



ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Annamayya District, AP – 516126, INDIA

**Department of Artificial Intelligence and Machine
Learning**

MEETING MINUTES
of
BOARD OF STUDIES

ACADEMIC YEAR: 2026-27



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RAJAMPET, Annamayya District, AP – 516126, INDIA

Date: 06/05/2026

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

3rd BoS Minutes of Meeting

The 3rd meeting of the Board of Studies (BoS) Department of Artificial Intelligence and Machine Learning was held in offline mode on 2nd May 2026 at 10:30 AM in Neumann Lab Main Block, with the following members of the board present.

Members Present:

Sno	Name of the member	Designation & address	Role in BoS
1	Dr N. Penchalaiah	Associate Professor & HoD Dept. of AIML Annamacharya University Rajampet. Ph: 9640435371 Email: penchalaiah550@gmail.com	Chairman
2	Dr. J. Krishna	Associate Professor Dept. of AIML Annamacharya University Rajampet. Ph: 9440793906 Email: krishnajik@gmail.com	Senior Faculty – Member
3	Dr. C.V.Lakshmi Narayana	Assistant Professor Dept. of AIML Annamacharya University Rajampet. Ph: 9989771567 Email: cvlakshminarayana@gmail.com	Senior Faculty – Member
4	Dr. S. Surekha	Assistant Professor Dept. of AIML Annamacharya University Rajampet. Ph: 7995738289 Email: swarnas.623@gmail.com	Course Coordinator- Member
5	Mr. N. Siva	Assistant Professor, Dept. of AIML Annamacharya University, Rajampet Ph. No: 7799468785 Email: nsiva5809@gmail.com	Course Coordinator- Member
6	Dr. D Vivekananda Reddy	Professor & Head Department of Computer Science and Engineering, SVUCE S V University, Tirupati. Mobile No: 9441005225 E-Mail: svuvivek@gmail.com	Subject Expert – Member



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7	Dr. Srinivasa Rao. B.	Professor, School of Computer and Information Sciences (SCIS), University of Hyderabad, Prof.C.R.Rao Road, Gachibowli, Hyderabad-500046 Ph: : 9666428448 Email: srinivas.battula@uohyd.ac.in	Subject Expert Member –
8	Dr. Hanumanthappa M	Professor, Dept. of Computer Science Director IQAC Bangalore University Bangalore Ph: 9448819017 Email: hanu6572@bub.ernet.in	University Nominee- Member
9	T. Maheedhar	Senior devOps Engineer, EPAM India, Hyderabad Ph. No: 8309877015 Email: tmahi131@gmail.com	Industry Representative- Member
10	S. Satheesh Reddy	Averixis Solutions Role -Business Development Associate Mobile No - 9059645025 Gmail: saddalassatheesh@gmail.com	Industry Representative- Member

Members of Absence: NIL



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Agenda of the Meeting:

Item No	Particulars
BoS/2026/AIML/3.1	Welcome and Introduction Confirmation of the Minutes of the 2 nd Board of Studies Meeting.
BoS/2026/AIML/3.2	To discuss and finalize the course structure and syllabus for III-B.Tech. under the AU-24 Regulations along with proposed syllabus for IV B. Tech
BoS/2026/AIML/3.3	To review and address any discrepancies observed in the second-year under the AU-24 Regulations. (If applicable)
BoS/2026/AIML/3.4	To consider and approve the merging of courses Exploratory Data Analysis with Python” and “Data Wrangling and Preprocessing” into a single integrated course titled “Data Wrangling and Exploratory Data Analysis”.
BoS/2026/AIML/3.5	To introduce a new subject titled “AI for Cloud Computing” in place of the existing “Data Wrangling and Preprocessing” course based on External BOS recommendations
BoS/2026/AIML/3.6	To approve the list of examiners for second-year courses/subjects.
BoS/2026/AIML/3.7	Any other item with permission of the Chair

MINUTES OF THE MEETING

Agenda Item No. BoS/2025/AIML/2.1 Welcome and Introduction

Welcome:

Dr N. Penchalaiah, Head, Department of Artificial Intelligence and Machine Learning has extended warm welcome to all the members.

Introduction:

At the outset, Dr N. Penchalaiah, Head, Department of Artificial Intelligence and Machine Learning introduced all the members of the Board of Studies and thanked them for accepting the invitation for the 3rd BoS meeting.



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Dr N. Penchalaiah he recalled the proceedings of the 2nd Board of Studies informed the members that the minutes had been documented and circulated in advance for their review. He then requested the board to kindly confirm the minutes as recorded and invited any comments or suggestions for modification, if necessary.

Agenda Item No. BoS/2026/AIML/3.1: Confirmation of the Minutes of the 2nd Board of Studies Meeting.

Resolution: The minutes of the 2nd Board of Studies meeting were presented before the members for review. The members thoroughly examined the recorded proceedings and resolutions. The Board unanimously approved and confirmed the minutes of the 2nd BoS meeting without any modifications.

The list is enclosed in the Annexure-I.

Agenda Item No. BoS/2026/AIML/3.2: Discussion and Finalization of Course Structure and Syllabus for III B. Tech (AU-24) and Proposed IV B. Tech Course Structure

Resolution: The Board unanimously approved the revised course structure and syllabus for III B. Tech under AU-24 Regulations, along with the proposed framework for IV B. Tech, incorporating the following modifications:

- Replacement of the course “Data Science using Python” with “Big Data Analytics”
- Shifting of “Big Data Analytics” from IV B. Tech I Semester (4-1) to III B. Tech II Semester (3-2)

The Board of Studies (BoS) convened to review, discuss, and finalize the proposed course structure and detailed syllabus for III B.Tech under the AU-24 Regulations, along with the proposed course framework for IV B. Tech in the Department of Artificial Intelligence and Machine Learning.

The Chairperson presented the proposed curriculum, highlighting its alignment with AICTE guidelines, industry expectations, and program outcomes. The Board undertook a comprehensive evaluation focusing on:

- Academic progression and logical sequencing of courses
- Integration of emerging technologies such as Artificial Intelligence, Machine Learning, and Big Data
- Enhancement of practical exposure and skill-based learning
- Avoidance of redundancy in course content



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During the deliberations, valuable suggestions were provided by the External BOS members:

Dr. B. Srinivasa Rao, Professor, School of Computer and Information Sciences (SCIS), University of Hyderabad, emphasized the growing importance of Big Data technologies in the current industry landscape and recommended strengthening this area in the curriculum.

Dr. D. Vivekananda Reddy, Professor & Head, Department of Computer Science and Engineering, SVUCE, Sri Venkateswara University, Tirupati, supported the inclusion of advanced data handling and analytics courses at an earlier stage to improve student competency and industry readiness.

Based on these expert recommendations, the Board discussed the proposal to:

- Replace the subject “Data Science using Python” with “Big Data Analytics”
- Shift the “Big Data Analytics” course from IV B.Tech I Semester (4-1) to III B.Tech II Semester (3-2)

The members observed that introducing Big Data Analytics earlier in the curriculum would:

- Provide a strong foundation for advanced AI/ML applications
- Enhance students’ ability to handle large-scale data processing frameworks such as Hadoop and Spark
- Better align with industry requirements and emerging job roles

After detailed deliberations and mutual consensus, the Board found the proposed changes to be academically sound and beneficial for students.

The approved Course Structure and Syllabus for III B. Tech and proposed IV B. Tech Course Structure are enclosed in **Annexure-II**.

Agenda Item No. BoS/2026/AIML/3.3: Review of Discrepancies in Second-Year Curriculum (AU-24 Regulations). (If applicable).

Resolution: The Board noted and recorded that the second-year B. Tech course structure and syllabus under AU-24 Regulations are consistent and require no modifications. The same is approved for continued implementation without any changes.

The Board of Studies (BoS) undertook a detailed review of the second-year B.Tech curriculum under the AU-24 Regulations. The internal faculty members, along with the External BOS subject experts, carefully examined all aspects of the curriculum, including course content, structure, learning outcomes, credit distribution, and sequencing of subjects.



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Upon thorough examination and verification, the Board observed that no discrepancies or inconsistencies were found in the existing curriculum. The syllabus was found to be well-structured, coherent, and appropriately aligned with academic standards and industry requirements.

Agenda Item No. BoS/2026/AIML/3.4: Approval for Merging of Courses

Resolution: The Board approved the merging of the courses into a single integrated course titled “Data Wrangling and Exploratory Data Analysis.”

The Board discussed the proposal to merge the following courses:

- “Exploratory Data Analysis with Python”
- “Data Wrangling and Preprocessing”

The objective of merging was:

- To eliminate redundancy in content
- To provide a comprehensive and integrated understanding of data preprocessing and analysis
- To improve curriculum efficiency and reduce fragmentation

After discussion, the merged course was proposed to be titled: “Data Wrangling and Exploratory Data Analysis”

External BOS members appreciated the integration, stating that it reflects real-world data workflows more effectively.

Agenda Item No. BoS/2026/AIML/3.5: Introduction of New Course: “AI for Cloud Computing”

Resolution: The Board, after detailed discussion and consideration of expert suggestions, unanimously approved the introduction of the course “AI for Cloud Computing” in place of “Data Wrangling and Preprocessing.”

The Board considered the proposal to introduce a new course titled “AI for Cloud Computing” in place of the existing “Data Wrangling and Preprocessing” course.

