½ Years of experience in S.R.G.D.S. Matric. Hr.Sec.School, Tiruvannamalai as a Computer Instructor from 4.9.2006 to 13.3.2008.
- 2 Years of experience in Sambhram Academy of Management studies, Bangalore as a Lecturer from 2.7.2008 to 09. 07.2010.
- 8 Year of experience as an Lecturer in College of Computing, Shaqra University, Kingdom of Saudi Arabia from 4.12.2010 to 3.09.2018
- Currently working as an Asst. Professor in Center of documents, archives, and Communication, King Faisal University, Kingdom of Saudi Arabia from 15.09.2018

Honours and Awards:

- Received best teacher awards for two consecutive years (2016 and 2017) from the Dean of college science and humanities, Shaqra University, Kingdom of Saudi Arabia

Recent publications:

1. K. Dutta, T. Meyyappan, B. Qureshi, M. Alsanea, A. W. Abulfaraj,Manal M. Al Faraj, Abdul Rahaman Wahab Sait, "Optimal deep belief network enabled cybersecurity phishing email classification," Computer Systems Science and Engineering, vol. 44, no.3, pp. 2701–2713, 2023.
2. A. R. W. Sait and M. K. Ishak, "Deep learning with natural language processing enabled sentimental analysis on sarcasm classification," Computer Systems Science and Engineering, vol. 44, no.3, pp. 2553–2567, 2023.
3. A. K. Dutta, M. M. Alqahtani, Y. Albagory, A. R. Wahab Sait and M. Alsanea, "Optimal machine learning enabled performance monitoring for learning management systems," Computer Systems Science and Engineering, vol. 44, no.3, pp. 2277–2292, 2023.
4. A. K. Dutta, N. M. A. Zakari, Y. Albagory and A. R. Wahab Sait, "Colliding bodies optimization with machine learning based parkinson's disease diagnosis," Computer Systems Science and Engineering, vol. 44, no.3, pp. 2195–2207, 2023.

5. A. R. Wahab Sait and M. K. Ishak, "A novel handcrafted with deep features based brain tumor diagnosis model," Intelligent Automation & Soft Computing, vol. 35, no.2, pp. 2057–2070, 2023.
6. A. K. Dutta, Y. Albagory, M. Alsanea, H. I. Almohammed and A. R. Wahab Sait, "Ensemble deep learning with chimp optimization based medical data classification," Intelligent Automation & Soft Computing, vol. 35, no.2, pp. 1643–1655, 2023.
7. A. Kumar Dutta, Y. Albagory, A. Rahaman Wahab Sait and I. Mohamed Keshta, "Autonomous unmanned aerial vehicles based decision support system for weed management," Computers, Materials & Continua, vol. 73, no.1, pp. 899–915, 2022.
8. Alothman, Abdulaziz Fahad, and Abdul Rahaman Wahab Sait. "Managing and Retrieving Bilingual Documents Using Artificial Intelligence-Based Ontological Framework." Computational intelligence and neuroscience 2022 (2022).
9. AlOthman, Abdulaziz Fahad, Abdul Rahaman Wahab Sait, and Thamer Abdullah Alhussain. "Detecting Coronary Artery Disease from Computed Tomography Images Using a Deep Learning Technique." Diagnostics 12, no. 9 (2022): 2073

Cumulative Impact factor: **65.28**

Total Citation: **272**

h- index: **5**

i10- index: **3**

CURRICULUM VITAE

Name	: **Dr. P. KALAVATHI**	
Designation	: Professor	
Address	: Department of Computer Science and Applications The Gandhigram Rural Institute (Deemed to be University) Gandhigram - 624302	
Phone	: 9445898371 / 9025616044	
Email	: pkalavathi.gri@gmail.com	

Educational qualification:

- Ph. D. Computer Science and Applications, The Gandhigram Rural Institute (Deemed to be University)
- M. Phil., Computer Science, Bharathidasan University
- M. C. A., The Gandhigram Rural Institute (Deemed to be University)
- B. C. A., Mother Teresa Women's University

Professional experience:

- Teaching Experience – 21 Years

Designation	Department	Period	
		From	**To**
Professor	Department of Computer Science and Applications, The Gandhigram Rural Institute (Deemed to be University) Gandhigram	04.12.2017	Till date
Associate Professor	--do--	04.12.2015	03.12.2017
Assistant Professor (Stage-3)	--do--	04.12.2011	03.12.2015
Assistant Professor (Stage-2)	--do--	04.12.2006	03.12.2011
Assistant Professor (Stage-1)	--do--	01.01.2006	03.12.2006
Lecturer	. –do--	04.12.2001	31.12.2005
Lecturer	Department of Computer Science, Nehru Memorial College, Puthanampatti, Trichy	07.06.2001	03.12.2001

Honours and Awards:

- University 2nd Rank Holder in M.C.A during 1998-2001.

- Gold Medalist for Securing University 1st Rank in BCA during 1995-1998

Recent publications:

1. S. Boopathiraja, P. Kalavathi, S. Deoghare, V. B. Surya Prasath, Near Lossless Compression for 3D Radiological Images using Optimal Multilinear Singular Value Decomposition (OMLSVD), Journal of Digital Imaging, 2022, (In Press), Indexed in WOS. Impact Factor : 4.904

2. S. Boopathiraja, V. Punitha, P. Kalavathi, V. B. S. Prasath. Computational 2D and 3D medical image data compression models - A Review. Archives of Computational Methods in Engineering, 2021, Submitted Minor Revision, Indexed in WOS. Impact Factor : 7.302

3. A.S.Joseph Charles and P.Kalavathi, "A Reliable Link Quality based RPL Routing for Internet of Things" Soft computing, 2021, Indexed in WOS, Impact Factor : 4.203

4. T.Priya and P.Kalavathi, "Brain Tissue Volume Estimation to Detect Alzheimer's Disease in Magnetic Resonance Images", Soft Computing, 2020, Indexed in WOS, Impact Factor : 4.203

5. S. Boopathiraja, P. Kalavathi, V. B. S. Prasath. "On a hybrid lossless compression technique for three-dimensional medical images", Journal of Applied Clinical Medical Physics, Impact Factor: 2.102, Indexed in WOS

6. S. Boopathiraja, P. Kalavathi, "A Near Lossless Three-Dimensional Medical Image Compression Technique using 3D- Discrete Wavelet Transform", Int. J. Biomedical Engineering and Technology, Vol. 35, No. 3, 2021, ISSN: 1752-6426 Indexed in WOS, Impact Factor: 1.01.

7. T.Priya and P.Kalavathi," Brain Tissue Segmentation in MRI Brain Images Using Histogram Based Swarm Optimization Techniques", Current Medical Imaging, 2019, Indexed in WOS (Print ISSN: 1573-4056, Online ISSN: 1875-6603), Impact Factor: 0.858

8. P.Kalavathi, M.Senthamilselvi, V.B.Surya Prasath, "Review of Computational Methods on Brain Symmetric and Asymmetric Analysis from Neuroimaging Techniques", Technologies, 5(16), 2017,DOI:10.3390/technologies5020016 Indexed in WOS.

9. P.Kalavathi and V.B.Surya Prasath, "Automatic Segmentation of Cerebral Hemispheres in MR Human Head Scans", International Journal of Imaging Systems and Technology - Neuroimaging and Brain Mapping, 2, pp. 15–23, 2016. ISSN: 1098-1098. Indexed in WOS, Impact Factor: 2.88

10. P.Kalavathi and V.B.Surya Prasath, "Methods on Skull Stripping of MRI Head Scan Images – a Review, Journal of Digital Imaging", Springer verlag, 29(3), pp. 365-379, 2016. ISSN: 0897-1889 (Print) 1618-727X (Online) (DOI 10.1007/s10278-015-9847-8), Indexed in WOS, Impact Factor : 4.904

11. P.Kalavathi and K.Somasundaram, "Segmentation of Brain from MRI Head Images using Modified Chan-Vese Active Contour Model", The International Arab Journal of Information Technology,13(6A),pp:858-866,2016, (ISSN: 1683-3198), Indexed in WOS, Impact Factor : 0.967

12. K.Somasundaram and P.Kalavathi, "Brain Segmentation in Magnetic Resonance Human Head Scans using Multi-Seeded Region Growing", Imaging Science Journal, 62(5), pp. 273-284, 2014. (ISSN:2229-791X, DOI: 10.1179/ 1743131X13Y .0000000068), Indexed in WOS, Impact Factor : 0.871

