676	BSW	Methods of Social Work	22USW203	2022
677	BSW	Human Growth and Development	22USW204	2022
678	BSW	Women and Development	22USW2A2	2022
679	M.A Tamil	IKKALA ILAKKIYAM	22PTM101	2022
680	M.A Tamil	KONGU NAATIYAL	22PTM1E1	2022
681	M.A Tamil	BAKTHI ILAKKIYAMUM SITRILAKKIYAMUM	22PTM205	2022
682	M.A Tamil	ILAKKIY MANUDAVIYAL	22PTM208	2022
683	M.A Tamil	Tamilar panpadu	22PTM2N1	2022
684	M.A Tamil	KAAPPIYANGAL	22PTM310	2022
685	M.A Tamil	TAMILAGA THOLLIYAL	22PTM312	2022
686	M.A Tamil	PENNIYAM	22PTM313	2022
687	M.A Tamil	THONAMI ILAKKIYAM	22PTM414	2022
688	M.Sc. Botany	Ethno Botany	22PBY1E2	2022
689	M.Sc. Botany	Plants in Tamil Culture	22PBY2N2	2022
690	M.Sc Computer Science	Data Mining using R	22PCS102	2022
691	M.Sc Computer Science	Full Stack Web Development	22PCS312	2022
692	M.Sc Computer Science	Elective III:Natural Language Processing and Text Analytics	22PCS3E2	2022
693	M.Com IB	Innovation and Entrepreneurship	22PIB104	2022
694	M.Com IB	International Logistics Management	22PIB205	2022
695	M.Com IB	Foreign Trade Procedure and Documentation	22PIB206	2022
696	M.Com IB	Map Reading and Route Tracing	22PIB208	2022
697	MA English	Shakespere	22PEL103	2022
698	MA English	World Drama	22PEL414	2022
699	MA English	World Fiction	22PEL415	2022

BOS HIGHLIGHTED

CLICK HERE

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE POLLACHI

Dr. R. MUTHUKUMARAN, M.A.,M.Phil.,B.Ed.,Ph.D.,
PRINCIPAL
N.G.M. College, Pollachi - 642 001
Coimbatore District

PG DEPARTMENT OF COMPUTER SCIENCE

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE

POLLACHI - 642001

13th Board of Studies Meeting in the PG Department of

Computer Science

Date & Time: 4th June 2022 & 2.00 p.m

Agenda

BoS / CS 13.1	:	Welcome address and Opening Remarks by Chairman, Board of studies in the PG Department of Computer Science
BoS / CS 13.2	:	Confirmation of the Minutes of the **12**th/ Previous meeting of Board of studies in the PG Department of Computer Science held on 22.05.2021 and Action taken report of 12th meeting of Board of studies
BoS / CS 13.3	:	13.3.1 Syllabus of I MSc COMPUTER SCIENCE under Regulation 2022
		13.3.2 Syllabus of II MSc COMPUTER SCIENCE under Regulation 2022
		Any other Discussions if any
BoS / CS 13.4	:	1. BOS Members suggested to remove the course Data Mining and Warehousing instead of that new course Data Mining using R (22PCS102) has been introduced in first semester. 2. Advanced Java Programming (22PCS104) has been moved from second semester to first semester and Advanced Database Management (22PCS209) has been moved from first semester to second semester. 3. Elective I: Mobile Computing was removed. Network Security & Cryptography (22PCS1E3) from third semester has been moved to first semester as Elective. Block chain security concept has been added to the existing syllabus. 4. Pilot Project-I (22PCS317) has been moved from second semester to third semester. 5. New course Full Stack Web Development (22PCS312) has been introduced in third semester. 6. Digital Image Processing (22PCS314) Unit 1 has been

		changed. MATLAB added to Unit 1. 7. Elective III: Data Science was removed. Instead of that Natural Language Processing and Text Analytics (22PCS3E2) has been introduced.
BoS / CS 13.5	:	1. Value Added Course Virtual Reality introduced in our syllabus.

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE

POLLACHI

PG DEPARTMENT OF COMPUTER SCIENCE

MINUTES OF BOS MEETING

The 13thMeeting ofthe Board ofstudies of the PG Department of Computer Science was held on 04/06/2022 at 2.00 p.m. in the Nallamuthu Gounder Mahalingam College, Palaghat Road, Pollachi.