The proposal was discussed in detail, and the following key justifications were highlighted:

- Growing demand for cloud-based AI solutions in industry
- Importance of integrating Artificial Intelligence with cloud platforms such as AWS, Azure, and Google Cloud Platform (GCP)



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- Need to enhance student employability through industry-relevant and future-oriented skills

During the deliberations, **Dr. Hanumanthappa M, Professor, Department of Computer Science and Director, IQAC, Bangalore University, Bangalore**, strongly recommended the introduction of this course to ensure that the curriculum remains aligned with current technological advancements and industry requirements.

External BOS members collectively supported this proposal, emphasizing the significance of cloud-integrated AI competencies for modern applications.

Agenda Item No. BoS/2026/AIML/3.6: Approval of List of Examiners

Resolution: The Board approved the list of examiners for third-year courses/subjects.

The approved list of Examiners is enclosed in **Annexure-III**.

BoS/2025/AIML/3.7: Any other item with permission of the Chair

Resolution: NIL.

Dr N. Panchalaiah
Chairman-BOS-AI&ML
Annamacharya Univesity,
Rajampet.

Internal Members:

1. Dr. J. Krishna
2. Dr. S. Surekha
3. Dr. C. V. Lakshimi Narayana
4. Mr. N. Siva

- J. Krishna
- S. Surekha
- C. V. Lakshimi Narayana
- N. Siva



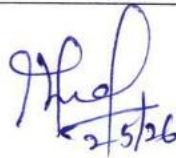
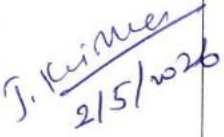
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Boards of Studies Attendance sheet:

Sno	Name of the member	Role in BoS	Signature of the Member
1	Dr N. Penchalaiah Associate Professor & HoD Dept. of AIML Annamacharya University Rajampet. Ph: 9640435371 Email: penchalaiah550@gmail.com	Chairman	 2/5/26
2	Dr. J. Krishna Associate Professor Dept. of AIML Annamacharya University Rajampet. Ph: 9440793906 Email: krishnajik@gmail.com	Senior Faculty – Member	 2/5/26
3	Dr. C. V. Lakshmi Narayana Assistant Professor Dept. of AIML Annamacharya University Rajampet. Ph: 9989771567 Email: cvlakshminarayana@gmail.com	Senior Faculty – Member	 2/5/26
4	Dr. S. Surekha Assistant Professor Dept. of AIML Annamacharya University Rajampet. Ph: 7995738289 Email: swarnas.623@gmail.com	Course Coordinator- Member	 02/05/26
5	Mr. N. Siva Assistant Professor, Dept. of AIML Annamacharya University, Rajampet Ph. No: 7799468785 Email: nsiva5809@gmail.com	Course Coordinator- Member	
6	Dr. D Vivekananda Reddy Professor & Head Department of Computer Science and Engineering, SVUCE S V University, Tirupati. Mobile No: 9441005225 E-Mail: svuvivek@gmail.com	Subject Expert – Member	
7	Dr. Srinivasa Rao. B. Professor, School of Computer and Information Sciences (SCIS), University of Hyderabad, Prof.C.R.Rao Road, Gachibowli, Hyderabad-500046 Ph: : 9666428448 Email: srinivas.battula@uohyd.ac.in	Subject Expert – Member	

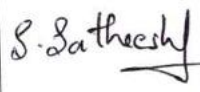


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8	Dr. Hanumanthappa M Professor, Dept. of Computer Science Director IQAC Bangalore University Bangalore Ph: 9448819017 Email: hanu6572@bub.ernet.in	University Nominee- Member	
9	T. Maheedhar Senior devOps Engineer, EPAM India, Hyderabad Ph. No: 8309877015 Email: tmahi131@gmail.com	Industry Representative- Member	
10	S. Satheesh Reddy Averixis Solutions Role - Business Development Associate, Hyderabad Mobile No - 9059645025 Gmail: saddalasatheesh@gmail.com	Alumni Representative- Member	



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Brief Note on the 3rd Board of Studies Meeting

The 3rd meeting of the Board of Studies (BoS) of the Department of Artificial Intelligence and Machine Learning was held in offline mode on **2nd May 2026 at 10:00 AM** in the **Neumann Lab, Main Block**, with the esteemed internal and external members of the Board present.

The meeting commenced at 10:00 AM and continued with detailed deliberations on all agenda items. The discussions were carried out in a structured and collaborative manner, focusing on curriculum development, course structure revisions, and alignment with industry requirements. The meeting concluded at **1:30 PM**, with all agenda items thoroughly discussed and resolved.

The total duration of the meeting was approximately **3:30 hours**.

HOD-AI&ML

Re: Submission of Revised Documents for 3rd BOS Meeting Verification--Reg;

From Dr. Srinivasa Rao Battula <srinivas.battula@uohyd.ac.in>

Date Tue 5/5/2026 10:43 PM

To N. Penchalaiah <npc@aitsrajampet.ac.in>

Cc svuvivek@gmail.com <svuvivek@gmail.com>; hanu6572@bub.ernet.in <hanu6572@bub.ernet.in>; tmahi131@gmail.com <tmahi131@gmail.com>; saddalasatheesh@gmail.com <saddalasatheesh@gmail.com>; siva n <nsiva5809@gmail.com>; surekha swarna <swarnas.623@gmail.com>; cvlakshminarayana@gmail.com <cvlakshminarayana@gmail.com>; krishnajjk@gmail.com <krishnajjk@gmail.com>; Penchalaiah Narasapuram <penchalaiah550@gmail.com>

Dear Dr.Penchalaiah,

Thank you for sharing the Minutes of the Meeting (MoM) held on 02-05-2026. I have reviewed the document and confirm that it reflects the discussions and decisions made during the meeting. I hereby approve the same.

Regards,
Srinivas

Dr.Srinivasa Rao Battula Ph.D

Professor

School of Computer and Information Sciences(SCIS),

University of Hyderabad

Prof.C.R.Rao Road,

Gachibowli,

Hyderabad -500046

Mob: +91 9666428448

Web: <https://scis.uohyd.ac.in/~bscs/>

Google Scholar: <https://scholar.google.com/citations?user=qbuooHIAAAAJ&hl=en>

On Mon, May 4, 2026 at 5:54 PM N. Penchalaiah <npc@aitsrajampet.ac.in> wrote:

Respected Sir/s,

Please find the attached documents pertaining to the 3rd BOS Meeting held on 02-05-2026. As per the modifications suggested during the meeting, we have incorporated the necessary changes in the course structure.

The revised documents are attached herewith in PDF format for your kind perusal.

We request you to kindly review the same and provide your approval. Upon receiving your acceptance, we will proceed with the preparation of the BOS Minutes of Meeting accordingly.

Thanks and Regards

Dr. N. Panchalaiah .

Associate professor & HoD,

Department of AI&ML

ANNAMACHARYA UNIVERSITY, RAJAMPET

PHNO: 9640435371

EMAIL: npc@aitsrajampet.ac.in

Re: Submission of Revised Documents for 3rd BOS Meeting Verification--Reg;

From Vivek <svuvivek@gmail.com>

Date Wed 5/6/2026 5:47 AM

To N. Penchalaiah <npc@aitsrajampet.ac.in>

Good morning

I have gone through the scheme and syllabus same may be approved

Dr D.VIVEKANANDA REDDY

Professor

Department of Computer science and Engineering

S.V.University college of Engineering

Tirupati

9441005225,7981269983

On Mon, 4 May 2026, 5:54 pm N. Penchalaiah, <npc@aitsrajampet.ac.in> wrote:

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Thanks and Regards

Dr. N. Penchalaiah

Associate professor & HoD,

Department of AI&ML .

ANNAMACHARYA UNIVERSITY, RAJAMPET

PHNO: 9640435371

EMAIL: npc@aitsrajampet.ac.in

Re: Submission of Revised Documents for 3rd BOS Meeting Verification--Reg;

From Hanumanthappa M <hanu6572@bub.ernet.in>

Date Tue 5/5/2026 9:55 AM

To N. Penchalaiah <npc@aitsrajampet.ac.in>

Dear Professor,

Greetings and good wishes. Thank you for your mail. I have gone through the contents circulated through this mail. Here with I approve the course structure and course contents.

With warm regards

Dr. Hanumanthappa M
Senior Professor & Chairman
Department of Computer Science & Applications,
Bangalore University,
Bangalore 56.
Ph. 9448819017, 8618801402, 080-22961451

On Mon, 4 May, 2026, 17:55 N. Penchalaiah, <npc@aitsrajampet.ac.in> wrote:

Respected Sir/s,

Please find the attached documents pertaining to the 3rd BOS Meeting held on 02-05-2026. As per the modifications suggested during the meeting, we have incorporated the necessary changes in the course structure.

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Thanks and Regards

Dr. N. Penchalaiah

Associate professor & HoD,

Department of AI&ML

ANNAMACHARYA UNIVERSITY, RAJAMPET

PHNO: 9640435371

EMAIL: npc@aitsrajampet.ac.in

Re: Submission of Revised Documents for 3rd BOS Meeting Verification--Reg;

From T mahi <tmahi131@gmail.com>

Date Thu 5/7/2026 9:58 AM

To N. Penchalaiah <npc@aitsrajampet.ac.in>

Cc Vivek <svuvivek@gmail.com>; hanu6572@bub.ernet.in <hanu6572@bub.ernet.in>; Satheesh Saddala <saddalasatheesh@gmail.com>; siva n <nsiva5809@gmail.com>; surekha swarna <swarnas.623@gmail.com>; Venkata Lakshmi Narayana Chenna <cvlakshminarayana@gmail.com>; krishnajjk@gmail.com <krishnajjk@gmail.com>; Penchalaiah Narasapuram <penchalaiah550@gmail.com>; srinivas.battula@uohyd.ac.in <srinivas.battula@uohyd.ac.in>

Dear Dr. Penchalaiah,

Thank you for sharing the Minutes of the Meeting (MoM) held on 02-05-2026. I have reviewed the document and confirm that it reflects the discussions and decisions made during the meeting. I hereby approve the same.