13. K.Somanusdaram and P.Kalavathi, Contour-Based Brain Segmentation Method for Magnetic Resonance Imaging Human Head Scans, Journal of Computer Assisted Tomography, 37(3), pp. 353-368, 2013. (ISSN: 0363-8715 (print), ISSN: 1532-3145 (online), DOI: 10.1097/RCT.0b013e3182888256). Indexed in WOS, Impact Factor: 1.826

Cumulative Impact factor: 36.03

Total Citation: 780

h- index: 12

i10- index: 21

<div align="center">

CURRICULUM VITAE

</div>

Name	: **Dr. M. BALAMURUGAN**	
Designation	: Professor	
Address	: Department of Computer Science	
	Bharathidasan University	
	Tiruchirappalli – 23	
Phone	9976507700	
Email	: mbala@bdu.ac.in	

Educational qualification:

- Ph. D.
- M. Phil.,
- M. Sc.,

Professional experience:

- Teaching Experience – 28 Years
- Research Experience – 16 Years

Recent publications:

1. Vijaykumar Selvam, Dr. M. Balamurugan, Unique Sense: A Smart Computing Prototype 4, International Journal of Innovative Technology and Exploring Engineering (IJITEE), ISSN No: 2278-3075, Vol No: 8, Page No: 4772-4776, 43739
2. Vijaykumar Selvam, Dr. M. Balamurugan, Unique Sense: A Smart Computing Prototype 3, International Journal of Recent Technology and Engineering (IJRTE), ISSN No: 2277-3878, Vol No: 8, Page No: 7909-7912, 43709
3. Vijaykumar Selvam, Dr. M. Balamurugan, Unique Sense: A Smart Computing Prototype 2, International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJCSEIT), ISSN No: 2456-3307, Vol No: 3, Page No: 2024-2031, March-April 2018
4. Nancy, Dr. M. Balamurugan, Normalization of Alzheimer's Disease Data using Min-Max Method, International Journal of Research and Analysis Reviews (IJRAR), ISSN (E): 23481269, ISSN (P): 2349-5138, Vol No: 6, Page No: 1094-1097, 43525
5. Nancy, Dr. M. Balamurugan, Alzheimer's Disease Diagnosis by using Likelihood Lattice Classification Algorithm, International Journal of Pure and Applied Mathematics (IJPAM), ISSN (E): 1314-3395, ISSN (P): 1311-8080, Vol No: 7, Page No: 563-571, 43101
6. Dr. M. Balamurugan, A. Nancy, Alzheimer's Disease Diagnosis by using Dimensionality Reduction based on KNN Classifier, Biomedical and Pharmacology Journal (BPJ), ISSN No: 1823-1830, Vol No: 10, Page No: 1823-1830, 43070
7. Nancy, Dr. M. Balamurugan, A Comparative Analysis of Cognitive Architecture, International Journal of Advanced Research Trends in Engineering and Technology (IJARTET), ISSN No (E): 2394-3785, ISSN No (P): 2394-3777, Vol No: 3, Page No: 152-155, 42461
8. R. Mallikka and Dr. M. Balamurugan, A Sequential Approach in Segmentation and Recognition Techniques in Image Based E-mail, International Journal of Computer Technology and Applications (IJCTA), 2229-6093, Vol 9, Issue 3, pp. 152- 159, 43252

9. R. Mallikka and Dr. M. Balamurugan, Shape Based Feature Extraction in Detection of Image Email, Journal of Physics: Conference Series (JPCS), 1742-6596, Vol 1142, Issue 6, pp. 1-10, 43435

10. R. Mallikka and Dr. M. Balamurugan, A Chronological Method of Detecting Image based Email, International Journal of Recent Technology and Engineering (IJRTE) , 2277-3878, Vol 8, Issue 2, pp. 4579-4583, 43647

11. R. Mallikka and Dr. M. Balamurugan, An Observation and Experimental Evaluation of Image Spam Detection, International Journal of Recent Technology and Engineering (IJRTE), 2277-3878, Vol. 8, Issue. 3, 43709