1. The following members were present:

S.No	Name	Designation
1	Dr.M.Sakthi Associate Professor and Head PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Chairman
2	Dr.S.N.Geethalakshmi Professor, Department of Computer Science, Avinashilingam University, Coimbatore-641043	University Nominee
3	Dr.T.Amutha Associate Professor Department of Computer Science, Bharathiar University, Coimbatore-641046	Academic Expert
4	Dr.P.Balamurugan Assistant Professor Department of Computer Science, Government Arts College, Coimbatore- 641018	Academic Auditor
5	Mr.P.Karthiswaran Test Engineering Team Lead, Accenture Solutions Pvt. Ltd. Chennai-600063	Industrial Expert
6	Mr. A.Manimohan Front-End Developer, ProfimaxDigiconnect Pvt. Ltd. Coimbatore-641011	Alumni Representative
7	Dr.R.Nandhakumar Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College,	Internal Member

	Pollachi-642001	
8	Dr.R.Deepa Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
9	Ms.M.Dhavapriya Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
10	Ms.S.Sharmila Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
11	Ms.N.Yasodha Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
12	Ms.M.MeenaKrithika Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
13	Ms.S.S.Shanthi Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
14	Mr.N.Arulkumar Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
15	Mr.N.Karthikeyan Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
16	Dr.A.Kanagaraj Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
17	Ms.P.Jayapriya Assistant Professor	Internal Member

	PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	
18	Ms.G.Angayarkanni Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
19	Dr.E.Ramadevi Associate Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
20	Dr.M.Rathamani Assistant Professor PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Internal Member
21	Ms. K. Kanchana Student of II M.Sc CS PG Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi-642001	Student Representative

BoS/CS13.1 WELCOME ADDRESS AND OPENING REMARKS BY CHAIRMAN, BOARD OF STUDIES IN THE PG DEPARTMENT OF COMPUTER SCIENCE

Dr.M.Sakthi, The Chairman, BoS of the PG Department of Computer Science welcomed and introduced the members of 13th Board of Studies and thanked each one of them for sparing their valuable time to attend the meeting.

BoS/CS 13.2 TO CONFIRM THE MINUTES OF 12th BOS MEETING HELD ON 22.05.2021.

The minutes of the 12th Board of Studies meeting held on 22.05.2021 were communicated to the members. The comments received have been incorporated and placed for confirmation. The same was approved by the 12th Academic council.

~ Action Taken Report (Enclosed in Annexure 1)

BoS/CS 13.3

BoS/CS 13.3.1

M.Sc COMPUTER SCIENCE (I to IV SEMESTER)

The Following Papers from MSc Computer Science were accepted by the experts without no modification:

- 22PCS101 – Design & Analysis of Algorithms
- 22PCS103 – Advanced Operating System
- 22PCS104 – Advanced Java Programming
- 22PCS105 – Programming Lab I: Design & Analysis of Algorithms
- 22PCS1E1 – Elective I: Advanced Networks
- 22PCS1E2 – Elective I: Wireless Networks
- 22PCS206 – Android Programming
- 22PCS207 - Cloud Computing
- 22PCS208 - Big Data Analytics
- 22PCS209 - Advanced Database Management System
- 22PCS210 - Programming Lab II: Android Programming
- 22PCS2E1 - Elective II: Software Project Management
- 22PCS2E2 - Elective II: Software Engineering and Testing
- 22PCS2E3 - Elective II: Object Oriented Analysis and Design with UML
- 22PCS2N1 - Non Major Elective I: Web Designing Lab
- 22PCS2N2 - Advanced Internet Technologies Lab
- 22PCS311 - Internet of Things
- 22PCS313 - Python Programming
- 22PCS315 - Programming Lab III: Internet of Things
- 22PCS316 - Programming Lab IV: Digital Image Processing using MATLAB
- 22PCS3E1 - Elective III: Artificial Intelligence & Machine Learning
- 22PCS3E3 - Elective III: Robotic Process Automation for Business
- 22PCS3P1 - Pilot Project – I
- 22PCS4P2 - Project Work and Viva-Voce

The following courses were revised with major / minor modifications

- 22PCS1E3 – Elective I: Network Security & Cryptography
- 22PCS314 – Digital Image Processing

New Course Added:

The following papers from M.Sc COMPUTER SCIENCE were accepted by the experts fully without further suggestions

- 22PCS102 – Data Mining using R
- 22PCS312 - Full Stack Web Development
- 22PCS3E2 - Elective III: Natural Language Processing and Text Analytics
- Value Added Course: Virtual Reality

BoS/CS13.4 SUGGESTIONS GIVEN BY THE BoS MEMBERS

13.4.1: It is suggested to introduce the new course in Data Mining using R in I Semester.