Your effort towards students academics to align with the current business standards are pretty much appreciated.

Thanks & Regards,

T.Maheedhar,
Cloud and DevOps,
EPAM, Hyderabad.

On Tue, 5 May 2026, 10:43 pm Dr. Srinivasa Rao Battula, <srinivas.battula@uohyd.ac.in> wrote:

Dear Dr.Penchalaiah,

Thank you for sharing the Minutes of the Meeting (MoM) held on 02-05-2026. I have reviewed the document and confirm that it reflects the discussions and decisions made during the meeting. I hereby approve the same.

Regards,
Srinivas

Dr.Srinivasa Rao Battula Ph.D
Professor
School of Computer and Information Sciences(SCIS),
University of Hyderabad
Prof.C.R.Rao Road,

Gachibowli,

Hyderabad -500046

Mob: +91 9666428448

Web: <https://scis.uohyd.ac.in/~bscs/>

Google Scholar: <https://scholar.google.com/citations?user=qbuooHIAAAAJ&hl=en>

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Thanks and Regards

Dr. N. Panchalaiah

Associate professor & HoD,

Department of AI&ML

ANNAMACHARYA UNIVERSITY, RAJAMPET

PHNO: 9640435371

EMAIL: npc@aitsrajampet.ac.in

ANNAMACHARYA UNIVERSITY
Department of Artificial Intelligence and Machine Learning

Semester V (Third year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	PC	24ACSE52T	Computer Networks	3	0	0	3
2	PC	24ACSM51T	Machine Learning	3	0	0	3
3	PC	24AAIM51T	Data Wrangling and Exploratory Data Analysis	3	0	0	3
4	PE	24ACSE5DT	Quantum Computing	3	0	0	3
		24ACSE5AT	Software Testing Methodologies				
		24AAIM5AT	AI Chatbots				
		24ACSE5BT	Object Oriented Analysis and Design				
5	OE	24AAIM5BT	MOOC	3	0	0	3
6	PC	24ACSE52L	Computer Networks Lab	0	0	3	1.5
7	PC	24ACSM51L	Machine Learning Lab	0	0	3	1.5
8	PC	24AAIM51L	Data Wrangling and Exploratory Data Analysis Lab	0	0	3	1.5
9	MC	24AUD51T	Gender Sensitization	2	0	0	0
10	Internship	24AAIM51I	Summer Internship 2 Months after second year (to be evaluated during V semester)	0	0	0	2
Total Credits							21.5

Category	Credits
Professional Core Courses	13.5
Professional Elective courses	3
Open Elective Courses	3
Industrial/Research Internship	2
Total Credits	21.5

Semester VI (Third year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	PC	24ACSM62T	Natural Language Processing	3	0	0	3
2	PC	24AAIM61T	AI for Cloud Computing	3	0	0	3
3	PC	24ACSM61T	Data Visualization	3	0	0	3
4	PE	24ACSM6AT	Internet of Things	3	0	0	3
		24ACSE6AT	Software Project Management				
		24ACSM6BT	Cryptography and Network Security				
		24AAIM6AT	Big Data Analytics				
5	OE	24AAIM6BT	MOOC	3	0	0	3
6	PC	24ACSM62L	Natural Language Processing Lab	0	0	3	1.5
7	PC	24AAIM61L	AI for Cloud Computing Lab	0	0	3	1.5
8	PC	24ACSM61L	Data Visualization Lab	0	0	3	1.5
9	SEC	24AENG61S	Soft Skills	1	0	2	2
10	MC	24AMBA61T	Technical Paper Writing and Intellectual Property Right	2	0	0	0
Total Credits							21.5

Category	Credits
Professional Core courses	13.5
Professional Elective courses	3
Open Elective Course/Job oriented elective	3
Skill Enhanced Courses	2
Total Credits	21.5

Semester VII (Fourth year)

Sl. No	Category	CourseCode	Course Title	Hours per week			Credits
				L	T	P	
1	PC	24ACSE71T	Deep Learning	3	0	0	3
2	PE	24AAIM7AT	Recommender Systems	3	0		3
		24ACSM7BT	Graph Neural Networks				
		24AAIM7BT	Explainable AI & Model Interpretability				
		24ACSM7DT	Computational Intelligence				
3	PE	24ACSM7ET	Computer Vision	3	0		3
		24ACSM7FT	Reinforcement Learning				
		24AAIM7CT	Generative AI				
		24ACSM7HT	AI for Robotics				
4	PE	24ACSM7IT	Cognitive Science	3	0		3
		24AAIM7DT	Information Retrieval Systems				
		24ACSM7KT	Data Science using Python				
		24ACSM7LT	MLops & AI Model Deployment				
5	OE	24ACSM7MT	Block Chain Technology	2	0		3
		24ACSM7NT	AI for Smart cities and IOT Systems				
		24AAIM7ET	Design Patterns				
		24AAIM7FT	AI in Cyber Security				
6	OE	24ACIV7NT	Water Resources and Harvesting	3	0		3
		24ACIV7MT	Disaster Management				
		24AECE7UT	Electric Vehicles				
		24AECE7TT	Renewable Energy Sources				
		24AMEC7HT	Optimization Techniques				
		24AMECGT	Entrepreneurship Development				
		24AECE7VT	Introduction to Image Processing				
		24AECE7TT	Introduction to Communications Systems				
		24AMBA71T	Human Resource Management				
		24AMBA72T	Startup Management				
		24AMAT71T	Numerical Methods				
		23ACHE71T	Chemistry of Energy Systems				
		23APHY71T	Smart Materials and devices				
		24AENG31T	English For Competitive Examinations				
7	SEC	24ACSE72S	Prompt Engineering	1	0	2	2
8	Internship	24ACSM7II	Industrial/Research Internship 2 Months after third year (to be evaluated during VII semester)	0	0	0	2
Total credits							22

Category	Credits
Professional Core Courses	3
Professional Elective courses	9
Open Elective Course	6
Skill Enhanced Courses	2
Industrial/Research Internship	2
Total Credits	22

Semester VIII (Fourth year)

Sl. No.	Category	CourseCode	Course Title	Hours per week			Credits
				L	T	P	C
1	PW	24AAIM81P	Project work, seminar and internship in industry	-	-	-	12
Internship (6 months)				Total credits			12

S.NO	Category	AIML
1	BS	20
2	MC	0
3	ES	24.5
4	PC	52.5
5	PE	15
6	OE	12
7	HSM	12
8	SEC	8
9	INTERNSHIP	4
10	PW	12
	Total	160



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RAJAMPET, Annamayya District, AP - 516126,

Title of the Course: Computer Networks
Category: PC
Year: III BTech
Semester: I Semester
Course Code: 24ACSE52T
Branch/es: CSE, CSE(AIML) & CSE (IoTCSBC)

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	-	-	3	52

Course Objectives: This course is designed to

1. Understand the protocol layering and physical level communication.
2. Analyze the performance of a network.
3. Describe the functions of network layer and the various routing protocols.
4. Familiarize the functions and protocols of the Transport layer.
5. Understand the working of various Application Layer Protocols.

Course Outcomes:

After completion of the course, students will be able to

1. Explain protocol layering, OSI/TCP-IP models, and physical layer communication.
2. Analyze network performance using metrics like throughput and delay.
3. Apply network layer functions and routing protocols.
4. Explain transport layer functions and differentiate TCP and UDP.
5. Illustrate the working of application layer protocols such as DNS and HTTP.

Unit 1 Introduction to Physical Layer

10

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet. Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

Unit 2 Data Link Layer

12

Data link layer: Design issues, framing, Error detection and correction. Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel. Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols. Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols.

LD

D. Sarika

V. Sathya Prasad

Ref. (S. M. Rafi)

V. Chaitanya

S. S. S. (S. S. S.)

B. S. S. Chaitanya

Unit 3 The Network Layer**10**

Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet.

Unit 4 The Transport Layer**10**

Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols: RTP, RTTP.

Unit 5 The Application Layer**10**

Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video

Textbooks:

1. Andrew S.Tanenbaum, David j.wetherall, Computer Networks, 7th Edition, PEARSON.

Reference Books:

1. James F. Kurose, Keith W. Ross, —Computer Networking: A Top-Down ApproachI, 6th edition, Pearson, 2019.
2. Forouzan, Datacommunications and Networking, 5th Edition, McGraw Hill Publication.
3. Youlu Zheng, Shakil Akthar, —Networks for Computer Scientists and EngineersI, Oxford Publishers, 2016.