12. Balamurugan, Udendhran, An Effective Hybridized Classifier Integrated with Homomorphic Encryption to Enhance Big Data Security, Europe Alliance Innovation and Springer Innovations in Communication and Computing - Springer, Cham Switzerland , https://doi.org/10.1007/978-3-030-19562-5_35, 978-3-030-19561-8, 43757

13. Suresh, Udendhran, Balamurugan, Hybridized neural network and decision tree based classifier for prognostic decision making in breast cancers, Journal of Soft Computing-Springer Berlin, https://doi.org/10.1007/s00500-019-04066-4, 1432-7643, 43602

14. Dr. M. Balamurugan, P. Mathiazhagan, A Systematic Study of Database for an Archaeological Data Management, International Journal of Research and Analysis Reviews (IJRAR), ISSN No (E): 2348-1269, ISSN No (P): 2349-5138, Vol No: 6, Page No: 993-997, 43466

15. Suresh, Udendhran, Balamurugan, Varatharajan, A Novel Internet of Things Framework Integrated with Real Time Monitoring for Intelligent Healthcare Environment, Journal of Medical Systems -Springer Nature Switzerland AG, https://doi.org/10.1007/s10916-019-1302-9, 0148-5598, 43588

Cumulative Impact factor:

Total Citation: 244

h- index: 9

i10- index: 8
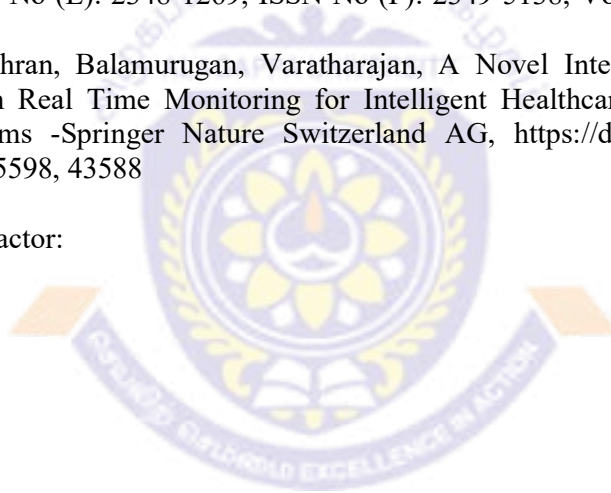
CURRICULUM VITAE

Name	: **Dr. R. GOKULAKRISHNAN**	
Designation	: Additional Director / Scientist E	
Address	: Software Technology Parks of India (STPI)	
	Ministry of Electronics & IT (MeitY)	
	Govt., of India	
Email	: r.gokul@stpi.in	

Educational qualification:

- Ph. D. in Computer Science & Engineering

Professional experience:

- Teaching Experience – 7 Years
- Industrial Experience – 14 Years

Roles and Responsibilities:

- Present assignment including IT consulting, strategy development, policy formulation, evaluation and performance measurement, budgeting & resource mobilization, project management, public outreach in Mission Mode implementation of projects.
- Promoting software and electronic hardware exports.
- Nodal officer for implementing the India BPO promotion Scheme under Digital India initiatives.
- Attracting investment in the field of Information Technology.
- Other promotional activities with respect to development of IT industries in Tamilnadu & Pondicherry Jurisdiction.

Publications : 5

Conference Proceedings : 10

Book Chapters : 5

CURRICULUM VITAE

Name	: **Dr. A. PADMAPRIYA**	
Designation	: Professor	
Address	: Department of Computer Science	
	Science Block	
	Alagappa University	
	Karaikudi – 630 003	
Phone	: +91 4565 223667	
Email	: padmapriyaa@alagappauniversity.ac.in	

Educational qualification:

- Ph. D. Computer Science and Engineering, Alagappa University
- M. Phil., Computer Science, Mother Teresa Women's University
- M. C. A., Bharathidasan University
- B. Sc., Computer Science, Bharathidasan University

Professional experience:

- Teaching Experience – 19 Years
- Research Experience – 15 Years

Honours and Awards:

- Won the Best Paper Award in the National Conference on Emerging Trends in Computer Science 2012 organized by STET College for Women, Mannargudi, Tamil Nadu.
- Got Gold Medal for M. C. A from Bharathidasan University