13.4.2: It is suggested to introduce the new courses Full Stack Web Development in III Semester.

13.4.3: It is suggested to replace Mobile Computing course with Network Security & Cryptography as Elective course in I Semester.

13.4.4: It is suggested to replace Data Science course with Natural Language Processing and Text Analytics as Elective course in III Semester.

13.4.5: It is suggested to move Advanced Java Programming from II Semester to I Semester and Pilot Project-I from II Semester to III Semester.

13.4.6: Block chain security should be added to Network Security & Cryptography.

13.4.7: In III Semester, MATLAB should be added to Unit-I in Digital Image Processing.

13.4.8: It is suggested to introduce Virtual Reality as Value Added Course.

The members had a brainstorming discussion and interaction among themselves. After discussion, fruitful suggestions were incorporated appropriately in the Curriculum and Syllabi.

Based on the suggestions given by the members, BOS resolved to recommend the following to the Academic Council for further approval.

ANNEXURE I

Minutes of the 12th / Previous Meeting – Action Taken Report

S.No	Suggestion given by expert members	Action taken
1	To include case study in Android Programming	Reviewed and Implemented
2	To include case study in Advanced Networks	Implemented
3	To include Wireless Devices with Windows CE in Mobile Computing	Implemented
4	To include case study in Design & Analysis of Algorithms	Implemented
5	To include Key Cryptosystems in Network Security & Cryptography	Implemented
6	To include data plotting and visualization techniques in Python Programming	Implemented
7	To introduce Elective – I Wireless Networks as a new paper	Implemented
8	To introduce Elective – II Software Project Management as a new paper	Implemented
9	To introduce Software Engineering and Testing as a new paper	Implemented
10	To introduce Elective-III Artificial Intelligence & Machine Learning as a new paper	Implemented
11	To introduce Elective-III Data Science as a new paper	Implemented
12	To introduce Elective-III Robotic Process Automation for Business as a new paper	Implemented

List of Courses having focus on local, national, regionaland global developmental needs offered by the M.Sc Computer Science

PG COMPUTER SCIENCE						
Programme: M.Sc Computer Science						Year: 2022
Course Code	Course Title	Need				Rationale
		Local	National	Regional	Global	
22PCS101	Design & Analysis of Algorithms	✓				It helps to design and analyze the logic on how the program will work before developing the actual code for a program
22PCS102	Data Mining using R		✓			Extract valuable information from available data, uncovering patterns and finding anomalies and relationships in large datasets
22PCS103	Advanced Operating System		✓			An operating system can manage how to divide the program so that it runs on more than one processor at a time
22PCS104	Advanced Java Programming		✓			Provides libraries to understand the concept of Client-Server architecture for web- based applications
22PCS206	Android Programming				✓	Address the business requirements and build new applications or services for smart devices
22PCS207	Cloud Computing				✓	Provides flexible resource allocation on demand with the promise of realizing

						elastic, Internet-accessible, computing on a pay-as-you-go basis
22PCS208	Big Data Analytics				✓	Leads to smarter business moves, more efficient operations
22PCS209	Advanced Database Management System				✓	Provides a centralized view of data that can be accessed by multiple users, from multiple locations, in a controlled manner
22PCS311	Internet of Things				✓	Have devices that self report in real-time, improving efficiency and bringing important information to the surface more quickly than a system depending on human intervention.
22PCS312	Full Stack Web Development				✓	Provides an unparalleled freedom to simultaneously work on the front- and backend, faster development and delivery
22PCS313	Python Programming				✓	Most accessible programming languages available because it has simplified syntax
22PCS314	Digital Image Processing		✓			Extract from an image quantitative information that is not readily apparent to the eye, and to calibrate an image in photometric or geometric terms
22PCS1E1	Advanced Networks		✓			Share information effortlessly,

						increasing productivity and efficiency, other benefits include cost-effectiveness, storage efficiency, flexibility, and data security
22PCS1E2	Wireless Networks				✓	Plays a key role in today's communications, and new forms of it will become central to emerging technologies including robots, drones, self-driving vehicles and new medical devices
22PCS1E3	Network Security & Cryptography				✓	A stable and efficient network security system is essential to protecting client data
22PCS2E1	Software Project Management	✓				Important role in an organization by giving insights into project progress, performance, and inventory tracking
22PCS2E2	Software Engineering and Testing	✓				Application of principles used in the field of engineering, which usually deals with physical systems, to the design, development, testing and deployment of software systems
22PCS2E3	Object Oriented Analysis and Design with UML	✓				Helps to visualize, specify, construct, and document the artifacts of an object-oriented system
22PCS3E1	Artificial Intelligence				✓	Makes it possible for machines to