Online Learning Resources:

1. <https://nptel.ac.in/courses/106105183/25>
2. <http://www.nptelvideos.in/2012/11/computer-networks.html>
3. <https://nptel.ac.in/courses/106105183/3>

CO-PO MAPPING:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSE52T.1	3	2	1	1	2	-	-	-	1	-	2	3	-	2
24ACSE52T.2	3	3	1	2	2	-	-	-	1	-	2	3	-	1
24ACSE52T.3	3	2	2	2	2	1	-	-	1	-	2	3	-	1
24ACSE52T.4	3	2	2	1	2	-	-	-	1	-	2	3	-	1
24ACSE52T.5	3	2	2	1	2	1	-	-	2	-	2	3	1	2

SL

D. Saritha

Raf.
(S.M. Rafi)

Veei
(Veerapugavalli)

(B. Ravi Kumar)

V. Sathya

B. Ravi
Chandrasekhar



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RAJAMPET, Annamayya District, AP - 516126,

Title of the Course: Machine Learning
Category: PC
Year: III BTech
Semester: I Semester
Course Code: 24ACSM51T
Branch/es: CSE, CSE(AIML)

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	-	-	3	56

Course Objectives: The course is introduced for students

1. To understand the fundamentals, applications, and learning techniques of Machine Learning.
2. To learn and apply regression and classification algorithms for predictive analysis.
3. To analyze advanced machine learning methods including SVM and ensemble techniques.
4. To develop unsupervised learning models using clustering and dimensionality reduction methods.
5. To explore advanced machine learning concepts, model deployment, and real-world applications.

Course Outcomes:

After completion of the course, students will be able to:

1. Understand Machine Learning concepts, learning paradigms, and regression techniques.
2. Apply classification algorithms and evaluate model performance using suitable metrics.
3. Analyze and implement SVM and ensemble learning techniques for predictive modeling.
4. Develop clustering and dimensionality reduction models for unsupervised learning tasks.
5. Apply advanced machine learning concepts and deploy models for real-world applications

Unit 1 Introduction to Machine Learning and Concept Learning 12

Definition and Scope of Machine Learning, Applications and Types of Learning: Supervised, Unsupervised, Reinforcement, Linear Regression: Least Squares, Cost Function, Gradient Descent, Polynomial Regression and Overfitting, Evaluation Metrics: RMSE, MAE, R^2 Score, Bias-Variance Trade off.

Concept Learning: FIND -S Algorithm, Candidate Elimination Algorithm.

Unit 2 Classification Algorithms 12

Classification Overview and Decision Boundaries, Logistic Regression: Sigmoid Function and Cost, K Nearest Neighbors (KNN), Naïve Bayes Classifier, Decision Trees and Random Forests, Model Evaluation: Confusion Matrix, Precision, Recall, F1-Score.

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(M. Rajagopal)

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(B. Nandhu)

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B. Dilip
Chakraborty

Unit 3 Support Vector Machines and Ensemble Methods

10

Support Vector Machines: Concepts, Kernels, Hyperplane and Margin Concepts, Kernel Tricks: RBF and Polynomial, Locally – Weighted Regression, Ensemble Learning: Bagging, Boosting, and Voting, Gradient Boosting, AdaBoost, and XGBoost, Model Tuning and Hyperparameter Optimization.

Unit 4 Unsupervised Learning Techniques

10

Clustering Overview: Applications, K-Means Clustering Algorithm, Expectation- Maximization(EM) Algorithm, Principal Component Analysis (PCA) for Dimensionality Reduction, Silhouette Score, Davies-Bouldin Index for Cluster Validation.

Unit 5 Neural Networks and Advanced Topics

12

Artificial Neural Networks using Back propagation algorithm, Introduction to Deep Learning, Reinforcement Learning Basics and Markov Decision Processes, Cross-Validation Techniques: k-Fold, Leave-One-Out, Feature Engineering and Feature Selection, Deployment of ML Models (Flask, Streamlit, etc.), Case Studies: Medical Diagnosis, Spam Detection, Credit Scoring.

Textbooks:

1. Tom Mitchell, Machine Learning, McGraw-Hill Education.

Reference Books:

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer..
2. Kevin P. Murphy, Machine Learning: A Probabilistic Perspective, MIT Press.
3. Christopher Bishop, Pattern Recognition and Machine Learning, Springer.

Online Learning Resources:

1. Coursera – Machine Learning by Andrew Ng (Stanford University)
2. Scikit-learn Documentation
3. Kaggle Learn – Machine Learning
4. Google's Machine Learning Crash Course
5. YouTube – StatQuest with Josh Starmer.

80

D. Santhosh

V. Sathya Narayanan

Rafi
(S.M. Rafi)

Veer
(Chandrasekhar)

S. Ramesh
(B. Ramesh)

R. B. D. P.
Chakraborty

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSM51T.1	3	2	1	1	2	-	-	1	1	-	2	3	2	1
24ACSM51T.2	3	3	2	2	3	-	-	1	1	-	2	3	3	2
24ACSM51T.3	3	3	3	2	3	-	-	1	1	1	2	3	3	3
24ACSM51T.4	2	3	2	3	3	-	-	1	1	-	2	2	3	2
24ACSM51T.5	2	2	3	2	3	1	1	2	2	1	3	3	3	3

D. Sankar

S. Ravi
(B. Sankar)

V. Sathya

Rafi
(S.M. Rafi)

Venu
(Nayagavelli)

Ravi
D. Dilip
Chabavaethy

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course : Data Wrangling and Exploratory Data Analysis
Category : PC
Year : III
Semester : I
Course Code : 24AAIM51T
Branch/es : AI&ML

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	0	0	3	52

Course Objectives:

1. Understand the fundamentals of EDA and data wrangling using Python for structured data.
2. Apply data cleaning and pre-processing techniques to prepare high-quality datasets.
3. Extract and manage data from Excel, PDFs, and databases using Python and SQL.
4. Analyse and visualize data to uncover patterns and insights.
5. Perform real-world EDA and collect data through web scraping for machine learning.

Course Outcomes:

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

1. Demonstrate understanding of EDA and perform data wrangling on structured datasets.
2. Apply data preprocessing techniques to handle missing values, duplicates, and outliers.
3. Extract, process, and integrate data from Excel files, PDFs, and relational databases.
4. Analyze data using statistical methods and visualize insights through various plots.
5. Conduct end-to-end EDA on real-world datasets and perform web scraping for data collection.

Unit 1 Introduction to EDA and Data Wrangling 10

Introduction to Data Science and EDA, Importance of EDA in Data Science Life Cycle, What Is Data Wrangling, Importance of Data Wrangling, Tasks of Data Wrangling, Data Wrangling Tools, Introduction to Python for Data Wrangling, Python Basics for Data Wrangling, Handling Structured Data: CSV, JSON, and XML Formats, Data Meant to Be Read by Machines.

Unit 2 Data Wrangling and Preprocessing 10

Handling Missing Data (mean, median, drop, and interpolation), Dealing with Duplicates, Removing duplicates and Fuzzy Matching, Outliers, and Anomalies, Encoding Categorical Variables (Label, One-hot), Data Transformation: Scaling, Normalization, Binning, Data Types Conversion and Data Type Casting, Measures of central tendency and disperency.

Unit 3 Working with Excel Files, PDFs, and Databases 11

Installing Python Packages for Data Wrangling, Parsing Excel Files, Programmatic Approaches to PDF Parsing, Converting PDF to Text (pdfminer), Acquiring and Storing Data, Introduction to Databases for Data Wrangling, Relational Databases: MySQL, Data Exploration: Table functions and Joining Datasets.

J. Krishna
(Dr. J. KRISHNA)

(88)
DR. S. SUREKHA

(Dr. C.V. Lathini Narayana)

gem
(N. SIVA)

(Dr. N. PENNELA ALAIAH)

Unit 4 Exploratory Data Analysis**10**

Visualization with Matplotlib and Seaborn, Customizing Plots: Titles, Legends, Labels and Themes
Distribution Plots: Histograms, Boxplots, KDE, Bar Charts, Count Plots, Pie Charts, Scatter Plots, Pair Plots, Heatmaps, Correlation and Covariance Analysis, Advanced Visuals: Violin Plots, Strip Plots, Swarm Plots, Multivariate Visualization and Subplots

Unit 5 EDA Case Studies and Web Scraping**11**

Step-by-step EDA on Sample Datasets (Titanic, Iris, Sales, etc.), Feature Engineering Techniques in EDA, EDA Report Generation using Python Notebooks, Preparing Data for Machine Learning Models, Web Scraping: What to Scrape and How, Analyzing and Parsing Web Pages with lxml and XPath, Advanced Web Scraping Using Selenium.

Textbook:

1. Jake VanderPlas, Python Data Science Handbook: Essential Tools for Working with Data, O'Reilly, 2016.

Reference Books:

1. Jacqueline Kazil and Katharine Jarmul, Data Wrangling with Python: Tips and Tools to Make Your Life Easier, O'Reilly Media, Sebastopol, CA, USA, 2016
2. Web Scraping with Python: Collecting More Data from the Modern Web" – Ryan Mitchell, O'Reilly Media.
3. Wes McKinney, Python for Data Analysis, 2nd Edition, O'Reilly, 2018.
4. Allen B. Downey, Think Stats: Probability and Statistics for Programmers, O'Reilly, 2014.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
24AAIM51T.1	3	2	1	1	3	-	-	-	-	-	2
24AAIM51T.2	2	3	2	2	3	-	-	-	-	-	2
24AAIM51T.3	2	3	2	3	2	-	-	-	-	-	1
24AAIM51T.4	1	2	2	2	3	-	-	-	2	-	1
24AAIM51T.5	2	3	3	3	3	-	-	-	2	1	2

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SR
(Dr. S. SUREKHA)

Dr. C. V. Lakshmi Narayana
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Siva
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Dr. N. P. Penchamiah
(Dr. N. P. PENCHAMIAH)



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RAJAMPET, Annamayya District, AP – 516126,

Title of the Course: Quantum Computing
Category: PE
Course Code: 24ACSE5DT
Year: III B. Tech
Semester: I Semester
Branch: CSE

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	-	-	3	52

Course Objectives:

1. Introduce fundamentals and history of quantum computing.
2. Develop background in mathematics, physics, and biology for quantum systems.
3. Explain qubits and quantum circuit design.
4. Present key quantum algorithms and their significance.
5. Study quantum error correction and cryptography applications.