Recent publications:

- Jeyabharathy S., Padmapriya Arumugam (2021) Predicting the Decomposition Level of Forest Trees Through Ensembling Methods. In: Bhattacharya M., Kharb L., Chahal D. (eds) Information, Communication and Computing Technology. ICICCT 2021. Communications in Computer and Information Science, vol 1417. Springer, Cham. https://doi.org/10.1007/978-3-030-88378-2_20.
- Subhasri, Prabhakaran, and Arumugam Padmapriya (2021) Cryptanalysis for securing DICOM medical contents using multilevel encryption, International Journal of Biomedical Engineering and Technology 36.4 (2021): 350-357.
- Mu. Annalakshmi, A.Padmapriya (2020), Evidence Phrase Based Combined Relevance for Web Information Filtering, International Journal on Emerging Technologies 11(4), June 2020, pp.72-77
- G. Yogeswari, A.Padmapriya (2019), Recommender System for Nutrient Management Based on Precision Agriculture, International Journal of Recent Technology and Engineering, November 2019, ISSN 2278–3075 (Online), Vol. 8 Issue 4, pp. 227-235
- G. Radhika, A.Padmapriya (2019), Novel Framework for Analyzing Air Quality using MatLab, International Journal of Recent Technology and Engineering, September 2019, ISSN 2277-3878 (Online), Vol. 8 Issue 3, pp. 6579-6583

- Mu. Annalakshmi, A.Padmapriya, (2019), Personalized medical information filtering using evidence phrases, International Journal of Innovative Technology and Exploring Engineering, August 2019

- N. Kanagaraj, A.Padmapriya, (2019), Symmetric Cryptographic Framework for Network Security, International Journal of Innovative Technology and Exploring Engineering, August 2019

- R. Ruba Mangala, Dr. A. Padmapriya (2018), Prediction based Agro Advisory System for Crop Protection, Springer – Cham, LNDECT, Vol. 26, ISBN 978-3-030- 03145, 212-213,

- L. Sathish Kumar & A. Padmapriya (2018), "Information Extraction and Prediction Using Partial Keyword Combination and Blends Measure", IETE Journal of Research, DOI: 10.1080/03772063.2017.1409666, Impact Factor : 0.829.

- Subhasri, P; Padmapriya, A (2017), "Cryptanalysis of Digital Imaging and Communications in Medicine (DICOM) Medical contents Encryption using Modified Vigenere Cipher and Multilevel Encryption", Research Journal of Pharmaceutics, Biological and Chemical Sciences, Sep-Oct. 2017, Volume 8 (Issue 5), Page No. 485-493

- N. Kanagaraj, A.Padmapriya (2016), "i-TSS: An Image Encryption Algorithm Based on Transposition, Shuffling and Substitution using Randomly Generated Bitmap image", Published by Springer - verlag, Lecture Notes in Computer Science, Volume 9581 2016, ISSN: 1611-3349, 0302-9743, Book Title : Distributed Computing and Internet Technology, DOI : 10.1007/978-3-319-28034-9.

- L. Sathish Kumar, Dr A. Padmapriya, "Evidence based subsequent disease extraction from EMR Health Record by Grade Measure", Proceedings of 2016 Online International Conference on Green Engineering and Technologies, IC-GET 2016,

Cumulative Impact factor: 6.7588

Total Citation: 201

h- index: 9

i10- index: 9
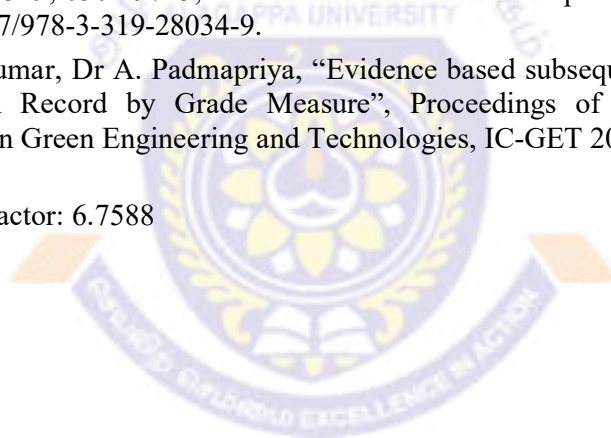
CURRICULUM VITAE

Name	: **Dr. S. SANTHOSH KUMAR**	
Designation	: Assistant Professor	
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	Science Block	
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Educational qualification:

- PhD in Computer Science from PRIST University, Thanjavur
- M.Phil in Computer Science from PERIYAR University, Salem
- M.Tech in Information Technology from Bharathidasan University
- M.Sc in Information Technology from Bharathidasan University
- P.G Diploma in Computer Application from Bharathidasan University
- B.Sc in Chemistry from Bharathidasan University

Professional experience:

- Teaching Experience: 19 Years
- Research Experience : 14 Years

Honours and Awards:

- Received best paper award 2014
- Received Young researcher award from Bose Scientific Society, Tamil Nadu
- Completed Minor projects – 2 under AURF Grant, Alagappa University, Karaikudi
- Doing one major project funded by Rashtriya Uchchatar Shiksha Abhiyan (RUSA), Department Of Higher Education, Ministry of Human Resource and Development (MHRD), Government of India
- Patents Filed National: 2 , International : 1
- Invited Talk given Regional : 20, National : 12, International : 1
- Countries Visited : NUS, Singapore, University of Malaya, Malaysiay

Recent publications:

- Uma Ramasamy, Sundar Santhoshkumar (2022) Analysis of Suitable Machine Learning Imputation Techniques for Arthritis Profile Data, IETE Journal of Research, DOI: 10.1080/03772063.2022.2120914 (Impact Factor: 2.33)
- Anwar R Shaheen, Sundar Santhoshkumar, "Tasks Scheduling in Cloud environment using PSO-BATS with MLRHE", Intelligent Automation & Soft Computing, 2023. (Impact Factor: 3.401)
- A. Thasil Mohamed and Sundar Santhoshkumar, "Deep learning based process analytics model for predicting type 2 diabetes mellitus," Computer Systems Science and Engineering, vol. 40, no.1, pp. 191–205, 2022. doi:10.32604/csse.2022.016754 (Impact Factor: 4.397)
- M. Gokiladevi, Sundar Santhoshkumar, Varadarajan, V, "Machine Learning Algorithm Selection for Chronic Kidney Disease Diagnosis and Classification", Malaysian Journal of

Computer Science, 102–115.2022. https://doi.org/10.22452/mjcs.sp2022no1.8 (Impact Factor: 0.436)

- A. Thasil Mohamed, Sundar Santhoshkumar, Varadarajan, V, "Intelligent Deep Learning Based Predictive Model For Coronary Heart Disease And Chronic Kidney Disease On People With Diabetes Mellitus", Malaysian Journal of Computer Science, 88–101.2022. https://doi.org/10.22452/mjcs.sp2022no1.7 (Impact Factor: 0.436)

- Sundar Santhoshkumar, Varadarajan, V, S.Gavaskar, J.J.Amalraj, A.Sumathi, "Machine Learning Model for Intracranial Hemorrhage Diagnosis and Classification". Electronics 2021, 10, 2574. https://doi.org/10.3390/electronics10212574 (Impact Factor: 2.690)

Cumulative Impact factor: 0.363

Total Citation: 70

h- index: 5

i10- index: 1

CURRICULUM VITAE

Name	: **Dr. P. GEETHA**	
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Email	: geeth.ganesan@gmail.com	

Educational qualification:

- Ph.D   Alagappa University
- M.Phil Bharathiyar University
- M.C.A Alagappa University
- B.Sc   Alagappa Arts College

Professional experience:

- 16 Years

Recent publications:

1. P.Geetha, Dr. E.Ramaraj,"Bit Mask Search Algorithm for Trajectory Database Mining", published in International Journal of Computer Applications, Vol.2, pp. 16-20, Dec 2013. ISBN:973-93-80878.
2. P.Geetha, Dr. E.Ramaraj, "A Frequent Trajectory Path Mining Using Bit Mask Search and UP Growth+ Algorithm", published in the IEEE Xplore Digital library, Feb 2014 ISBN: 978-1-4799-2877-4.
3. P.Geetha , Dr. E.Ramaraj, "A Study and Analysis of Trajectory Database Privacy and Issues", published in International Journal of Computer Technology & Applications, Vol 6 issue 5 Sep-Oct 2015. ISSN: 2229-6093.
4. P.Geetha, Dr.E.Ramaraj, "Tree Based Space Partition of Trajectory Pattern Mining for Frequent Itemsets" published in Australian Journal of Basic and Applied Sciences, Vol 10 (2), Special 2016, pp 250-261 ISSN 1991-8178.
5. P.Geetha, "A frequent Data Mining Technique for Transactional Data" Published in International Journal of Engineering Research & Technology.Volume 3, Issues30.ISSN 2278-0181.
6. P. Geetha "An improved, efficient mining technique for operation reduction" Published in International Journal of Advance Research in Science and Engineering, Vol 5, Issues 10, March 16, ISSN-2319-8354.
7. P.Geetha, "Customer relationship management M-Commerce in data mining" published in International Journal of Science,Technology & Management, Vol5,issues03 march 16. ISSN-2394-1537.
8. P.Geetha, "Security enhancement of business to consumer electronic commerce" published in the International Journal of Advance Research in Science and Engineering, Vol 5, Issue 2, Feb16,ISSN-2319-8354.
9. P.Geetha, "strengthening data confidentiality in computer network" Published in Journal of Innovative Research in Scienc and Engineering. Vol 2, Issue 2, Feb 16. ISSN-2454-9665.
10. P.Geetha ,E.Ramaraj,"An Efficient Algorithm for Frequent Trajectory Itemset, Published in Springer Natural Singapore 2018.

11. P.Geetha, "Mobile Storage Protection during Encryption Algorithm" Published in the international journal of Engineering and Technology, Vol 9 issue 6,Dec 2017,ISSN 0975-4024.
12. P.Geetha, " Multilevel Security Mechanism for E-Learning" International journal of pure and applied mathematics" ISSN 1311-8080.
13. P.Geetha,"An Efficient data mining Technique for Transactional Data", communicated to Modern Education and Computer Science journal.
14. P.Geetha , "A Multilayered Back Propagation Algorithm to Predict Significant Attributes of UG Pursuing Students Absenteeism at Rural Educational Institution.Published in International Journal of Computer Science and Engineering Vol-6,issue -12 Dec 2018. E-ISSN: 2347-2693 impact factor:3.022
15. P.Geetha, P.Yogapriya, "K-means Clusterig Algorithm for Dengue Disease Detection Using Tanagra Tool" International Journal of Computer Sciences and Engineering, Vol.-7, Issue-2, Feb- 2019.
16. P.Geetha, Dr. E.Ramaraj, Published paper in IEEE Xplore Titled "Rule Based System for Better Prediction of Diabetes" ISBN:978-1-5386-9371-1/19/ 2019IEEE.
17. P.Geetha "Inquiry of Personal Intelligence of Adolescence and Early Adulthood College Students of Tamil Nadu using Id3 Algorithm", 'International Journal of Innovative Technology and Exploring Engineering' at Volume-8 Issue-10, August 2019.(SCOPUS).
18. P.Geetha, P.yogapriya, "Dengue Disease Detection using K-Means, Hierarchical, Kohonen-SOM Clustering", International Journal of Innovative Technology and Exploring Engineering' at Volume-8 Issue-10, August 2019.(SCOPUS).
19. P.Geetha "Analyzing The Personal Behavior Of Adolescence Using Artificial Neural Networks", International Journal Of Scientific & Technology Research Volume 8, Issue 10, pp: 3654-3658, October 2019, ISSN 2277-8616. (SCOPUS)
20. P.Geetha, "Similarity based Prediction system using machine Learning Algorithms in Big Data Analytics" International Journal of Innovative Technology and Exploring Engineering' at Volume-8 Issue-12, October 2019.(SCOPUS).
21. P.Geetha " A Rule Based Recommender system to improve the yield of groundnut crop using decision tree with backward eliminations, principal component analysis" Turkish journal of computer and mathematics education, 2021
22. P.Geetha " Multi Objective optimization with artificial neural network based robust paddy yield prediction model" Intelligent Automation & Soft computing.(SCI)

Total Citation: 2

h- index: 1

SCIENCE CAMPUS