	& Machine Learning					learn from experience, adjust to new inputs and perform human-like tasks
22PCS3E2	Natural Language Processing and Text Analytics				✓	Helps to analyze the data collected from various sources, such as social media profiles, customer surveys, employee surveys, and other feedback tools and
22PCS3E3	Robotic Process Automation for Business				✓	Automate various supply chain processes, including data entry, predictive maintenance and after-sales service support
22PCS3P1	Pilot Project – I				✓	Enables to manage the risk of a new idea and identify any deficiencies before substantial resources are committed
22PCS4P2	Project Work and Viva-Voce				✓	Explore the various functional areas and analyze how theoretical concepts taught are applied in real life situations

List of Courses having focus on employability/ entrepreneurship/ skill development offered by the M.Sc Computer Science

PG COMPUTER SCIENCE						
Programme: M.Sc Computer Science					Year: 2022	
Course Code	Course Title	Employability (EM) / Entrepreneurship (EN) / Skill Development (SD)			Focus	Year of Introduction
		EM	EN	SD		
22PCS101	Design & Analysis of Algorithms			✓	Algorithm Design	2010
22PCS102	Data Mining using R	✓			Data Analyst	2022
22PCS103	Advanced Operating System	✓			Operating System Cert/Qual Engineer	2010
22PCS104	Advanced Java Programming			✓	Java Web Developer	2014
22PCS206	Android Programming	✓			Android Developer	2014
22PCS207	Cloud Computing			✓	Cloud Administrator	2020
22PCS208	Big Data Analytics	✓			Data Architect	2016
22PCS209	Advanced Database Management System	✓			Database Management	2018
22PCS311	Internet of Things		✓		IoT Architect	2017
22PCS312	Full Stack Web Development	✓			Full Stack Web Developer	2022
22PCS313	Python Programming			✓	Python Developer	2019
22PCS314	Digital Image Processing			✓	Image Processing Engineer	2013
22PCS1E1	Advanced Networks	✓			Network Architect	2010

22PCS1E2	Wireless Networks			✓	Network Engineer	2021
22PCS1E3	Network Security & Cryptography			✓	Cyber Security Engineer	2018
22PCS2E1	Software Project Management	✓			Project Manager	2021
22PCS2E2	Software Engineering and Testing	✓			Software Engineer	2021
22PCS2E3	Object Oriented Analysis and Design with UML	✓			System Analyst	2021
22PCS3E1	Artificial Intelligence & Machine Learning	✓			AI Data Analyst, Machine Learning Engineer	2021
22PCS3E2	Natural Language Processing and Text Analytics	✓			Data Analyst	2022
22PCS3E3	Robotic Process Automation for Business		✓		Business Automation	2021
22PCS3P1	Pilot Project – I		✓		Android App Developer	2015
22PCS4P2	Project Work and Viva-Voce		✓		Software Developer	2010

Percentage of Revision of M.Sc Computer Science Syllabus under Regulation 2022

PG COMPUTER SCIENCE							
S.No	Course Code	Course Title	Change Details	% of Changes	Content Deleted	Content Updated	Reason for Change
							Subject Expert / Course Teacher / Alumini Opinion
1	22PCS102	Data Mining using R	New	100%	New	New	Subject Expert
2	22PCS1E3	Elective I: Network Security & Cryptography	Unit-IV	10%	NIL	Block chain Security	Subject Expert
3	22PCS312	Full Stack Web Development	New	100%	New	New	Subject Expert, Alumini Opinion
4	22PCS314	Digital Image Processing	Unit-I	10%	NIL	MATLAB: Introduction-Basic features, Starting , Quitting, Creating variables.	Subject Expert
5	22PCS3E2	Elective III: Natural Language Processing and Text Analytics	New	100%	New	New	Subject Expert

M.Sam

HoD

Dr. M.SAKTHI, M.Sc.,M.Phil.,Ph.D.,
Associate Professor & Head
PG Department of Computer Science
NGM College, Pollachi - 642 001.