Course Outcomes

1. Understand differences between classical and quantum computing.
2. Grasp core principles like superposition, entanglement, and measurement.
3. Analyze qubits and basic quantum circuits.
4. Evaluate major quantum algorithms.
5. Understand quantum error correction and impact on cryptography.

UNIT – 1

10

History of Quantum Computing: Importance of Mathematics, Physics and Biology. Introduction to Quantum Computing: Bits Vs Qubits, Classical Vs Quantum logical operations.

UNIT – 2

12

Background Mathematics: Basics of Linear Algebra, Hilbert space, Probabilities and measurements. Background Physics: Paul's exclusion Principle, Superposition, Entanglement and super-symmetry, density operators and correlation, basics of quantum mechanics, Measurements in bases other than computational basis. Background Biology: Basic concepts of Genomics and Proteomics (Central Dogma).

UNIT – 3

10

Qubit: Physical implementations of Qubit. Qubit as a quantum unit of information. The Bloch sphere. Quantum Circuits: single qubit gates, multiple qubit gates, designing the quantum circuits. Bell states.

SD

V. Sathya Narayanan

D. J. J. J.

Raf.
(S.M. Rafi)

V. V.
(V. V. V. V.)

B. B.
(B. B. B. B.)

R. R.
(R. R. R. R.)

UNIT – 4

10

Quantum Algorithms: Classical computation on quantum computers. Relationship between quantum and classical complexity classes. Deutsch's algorithm, Deutsch's-Jozsa algorithm, Shor's factorization algorithm, Grover's search algorithm.

UNIT – 5

10

Noise and error correction: Graph states and codes, Quantum error correction, fault-tolerant computation. Quantum Information and Cryptography: Comparison between classical and quantum information theory. Quantum Cryptography, Quantum teleportation.

TEXT BOOK:

1. Nielsen M. A., Quantum Computation and Quantum Information, Cambridge.

REFERENCE BOOKS:

1. Quantum Computing for Computer Scientists by Noson S. Yanofsky and Mirco A. Mannucci
2. Benenti G., Casati G. and Strini G., Principles of Quantum Computation and Information, Vol.I: Basic Concepts, Vol II.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSE5DT. 1	3	2	-	-	1	-	-	-	-	-	-	2	2	-
24ACSE5DT. 2	3	2	1	1	2	-	-	-	-	-	-	2	2	-
24ACSE5DT. 3	3	3	2	2	2	-	-	-	1	1	-	2	3	-
24ACSE5DT. 4	3	2	1	1	1	2	-	2	-	1	-	2	2	-
24ACSE5DT. 5	3	3	2	2	2	1	-	1	-	1	-	3	3	-

SD

D. Saritha

Raj
(S.M. Rafi)Vani
(Chagapavali)B. Rha
(B. Rhaanur)

V. Sathya Dev

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Chakravarthy



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RAJAMPET, Annamayya District, AP - 516126,

Title of the Course : Software Testing Methodologies
Category : PE
Course Code : 24ACSE5AT
Year : III B. Tech
Semester : I Semester
Branch : CSE, CSE(AIML)

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	-	-	3	52

Course Objectives:

1. To understand the fundamental concepts of software testing, including software testing objectives, the taxonomy of bugs
2. To analyze testing techniques such as path testing and transaction flow testing
3. To understand the concepts of data flow testing and its applications
4. To build the paths and decision tables for a software project
5. To apply the concepts of State Graphs, Transition Testing and Graph Testing.

Course Outcomes:

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

1. Understand the concepts of software testing and taxonomy of bugs.
2. Construct control flow graphs for different programs.
3. Apply and Test the applications using different testing methods and automation tools.
4. Build paths and decision tables for various problems
5. Analyze state graphs for different problems and apply transition testing on them.

Unit 1 : Introduction

10

Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

Unit 2 : Flow Graphs and Path Testing

10

Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

Unit 3 : Transaction Flow Testing & Domain Testing

12

Transaction flows, transaction flow testing techniques. Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing. DOMAIN TESTING: Domains and paths, Nice & ugly domains, domain testing.

Unit 4 : Paths, Path Products and Regular Expressions

10

Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection.

Logic Based Testing: Overview, Decision Tables, Path Expressions, KV Charts and Specifications.

[Handwritten signatures and initials]
S. Sathya
Raf. (S.H. Rafi)
Valli Chalapavalli
B. N. N. (B. N. N. N.)
B. B. N. P. Chakraborty

Unit 5 State, State graphs and Transaction Testing

10

State Graphs, Good & Bad State Graphs, State Testing, Testability Tips.

Graph Matrices and Application: Motivational Overview, Matrix of Graph, Relations, Power of Matrix, Node Reduction Algorithm, Building Tools.

Prescribed Text Book:

1. Baris Beizer, Software testing techniques. Dreamtech, 2nd Ed.

Reference Text books:

1. Dr.K.V.K.K.Prasad, Software Testing Tools. Dreamtech.
2. Brian Marick, The craft of software testing. Pearson Education.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSE5AT.1	3	2	1	2	2	-	-	-	-	-	3	2	2	-
24ACSE5AT.2	3	2	1	2	2	-	-	-	-	-	3	2	2	-
24ACSE5AT.3	3	3	3	3	2	-	-	-	-	-	3	2	2	-
24ACSE5AT.4	3	3	3	3	2	-	-	-	-	-	3	2	2	-
24ACSE5AT.5	3	3	3	3	2	-	-	-	-	-	3	2	2	-

D. Sarika

Raf
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RAJAMPET, Annamayya District, AP - 516126, INDIA

Title of the Course : AI CHATBOTS
Category : PE
Year : III
Semester : I
Course Code : 24AAIM5AT
Branch/es : AI&ML

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	0	0	3	51

Course Objectives:

- Knowledge on concepts of chatbots and understanding the developer environment bot framework.

Course Outcomes:

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

1. Explain chatbot fundamentals, evolution, and platforms.
2. Set up a chatbot development environment and build a basic bot with database support.
3. Design intent- and entity-based conversational models.
4. Develop advanced chatbots using design principles and custom intent classifiers.
5. Analyze chatbot performance and design solutions for various business communication models.

Unit 1 10
Introduction to Chatbots: Definition of chatbots, Journey of Chatbots, Rise of Chatbots, Messaging Platforms

Unit 2 10
Setting Up the Developer Environment Botframework Local Installation, Installing NodeJS, Following the Development Pipeline, Storing Messages in Database.

Unit 3 9
Basics of Bot Building- Intents, Entities

Unit 4 10
Advanced Bot Building Design Principles, Showing Product Results, Saving Messages, Building Your Own Intent Classifier.

Unit 5 12
Analytics, Chatbot Use Cases- Modes of Communication- Business-to-Business (B2B), Chap Business to-Consumer (B2C) Consumer-to-Consumer (C2C) Business-to-Employee (B2E), Employee-to Employee (E2E), Chatbots by Industry Vertical

Textbook:

1. Rashid Khan and Anik Das, Build Better Chatbots: A Complete Guide to Getting Started with Chatbots, Apress (Springer Nature), Berkeley, CA, 2017

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Dr. C.V. Laxmi Narayana
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Dr. N. Penchalaiah
(Dr. N. PENCHALAIAN)

S. S. Surekha
(Dr. S. SUREKHA)

N. Siva
(N. SIVA)

Reference Books:

1. Drexen Braxley: A Comprehensive Guide to AI: Elevate Your Daily Life, Increase Work Output, Secure Financial Gains, Foster Career Growth, and Cultivate Modern Talents Paperback
2. D. Nardo Publications, ChatGPT Made Simple How Anyone Can Harness AI To Streamline Their Work, Study & Everyday Tasks to Boost Productivity & Maintain Competitive Edge by Mastering Prompt Engineering
3. Robert E. Millèr, Prompt Engineering Bible Join and Master the AI Revolutions Profit Online with GPT-4 & Plugins for Effortless Money Making!
4. Lucas Foster, Chat GPT Bible Developer and Coder Special Edition: Enhancing Coding Productivity with AI-Assisted Conversations.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
24AAIM5AT.1	3	2	1	-	1	-	-	-	2	-	2
24AAIM5AT.2	3	2	3	1	3	-	-	1	1	1	2
24AAIM5AT.3	3	3	3	2	3	-	-	1	1	-	2
24AAIM5AT.4	3	3	3	2	3	-	-	2	1	1	2
24AAIM5AT.5	2	3	3	2	2	-	-	2	2	2	3

J. Krishna
(Dr. J. KRISHNA)

Dr. C.V. Lakshmi Narayana
(Dr. C.V. Lakshmi Narayana)

Dr. N. PERUMALAIAN
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SV
(Dr. S. SUREKHA)

CN SIVA
(CN SIVA)



ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
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RAJAMPET, Annamayya District, AP – 516126,

Title of the Course: Object Oriented Analysis and Design
Category: PE
Course Code: 24ACSEBT
Year: III B. Tech
Semester: I Semester
Branch: CSE, CSE(AIML) & CSE (IoTCSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	-	-	3	51

Course Objectives:

1. Describe the activities in the different phases of the object-oriented development lifecycle.
2. Understand the concepts of object-oriented model with the E-R and EER models.
3. Model a real-world application by using UML diagram.
4. Describe architectural modelling.
5. Design an application of UML.