NALLAMUTHU GOUNDER MAHALINGAM Co. POLLACHI

PRINCIPAL

Dr. R. MUTHUKUMARAN,
M.A.,M.Phil.,B.Ed.,Ph.D.,
PRINCIPAL
N.G.M. College, Pollachi - 642 001
Coimbatore District

SCHEME OF EXAMINATION

Course Code	Course Title	Hours		Examination				
		Theory	Practical	Hours	CIA	ESE	Total	Credits
I SEMESTER								
22PCS101	Design & Analysis of Algorithms	4	-	3	50	50	100	4
22PCS102	Data Mining using R	2	4	3	50	50	100	5
22PCS103	Advanced Operating System	4	-	3	50	50	100	4
22PCS104	Advanced Java Programming	2	4	3	50	50	100	5
22PCS105	Programming Lab I: Design & Analysis of Algorithms	-	5	3	50	50	100	3
22PCS1E1	Elective I: Advanced Networks	5	-	3	50	50	100	5
22PCS1E2	Elective I: Wireless Networks							
22PCS1E3	Elective I: Network Security & Cryptography							
	Total	17	13		300	300	600	26
II SEMESTER								
22PCS206	Android Programming	4	-	3	50	50	100	4
22PCS207	Cloud Computing	4	-	3	50	50	100	4
22PCS208	Big Data Analytics	2	4	3	50	50	100	5
22PCS209	Advanced Database Management System	2	4	3	50	50	100	5
22PCS210	Programming Lab II: Android Programming	-	4	3	50	50	100	2
22PCS2E1	Elective II: Software Project Management	4	-	3	50	50	100	4
22PCS2E2	Elective II: Software Engineering and Testing							
22PCS2E3	Elective II: Object Oriented Analysis and Design with UML							
22PCS2N1/ 22PCS2N2	Non Major Elective I: Web Designing Lab/ Advanced Internet Technologies Lab	-	2	2	-	100	100	2
	Total	16	14		300	400	700	26

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Course Code	Course Title	Hours		Examination				
		Theory	Practical	Hours	CIA	ESE	Total	Credits
III SEMESTER								
22PCS311	Internet of Things	4	-	3	50	50	100	4
22PCS312	Full Stack Web Development	2	3	3	50	50	100	4
22PCS313	Python Programming	2	3	3	50	50	100	4
22PCS314	Digital Image Processing	3	-	3	50	50	100	3
22PCS315	Programming Lab III: Internet of Things	-	3	3	50	50	100	2
22PCS316	Programming Lab IV: Digital Image Processing using MATLAB	-	3	3	25	25	50	2
22PCS3P1	Pilot Project – I	-	2	-	-	50	50	2
22PCS3E1	Elective III: Artificial Intelligence & Machine Learning	5	-	3	50	50	100	5
22PCS3E2	Elective III: Natural Language Processing and Text Analytics							
22PCS3E3	Elective III: Robotic Process Automation for Business							
	Total	16	14		375	375	700	26
IV SEMESTER								
22PCS4P2	Project Work and Viva-Voce	-	-	-	-	200	200	12
						GRAND TOTAL	2200	90

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# CO-SCHOLASTIC COURSES					Grade/ Credit
	Teaching Hours	**CIA**	**ESE**	**TOTAL**	
ONLINE COURSES					
Swayam, MOOC Course etc.,	-	-	-	-	**Grade**
VALUE ADDED COURSES					
Value Added Courses	30	25	25	50	**2**
CERTIFICATE COURSE					
Certificate Course	30	-	-	-	2
ADVANCED LEARNER COURSE					
Advanced Learner Course	-	-	-	-	**Grade**
The scholastic courses are only counted for the final grading and ranking. However for the award of the degree, the completion of co-scholastic one online course is mandatory. All other co-scholastic courses are optional only.					

1	Semester I	#SWAYAM/ MOOC	Any Online Course **(Compulsory)**
2	Any Semester	#Value Added Course	Virtual Reality**(Compulsory)**
3	Any Semester	#Certificate Course	Software Testing Lab– Selenium **(Optional)**
4	Any Semester	#Advanced Learner Course	User Interface Design Lab – Figma **(Optional)**

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Programme Code:		M.Sc CS	**Programme Title:**		Master of Science (Computer Science)	
Course Code:	22PCS102	**Course Title:**	Data Mining using R		**Batch :**	2022-2024
Lecture Hrs./Week Or Practical Hrs./Week		6	**Tutorial Hrs/Sem**	-	**Semester:**	I
					Credits:	5

Course Objective

To understand the basic concepts and techniques of Data Mining and to develop skills of using recent data mining software for solving practical problems using R

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Remember the basic concepts of data mining techniques	K1
CO2	Understand the concept of data warehouse and its backend process	K2
CO3	Apply various clustering and association finding algorithms for feature selection	K3
CO4	Demonstrate an understanding of the basic algorithmic methods that support knowledge discovery	K4
CO5	Evaluate what has been learned through the application of the appropriate statistics.	K5

MAPPING

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1O	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	H	M	H	H	M	H	M	H	H	H	H	M	M	H
CO2	M	H	M	H	H	H	M	M	H	H	H	M	M	H	M
CO3	H	H	H	M	M	H	H	M	M	M	M	H	M	H	M
CO4	M	M	H	H	M	M	H	M	H	M	M	M	H	M	M
CO5	H	H	M	H	M	M	H	H	H	H	H	H	M	H	M

H: High; M: Medium; L: Low.

Units	Contents	Hrs
UNIT I	**Introduction:** Data Mining – R – R-Studio – Datasets **Data Import and Export:** Save and Load R Data - Import from and Export to .CSV Files - Import Data from SAS - Import/Export via ODBC - Read and Write EXCEL files with package xlsx .	**18**
UNIT II	**Data Exploration and Visualization:** Have a Look at Data - Explore Individual Variables - Explore Multiple Variables - More Explorations - Save Charts into Files. **Decision Trees and Random Forest:** Decision Trees with Package party - Decision Trees with Package rpart - Random Forest.	**18**
UNIT III	**Regression:** Linear Regression - Logistic Regression - Generalized Linear Regression - Non-linear Regression. **Clustering:** The k-Means Clustering - The k-Medoids Clustering - Hierarchical Clustering. **Outlier Detection:** Univariate Outlier Detection - Outlier Detection with LOF - Outlier Detection by Clustering - Outlier Detection from Time Series.	**18**
UNIT IV	**Time Series Analysis and Mining:** Time Series Data in R - Time Series Decomposition - Time Series Forecasting - Time Series Clustering - Time Series Classification - Classification with Original Data - Classification with Extracted Features - k-NN Classification. **Association Rules:** Basics of Association Rules - The Titanic Dataset - Association Rule Mining - Removing Redundancy - Interpreting Rules - Visualizing Association Rules.	**18**

UNIT V	**Text Mining:** Retrieving Text from Twitter - Transforming Text - Stemming Words - Building a Term-Document Matrix - Frequent Terms and Associations - Word Cloud - Clustering Words - Clustering Tweets. **Social Network Analysis:** Network of Terms - Network of Tweets - Two-Mode Network. **Case Study:** Analysis and Forecasting of House Price Indices.	**18**
	Total Contact Hours	**90**

Pedagogy and Assessment Methods:
Direct Instruction, Flipped Class, Digital Presentation, Seminar, Quiz, Assignments, Group Task.

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/EDITION	YEAR OF PUBICATION
1	Yanchang Zhao	R and Data Mining: Examples and Case Studies	Elsevier	2015

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBICATION
1	Luis Torgo	Data Mining with R Learning with Case Studies	2nd Edition, Chapman and Hall/CRC	2017
2	Jiawei Han & Micheline Kamber	Data Mining Concepts & Techniques	9th Edition, Academic Press	2011

Web References

1. https://swayam.gov.in/nd2_cec20_cs12/preview
2. https://onlinecourses.nptel.ac.in/noc20_mg24/preview
3. https://www.rdatamining.com/examples/decision-trees
4. https://www.tutorialspoint.com/Data-Warehousing-and-Data-Mining
5. https://www.jnec.org/labmanuals/it/te/sem1/R-lab.pdf

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: M.Dhavapriya Signature:	Name: Dr.M. Sakthi Signature:	Name: K.Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:		M.Sc CS	**Programme Title:**		Master of Science (Computer Science)	
Course Code:	22PCS312	**Course Title:**	Full Stack Web Development		**Batch :**	2022-2024
Lecture Hrs./Week Or Practical Hrs./Week		5	**Tutorial Hrs/Sem**	-	**Semester:**	III
					Credits:	4