Course Outcomes:

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

1. The importance of modelling in UML.
2. Compare and contrast the object-oriented models.
3. Design an application using Basic Behavioral Modeling.
4. Apply UML Diagrams to build library application.
5. Demonstrate the ability to implement standard design patterns.

Unit 1

10

Introduction to UML: Importance of modelling, principles of modelling, object-oriented modelling, conceptual model of the UML, Architecture, Software Development Life Cycle.

Unit 2

12

Basic Structural Modelling: Classes, Relationships, common Mechanisms, and diagrams. Advanced Structural Modelling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages. Class & Object Diagrams: Terms, concepts, modelling techniques for Class & Object Diagrams.

Unit 3

10

Basic Behavioural Modelling-I: Interactions, Interaction diagrams. Basic Behavioural Modelling-II: Use cases, Use case Diagrams, Activity Diagrams.

SD

V. Sathya Narayanan

D. Senthil

Rafi.
(SM. Rafi)

Vani
(Karpagavalli)

Srinivas
(B. Srinivas)

B. D. H. P.
Chakravarthy

Unit 4**12**

Advanced Behavioral Modelling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.,

Unit 5**10**

Architectural Modelling: Component Deployment, Component diagrams and Deployment diagrams.
Case Study: The Unified Library application, ATM

Text Books:

1. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modelling Language User Guide, Pearson Education 2nd Edition.

Reference Books:

1. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning
2. Meilir Page-Jones: Fundamentals of Object-Oriented Design in UML, Pearson Education.
3. Pascal Roques: Modelling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSEBT.1	3	2	1	1	1	-	-	-	-	-	2	2	1	-
24ACSEBT.2	3	3	2	2	3	-	-	-	-	-	2	3	2	-
24ACSEBT.3	3	3	2	2	1	-	-	-	-	-	3	2	2	-
24ACSEBT.4	3	3	3	3	2	-	-	-	-	-	3	2	2	-
24ACSEBT.5	3	3	3	3	3	-	-	2	2	2	3	3	3	1

SD

D. Sankar

V. Sathya Narayanan

Rafi (S.M. Rafi)

Vani (Annapavalli)

B. R. S. (B. R. S. Narasimhan)

B. R. S. Chakravarthy



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RAJAMPET, Annamayya District, AP - 516126,

Title of the Course: Computer Networks Lab
Category: PC
Year: III BTech
Semester: I Semester
Course Code: 24ACSE52L
Branch/es: CSE, CSE(AIML) CSE(IoTCSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1. To understand the working principle of various communication protocols.
2. To understand the network simulator environment and visualize a network topology and observe its Performance
3. To analyze the traffic flow and the contents of protocol frames.
4. Familiarize with the applications of Internet.

Course Outcomes:

After completion of the course, students will be able to

1. Understand the working principle of various communication protocols.
2. Understand the network simulator environment and visualize a network topology and observe its performance.
3. Analyze the traffic flow and the contents of protocol frames.
4. Critique the existing routing protocols.

Note: It is suggested for every student to complete all the experiments in the semester.

1. Simulate network topologies Star, Bus, Mesh and Ring using Packet Tracer Tool.
2. Implement the data link layer framing methods such as character, character stuffing and bit stuffing.
3. Implement on a data set of characters the three CRC polynomials - CRC 12, CRC 16 and CRC CCIP.
4. Implement Dijkstra's algorithm to compute the Shortest path through a graph.
5. Implement and simulate algorithm for Distance vector routing protocol.
6. Implement and simulate algorithm for Link state routing protocol.

[Handwritten signatures and initials]
D. Saritha
Raf (S.M. Rafi)
Vali (Hariprasad)
S. R. (B. R. R. R.)
T. R. R. R.
R. R. R. R.
Chakraborty

7. Install network simulator NS-2 in any of the Linux operating system and simulate wired and wireless scenarios.
8. Using Wireshark observe data transferred in client server communication using UDP and identify the UDP datagram
9. Using Wireshark observe Three Way Handshaking Connection Establishment, Data Transfer and Three-Way Handshaking Connection Termination in client server communication using TCP.
10. Design and configure a network with multiple subnets with wired and wireless LANs using required network devices. Configure the following services in the network- TELNET, SSH, FTP server, Web server, File server, DHCP server and DNS server.
11. Implement Simple Mail Transfer Protocol.
12. Create a simple LAN connection between two PCs using a switch in Packet Tracer and test connectivity using the ping command.
13. Configure IP addresses manually for hosts in different subnets and verify communication between them using a router.
14. Observe and analyze basic network packets such as ARP, ICMP, TCP, and UDP using Wireshark.

Text Book:

1. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, 6th Edition, PEARSON.

References:

1. James F. Kurose, Keith W. Ross, Computer Networking: A Top-Down 6th edition, Pearson, 2019.
2. Computer Networks: A Systems Approach- Bruce Davie, VMware-Larry Peterson, Princeton University-2019.
3. Computer Networks-B. K. Mathan Nagan, T. Mahalakshmi- Charulatha Publications Private Limited-2019.
4. Computer Networks-Dr. Amol V. Dhumane Nitin N. Sakhare-Nirali Prakashan Publishers-2024 5. Data Communications and Networking with TCP/IP Protocol Suite-Behrouz A. Forouzan-McGraw Hill-6th Edition.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSE52L.1	3	2	1	1	2	-	-	-	1	-	2	-	3	3
24ACSE52L.2	2	3	2	2	3	-	-	1	1	-	2	1	3	-
24ACSE52L.3	3	2	2	3	2	1	-	-	1	-	2	-	3	3
24ACSE52L.4	3	3	3	2	2	1	1	-	2	-	3	-	3	3

V. Sathya Narayan

SD

D. Sarika

Rafi
(S.M. Rafi)

Vai
(V. Vai)

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Chandrasekhar
Chandrasekhar



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RAJAMPET, Annamayya District, AP – 516126,

Title of the Course: Machine Learning Lab
Category: PC
Year III BTech
Semester: I Semester
Course Code: 24ACSM51L
Branch/es: CSE(AIML)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1. Make use of Data sets in implementing the machine learning algorithms
2. Implement the machine learning concepts and algorithms in any suitable language of choice.

Course Outcomes:

After completion of the course, students will be able to

1. Understand the Mathematical and statistical prospectives of machine learning algorithms through python programming
2. Appreciate the importance of visualization in the data analytics solution.
3. Derive insights using Machine learning algorithms.

List of Experiments:

Note:

- a. The programs can be implemented in Python.
- b. For Problems 1 to 6 and 10, programs are to be developed without using the built-in classes or APIs of Java/Python.
- c. Data sets can be taken from standard repositories (<https://archive.ics.uci.edu/ml/datasets.html>) or constructed by the students.

Note: It is suggested for every student to complete all the experiments in the semester.

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.

V. Sathya Prasad

D. Sarika

Raf.
(S.M. Rafi)

V. Veni
(Chandrababu)

S. S. S. S.
(B. S. S. S.)

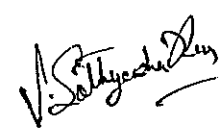
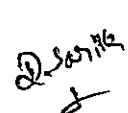
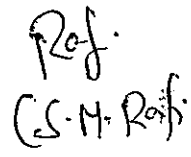
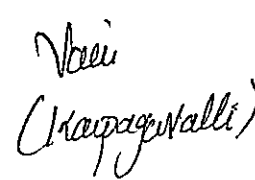
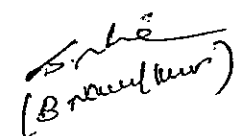
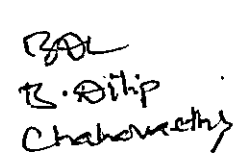
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R. S. S. S.
Chakravarthy

3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Back-propagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.
8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
9. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
11. Write a program to implement the Support Vector Machine (SVM) algorithm for classification using a suitable data set stored in a .CSV file. Evaluate the performance of the classifier using accuracy and confusion matrix.
12. Implement the Random Forest algorithm for classification on a given data set. Compare its performance with the Decision Tree algorithm and analyze the results.
13. Write a program to perform Principal Component Analysis (PCA) for dimensionality reduction on a given data set. Visualize the transformed data using graphs.
14. Implement the Linear Regression algorithm to predict values from a given training data set stored in a .CSV file. Plot the regression line and calculate the prediction error.

Projects

1. Predicting the Sale price of a house using Linear regression
2. Spam classification using Naïve Bayes algorithm
3. Predict car sale prices using Artificial Neural Networks
4. Predict Stock market trends using LSTM
5. Detecting faces from images

References: 1. Python Machine Learning Workbook for beginners, AI Publishing, 2020.

Online Learning Resources/ Virtual Labs:

- 1) Machine Learning A-Z (Python & R in Data Science Course) | Udemey
- 2) Machine Learning | Coursera

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSM51L-1	3	2	1	1	2	-	-	-	-	2	3	2	2	-
24ACSM51L-2	3	3	2	2	2	1	-	-	-	2	3	2	2	-
24ACSM51L-3	3	3	3	3	2	1	-	1	-	2	3	2	2	-
24ACSM51L-4	3	3	3	3	3	2	1	2	1	2	3	2	2	-
24ACSM51L-5	3	3	3	3	3	2	2	3	2	3	3	2	2	-

[Signature]

D. Senthil

*Raf.
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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: DATA WRANGLING AND EXPLORATORY DATA ANALYSIS LAB
Category: PC
Year: III
Semester: I
Course Code: 24AAIM51L
Branch/es: AI&ML

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives: This course will be able to

1. To provide practical exposure to data wrangling and exploratory data analysis using Python.
2. To enable students to clean, preprocess, and transform structured datasets.
3. To develop skills in extracting data from Excel, PDFs, and databases.
4. To apply visualization techniques to analyze and interpret data.
5. To perform real-world EDA workflows and web scraping for data collection.

Course Outcomes:

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

1. Perform data wrangling operations on structured datasets using Python.
2. Handle missing values, duplicates, and outliers effectively.
3. Extract and integrate data from Excel, PDFs, and relational databases.
4. Analyze datasets using statistical methods and visualization tools.
5. Conduct end-to-end EDA and collect data through web scraping.

Exercise 1: Python Environment Setup and Basics

3

- a) Install and configure Python, Jupyter Notebook / Google Colab
- b) Perform basic operations: variables, data types, lists, dictionaries

Exercise 2: Data Loading and Inspection

3

- a) Load datasets from CSV, JSON files using Pandas
- b) Perform inspection using head(), tail(), shape, info(), describe()

Exercise 3: Handling Missing Data

3

- a) Identify missing values using isnull()
- b) Apply techniques: mean, median, mode imputation
- c) Use dropna() and interpolation

Exercise 4: Handling Duplicates and Inconsistencies

3

- a) Detect duplicate rows using duplicated()
- b) Remove duplicates using drop_duplicates()
- c) Handle inconsistent data (case mismatch, formatting issues)

Exercise 5: Data Transformation and Type Conversion

3

- a) Convert data types (astype())
- b) Perform string operations and datetime parsing
- c) Apply normalization and standardization

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SV
(Dr. S. SUREKHA)

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(N. SIVA)

- Exercise 6: Encoding and Feature Engineering**
- Apply Label Encoding and One-Hot Encoding
 - Perform binning and discretization
 - Create new derived features

3

Exercise 7: Working with Excel Files

- Read Excel files using Pandas
- Write data into Excel files
- Perform multi-sheet data extraction

3

Exercise 8: PDF Data Extraction

- Extract text from PDF using Python libraries
- Convert PDF data into structured format (DataFrame)

3

Exercise 9: Database Operations

- Connect to SQLite/MySQL database
- Perform CRUD operations (Create, Read, Update, Delete)
- Execute SQL queries and joins

3

Exercise 10: Data Visualization

- Create plots using Matplotlib (line, bar, histogram)
- Use Seaborn for advanced plots (boxplot, heatmap, pairplot)
- Customize plots (titles, labels, legends)

3

Exercise 11: Exploratory Data Analysis

- Perform univariate and bivariate analysis
- Detect outliers using boxplots and IQR
- Analyze correlations using heatmaps

3

Exercise 12: Mini Project (EDA + Web Scraping)

- Scrape data using BeautifulSoup/Selenium
- Clean and preprocess the collected dataset
- Perform complete EDA and visualization
- Prepare dataset for machine learning

3

Note: All Exercises shall be completed by the students within a duration of fourteen (14) weeks during the semester.

Text Book:

- Jake VanderPlas, Python Data Science Handbook: Essential Tools for Working with Data, O'Reilly, 2016.

Reference Books:

- Jacqueline Kazil & Katharine Jarmul, Data Wrangling with Python, O'Reilly
- Ryan Mitchell, Web Scraping with Python, O'Reilly
- Wes McKinney, Python for Data Analysis, O'Reilly
- Allen B. Downey, Think Stats, O'Reilly

J. Krishnan
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88
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Online Learning Resources:

- NPTEL – Data Science for Engineers
- Coursera – Applied Data Science with Python (University of Michigan)
- Kaggle (Datasets & Practice)
- Google Colab Documentation
- Pandas & NumPy Official Documentation

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and world	Ethics	Individual and Collaborative teamwork	Communication	Project management and finance	Life-long learning
24AAIM51L.1	3	2	1	1	3	-	-	-	-	-	2
24AAIM51L.2	2	3	2	2	3	-	-	-	-	-	2
24AAIM51L.3	2	3	2	3	2	-	-	-	-	-	1
24AAIM51L.4	1	2	2	2	3	-	-	-	-	-	1
24AAIM51L.5	2	3	3	3	3	-	-	2	-	1	2

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(Dr. C.V. Lakshmi Narayana)

Dr. N. Penchalaiah
(Dr. N. PENCHALAIAH)

S. S. SUREKHA
(Dr. S. SUREKHA)

C.N. SIVA
(C.N. SIVA)



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RAJAMPET, Annamayya District, AP – 516126.

Title of the Course:	GENDER SENSITIZATION
Category:	MC
Couse Code:	24AAUD51T
Branch/es:	Common to all branches
Year:	III B.Tech
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
2	-	-	-	32

1. To enable students to understand the gender related issues, and foster humane attitude,
2. To familiarize them about constitutional safeguards for gender equality.
3. To expose students to debates on the politics and economics of work related discrimination.
4. To help students reflect critically on gender violence.
5. To make them understand gender identities and gender relations as part of culture.

1. Understand the basic concepts of gender and its related terminology.
2. Identify the biological, sociological, psychological and legal aspects of gender.
3. Understand how gender discrimination prevails in our society and how to counter it.
4. Analyze the gender division of labor and its relation to politics and economics.
5. Appraise how gender-role beliefs and sharing behavior are associated with more well-being

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6

Gender and Films-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature-Gender Development Issues-Gender Sensitive Language- Just Relationships

S. D.
 D. Sarika
 V. Sathya Narayana
 Raf
 (S. V. Rafi)
 Vani
 (Chapugubelli)
 S. R.
 (B. Narasimha)
 T. R.
 B. R.
 Chakraborty

Prescribed Textbooks:

1. A.Suneetha, Uma Bhargubanda, et al. Towards a World of Equals: A Bilingual Textbook on Gender, Telugu Akademi, Telangana, 2015.
2. Butler, Judith. Gender Trouble: Feminism and the Subversion of Identity. UK Paperback Edn. March 1990.

Reference Books:

1. Watt, Robin and Masood, Nazia, Broken Mirrors: The dowry Problems in India, London : Sage Publications, 2011.
2. Datt, R. and Kornberg, J.(eds), Women in Developing Countries, Assessing Strategies for Empowerment, London: Lynne Rienner Publishers, 2002.
3. Brush, Lisa D., Gender and Governance, New Delhi, Rawat Publication, 2007.
4. Singh, Directi, Women and Politics World Wide, New Delhi, Axis Publications, 2010 5.
5. A.Revathy & Murali, Nandini, A Life in Trans Activism (Lakshmi Narayan Tripathi). The University of Chicago Press, 2016.

Online Learning Resources:

Understanding Gender chrome-extension:

https://onlinecourses.swayam2.ac.in/nou24_hs53/preview

Gender Roles and Relations

<https://www.plannedparenthood.org/learn/gender-identity/sex-gender-identity/what-are-gender-roles-and-stereotypes>

Gender and Labour

<https://www.economicsobservatory.com/what-explains-the-gender-division-of-labour-and-how-can-it-be-redressed>

GENDER-BASED VIOLENCE

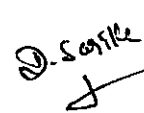
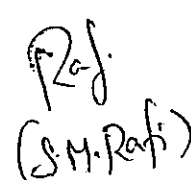
<https://eige.europa.eu/gender-based-violence/what-is-gender-based>

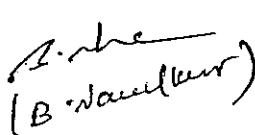
GENDER AND CULTURE

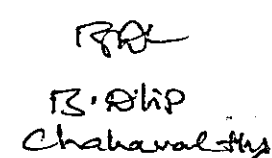
<https://gender.study/psychology-of-gender/culture-impact-gender-roles-identities/>

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and society	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning
24AAUD51T.1	-	-	-	-	-	-	3	-	1	-	1
24AAUD51T.2	-	-	-	-	-	-	3	-	1	-	1
24AAUD51T.3	-	-	-	-	-	-	3	-	1	-	1
24AAUD51T.4	-	-	-	-	-	-	3	-	1	-	1
24AAUD51T.5	-	-	-	-	-	-	3	-	1	-	1





RAJAMPET, Annamayya District, AP – 516126,

Neural Network Basics for NLP, Recurrent Neural Networks (RNNs) and Limitations, LSTM and GRU Networks, Sequence Labeling: POS Tagging, NER using Bi-LSTM, Text Classification using CNNs and RNNs, Model, Evaluation and Hyperparameter Tuning.

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 D. Sanku
 V. Sathya Narayan
 Raf
 (S.M. Rafi)
 Vani
 Chalapavalli /
 (B. Nand Kumar)
 TBR
 B. Dilip
 Chakraborty

UNIT 4: Transformers and Advanced NLP**10**

Attention Mechanism and Self-Attention, Transformer Architecture: Encoder-Decoder Models, Pretrained Language Models: BERT, RoBERTa, GPT, Fine-tuning Transformers for Text Classification, Question Answering and Text Summarization using Transformers, Sentiment Analysis and Zero-shot Classification.

UNIT 5: Applications, Ethics, and Multilingual NLP**10**

Machine Translation: Rule-based vs Neural MT, Chatbots and Conversational AI, Information Retrieval and Question Answering, Speech-to-Text and Text-to-Speech Overview, Multilingual NLP and Low-Resource Languages, Bias, Fairness, and Ethics in NLP.