Course Objective

To understand full stack web development and use HTML, CSS and Javascript to handle front-end operations and back-end server scripting. MEAN is a full-stack development toolkit used to develop a fast and robust web application.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Remember the basics of HTML, CSS and Javascript	K1, K2
CO2	Understand the principles, knowledge and skills for the design and construction of web-enabled internet applications	K2
CO3	Design, implement and deploy an inhouse project using MongoDB, Express.js, AngularJS and Node.js	K4, K5
CO4	Analyze and design appropriate database services based on the requirements	K4, K5
CO5	Evaluate different web application development alternatives and choose the appropriate one for a specific scenario	K5

MAPPING

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P1O	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	H	H	M	M	H	H	M	H	H	H	M	H	H	M
CO2	M	M	H	H	H	H	M	M	H	H	H	M	H	H	M
CO3	H	H	H	M	H	H	M	H	M	H	H	M	H	H	H
CO4	M	H	M	M	H	M	H	M	H	M	H	M	H	H	H
CO5	M	M	H	H	H	H	H	H	H	H	M	H	H	H	H

H: High; M: Medium; L: Low.

Units	Contents	Hrs
UNIT I	**Introduction:** Basics of HTML, CSS, and Javascript HTML, CSS, Bootstrap, Javascript basics – Variables, functions, and scopes, Logic flow and loops, Events and Document object model, Handling JSON data, Understanding Jsoncallbacks.	**15**
UNIT II	**Node JS:** Introduction to Node JS Installation, Callbacks, Installing dependencies with npm, Concurrency and event loop fundamentals, Node JS callbacks, Building HTTP server, Importing and exporting modules, Building chat application using web socket.	**15**
UNIT III	**REST Services:** Building REST services using Node JS REST services, Installing Express JS, Express Node project structure, Building REST services with Express framework, Routes, filters, template engines – Jade, ejs.	**15**

UNIT IV	**MongoDB:** MongoDB Basics and Communication with Node JS Installation, CRUD operations, Sorting, Projection, Aggregation framework, MongoDB indexes, Connecting to MongoDB with Node JS, Introduction to Mongoose, Connecting to MongoDB using mongoose, Defining mongoose schemas, CRUD operations using mongoose.	**15**
UNIT V	**Angular JS:** Building Single Page Applications with AngularJS Single Page Application – Introduction, Two-way data binding(Dependency Injection), MVC in Angular JS, Controllers, Getting user input, Loops, Client side routing – Accessing URL data, Various ways to provide data in Angular JS – Services and Factories, Working with filters, Directives and Cookies, The digest loop and use of $apply.	**15**
	Total Contact Hours	**75**
Pedagogy and Assessment Methods: Direct Instruction, Flipped Class, Digital Presentation, Seminar, Quiz, Assignments, Group Task.		

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/EDITION	YEAR OF PUBICATION
1	Simon Holmes	Getting MEAN with Mongo, Express, Angular, and Node	Manning Publications, First Edition	2015
2	Jeff Dickey	Write Modern Web Apps with Mean Stack	Peachpit Press	2015
3	Ken Williamson	Learning Angular JS	O′Reilly, First Edition	2015
4	Mithun Satheesh	Web development with MongoDB and Node JS	Packt Publishing Limited, Second Revised Edition	2015

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBICATION
1	Laura Lemay, Rafe Colburn, Jennifer Kyrnin	Mastering HTML, CSS & JavaScript Web Publishing	Paperback	2016
2	Jon Duckett	Web Design with HTML, CSS, JavaScript and jQuery	Paperback	2014
3	Mardan, Azat	Full Stack JavaScript: Learn Backbone.js, Node.js and MongoDB	Apress	2015

Web References

1. https://www.tutorialspoint.com/the_full_stack_web_development/index.asp
2. https://www.javatpoint.com/how-to-be-a-full-stack-developer
3. https://www.fita.in/full-stack-developer-tutorial/
4. https://www.mongodb.com/languages/mean-stack-tutorial
5. https://intellipaat.com/blog/tutorial/angularjs-tutorial/

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: N.Arulkumar Signature:	Name: Dr.M. Sakthi Signature:	Name: K. Srinivasan Signature:	Name: Dr.R.Manicka Chezian Signature:

Programme Code:		M.Sc CS	**Programme Title:**		Master of Science (Computer Science)	
Course Code:	22PCS3E2	**Course Title:**	**Elective III: Natural Language Processing and Text Analytics**		**Batch :**	2022-2024
Lecture Hrs./Week Or Practical Hrs./Week		5	**Tutorial Hrs/Sem**	-	**Semester:**	III
					Credits:	5

Course Objective

To understand text processing for extracting information and to provide insights into fundamental concepts to speech processing and phonetic.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the data science concepts and infer the knowledge about data science process	K2,K4
CO2	Illustrate the basics of natural language processing and apply feature engineering concept for text representation	K2,K3
CO3	Analyze text classification an devaluatethe classification model in real word application	K4,K5
CO4	Learn and apply different text analytics techniques to retrieve information from text	K3
CO5	Understand the basic concept of speech recognition and analyze the phonetic in speech	K2,K4

MAPPING

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1O	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	L	H	H	L	M	L	L	L	H	H	H	H	H	H
CO2	M	L	H	H	L	L	L	L	L	M	H	H	H	H	H
CO3	H	M	H	M	M	L	L	L	L	H	H	H	H	H	H
CO4	H	H	H	M	M	M	L	L	L	H	H	H	H	H	H
CO5	L	L	M	M	M	M	L	L	L	M	M	M	M	H	H

H: High; M: Medium; L: Low.

Units	Contents	Hrs
UNIT I	Introduction to data science - case for data science - data science classification - data science algorithms - Data Science Process - prior Knowledge - Data Preparation - Modeling - Application - Knowledge - Data Exploration - Objectives of data Exploration - Datasets - Descriptive Statistics - Roadmap for data exploration.	**15**
UNIT II	Natural language Processing basics - Language Syntax and Structure - Language Semantics - Natural language Processing - Text Analytics - Text Preprocessing and Wrangling - Understanding Text Syntax and Structure - Feature Engineering for Text Representation - Traditional Feature Engineering Models - bag of words model - bag of N-Grams model - TF - IDF Model – Topic Models	**15**
UNIT III	Text Classification - Automated Text Classification - Text Classification Blueprint - Classification Models - Multinomial Naïve Bayes - Logistic Regression - Support Vector	**15**

	Machines - Ensemble Models - Random Forest - Gradient Boosting Machines - Evaluating Classification Models – Text Similarity and clustering - Essential Concepts - Analyzing term Similarity - Analyzing Document Similarity - Document Clustering	
UNIT IV	Feature Engineering - K-means Clustering - Affinity Propagation - Wards Agglomerative Hierarchical Clustering - Semantic Analysis - Exploring Word net - Word Sense Disambiguation - Named Entity Recognition - Analyzing Semantic Representations - Sentiment Analysis - Unsupervised Lexicon-Based Models - Bing Lius Lexicon - MPQA Subjectivity Lexicon - Pattern Lexicon – Text Blob Lexicon - AFINN Lexicon – Senti WordNet Lexicon - VADER Lexicon - Classifying Sentiment with Supervised Learning.	**15**
UNIT V	Speech - Phonetics - Speech Sounds and Phonetic Transcription - Articulatory Phonetics - Phonological Categories and Pronunciation variation - Acoustics Phonetics and Signals - Speech Synthesis - Phonetic Analysis - Prosodic Analysis - Diphone Waveform synthesis - Automatic Speech Recognition - Speech Recognition Architecture - Applying Hidden Markov Model to Speech.	**15**
	Total Contact Hours	**75**
Pedagogy and Assessment Methods: Direct Instruction, Flipped Class, Digital Presentation, Seminar, Quiz, Assignments, Group Task.		

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/EDITION	YEAR OF PUBICATION
1	Vijay Kotu, Bala Deshpande	Data Science: Concepts and Practice	Second Edition, Elsevier Publications	2019
2	DipanjanSarkar	Text Analytics with Python: A Practitioner"s Guide to Natural Language Processing	A Press	2019
3	Daniel Jurafsky, James H. Martin	Speech and Language Processing	Pearson	2009

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBICATION
1	AdiAdhikari and John De Nero	Computational and Inferential Thinking: The Foundations of Data Science	First edition	2019
2	D. Jurafsky, J.H. Martin	Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition	3rd Edition Draft	2019