TEXTBOOK:

1. Daniel Jurafsky and James H. Martin, Speech and Language Processing, Pearson Education.

REFERENCE BOOKS:

1. Steven Bird, Ewan Klein, Edward Loper, Natural Language Processing with Python, O'Reilly Media
- Jacob Eisenstein, Introduction to Natural Language Processing, MIT Press.
2. Delip Rao and Brian McMahan, Natural Language Processing with PyTorch, O'Reilly.
3. Thushan Ganegedara, Transformers for Natural Language Processing, Packt Publishing.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSM62T.1	3	2	-	-	-	-	-	-	-	-	2	2	-	-
24ACSM62T.2	3	3	2	-	2	-	-	-	-	-	2	3	2	2
24ACSM62T.3	3	3	3	2	3	-	-	-	-	-	2	3	2	2
24ACSM62T.4	3	3	3	3	3	-	-	-	-	-	3	2	-	3
24ACSM62T.5	3	3	3	3	3	2	-	2	2	-	3	3	3	2

D. Sankar

Raf.
(S.M. Rafi)V. Sathya
ChandrasekharB. Sathya
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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: AI FOR CLOUD COMPUTING
Category : PC
Year : III
Semester : II
Course Code : 24ACAI62T
Branch/es : AI&ML, CSE(AI)

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	0	0	3	52

Course Objectives:

1. To introduce the concepts, models, and services of cloud computing and its role in AI.
2. To explore the architecture and deployment of AI applications on cloud platforms.
3. To equip students with skills in using cloud-based tools and services for AI/ML workloads.
4. To understand data storage, processing, and security in cloud for AI tasks.
5. To apply cloud computing principles to real-world AI-based solutions.

Course Outcomes:

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

1. Explain cloud computing architecture, services, and deployment models.
2. Utilize cloud platforms (AWS, GCP, Azure) for training and deploying AI models.
3. Handle large-scale data storage and processing in the cloud environment.
4. Integrate AI workflows using serverless and container-based architectures.
5. Analyze challenges in security, cost, scalability, and performance of cloud-based AI systems.

Unit 1 INTRODUCTION TO CLOUD COMPUTING AND AI INTEGRATION 10

Basics of Cloud Computing: Characteristics, Models, and Services, Cloud Service Models: IaaS, PaaS, SaaS, Deployment Models: Public, Private, Hybrid, Community, AI and Cloud Convergence: Benefits and Challenges, Use Cases of AI in Cloud: NLP, Vision, Analytics, Overview of Cloud Providers for AI: AWS, Azure, GCP.

Unit 2 STORAGE, COMPUTING, AND DATA PROCESSING IN THE CLOUD 10

Cloud Storage Services: S3, Blob, BigQuery, Virtualization and Elastic Computing, Distributed Computing with Hadoop and Spark, Data Ingestion and Processing Pipelines, Data Lakes and Warehousing in the Cloud, Cost Optimization for Storage and Compute Resources.

Unit 3 CLOUD-BASED MACHINE LEARNING AND DEEP LEARNING 10

ML Services on AWS (SageMaker), Azure ML, GCP Vertex AI, Training and Deploying Models on Cloud, AutoML and Custom ML Model Workflows, GPUs/TPUs for Model Training, Experiment Tracking and Model Evaluation, Integration of Notebooks (Jupyter, Colab) with Cloud Storage.

Unit 4 ADVANCED CLOUD CONCEPTS FOR AI APPLICATIONS 12

Containers and Docker for AI Applications, Kubernetes and Cloud-native AI Workflows, Serverless Computing: AWS Lambda, Azure Functions, CI/CD Pipelines for AI Models in Cloud, Scaling AI Applications using Load Balancers and Auto-Scaling. Monitoring and Logging in Cloud for AI Workflows.

J. Krishna
(Dr. J. KRISHNA)

Dr. C.V. Lakshmi Narayana
(Dr. C.V. Lakshmi Narayana)

Dr. N. Penchalaiah
(Dr. N. PENCHALAI AH)

Sr
(Dr. S. SURBHA)

Sem
(C.N. SIVA)

Unit 5 SECURITY, ETHICS, AND CASE STUDIES IN CLOUD AI

10

Security and Privacy in Cloud-based AI, Identity and Access Management (IAM) in Cloud, Cost Management and Billing for AI Services, Ethical Issues and Fairness in Cloud AI, Case Study: AI in Healthcare Cloud Solutions, Case Study: Real-Time Analytics in Financial Cloud Services.

Textbook:

1. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, Mastering Cloud Computing, McGraw-Hill.

Reference Books:

1. Judith Hurwitz et al., Cloud Computing for Dummies, Wiley.
2. Aurélien Géron, Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, O'Reilly.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning
24ACAI62T.1	3	2	-	-	1	-	-	-	-	-	2
24ACAI62T.2	2	3	2	2	3	-	-	-	-	3	2
24ACAI62T.3	2	2	3	2	3	-	-	-	-	-	3
24ACAI62T.4	2	2	3	2	3	-	-	2	-	2	2
24ACAI62T.5	2	2	2	-	2	-	-	-	-	3	2

J. K. Ramesh
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SV
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Dr. C. V. Lakshmi Narayana
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SV
(N. SIVA)

Dr. N. Penchalaiah
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RAJAMPET, Annamayya District, AP – 516126,

Title of the Course: Data Visualization
Category: PC
Year: III BTech
Semester: II Semester
Course Code: 24ACSM61T
Branches: CSE(AIML)

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	-	-	3	52

COURSE OBJECTIVES

1. To understand the principles, techniques, and tools of data visualization.
2. To develop the ability to transform data into visual insights using different types of charts and plots.
3. To introduce the cognitive and perceptual foundations of effective data visualization.
4. To apply tools and programming environments (like Python, Tableau, or Power BI) for creating interactive and dynamic visualizations.
5. To analyze real-world datasets and effectively communicate data-driven findings visually.

COURSE OUTCOMES

1. Interpret different types of data and recognize the appropriate visualization methods.
2. Design effective and interactive data visualizations using various tools.
3. Apply visual encoding and perceptual principles in presenting complex data.
4. Analyze and visualize real-world data sets using Python libraries and dashboards.
5. Create visual stories and dashboards for effective communication of insights.

UNIT 1 - INTRODUCTION TO DATA VISUALIZATION & PERCEPTION

10

Introduction to Data Visualization, Importance and Scope of Data Visualization, Data Types and Sources, Visual Perception: Pre-attentive Processing, Gestalt Principles, Data-Ink Ratio, Data Density, Lie Factor, Visualization Process and Design Principles, Tools Overview: Tableau, Power BI, Python Libraries.

UNIT 2 - VISUALIZATION TECHNIQUES FOR CATEGORICAL & QUANTITATIVE DATA

10

Charts for Categorical Data: Bar Charts, Pie Charts, Column Charts, Charts for Quantitative Data: Histograms, Line Charts, Boxplots, Scatter Plots, Bubble Charts, Heatmaps, Choosing the Right Chart Type, Best Practices in Labeling, Coloring, and Scaling.

[Signatures]
Raj
(S.M. Rafi)
Venu
(Chalapathi Valli)
S. R. Chakraborty
(B. N. Chakraborty)
R. D. Chakraborty
Chakraborty

UNIT 3- MULTIDIMENSIONAL, TEMPORAL AND HIERARCHICAL DATA VISUALIZATION 12

Visualizing Multivariate Data: Parallel Coordinates, Radar Charts, Time-Series Visualization: Time Plots, Animation over Time, Geographic Data Visualization: Maps, Choropleths, Hierarchical Data: Treemaps, Sunburst Charts, Network and Graph Visualization.

UNIT 4 - DATA VISUALIZATION USING PYTHON AND DASHBOARD 10

Introduction to Matplotlib, Seaborn, and Plotly, Creating Static and Interactive Charts, Pandas Visualization Capabilities, Dashboards with Dash, Streamlit, Power BI, Case Studies: Real-world Dataset Visualization.

UNIT 5 - STORYTELLING WITH DATA AND ETHICAL VISUALIZATION 10

Storytelling and Narrative Techniques in Visualization, Dashboards and Reporting, Misleading Visualizations and Bias, Ethical Principles in Data Visualization, Final Project: Create a Storytelling Dashboard with Real Data.

TEXT BOOKS

1. Tamara Munzner, Visualization Analysis and Design, CRC Press, 2014.
2. Nathan Yau, Data Points: Visualization That Means Something, Wiley, 2013.

REFERENCE BOOKS

1. Alberto Cairo, The Truthful Art: Data, Charts, and Maps for Communication, New Riders, 2016.
2. Cole Nussbaumer Knaflic, Storytelling with Data: A Data Visualization Guide for Business Professionals, Wiley, 2015.
3. Claus O. Wilke, Fundamentals of Data Visualization, O'Reilly, 2019.
4. Rohan Chopra, Hands-On Data Visualization with Bokeh, Packt Publishing, 2019.

ONLINE LEARNING RESOURCES

1. NPTEL: Data Visualization - IIT Madras
2. Coursera: Data Visualization with Python by IBM

Disarika
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V. Sathya
Nani
Chapagavalli
B. R. (B. R. Ravi)
R. D. Dip
Chakraborty

CO-PO MAPPING:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSM61T.1	3	2	-	-	-	-	-	-	-	-	-	2	-	-
24ACSM61T.2	3	3	2	-	-	-	-	-	-	-	-	3	2	2
24ACSM61T.3	3	3	2	1	-	-	-	-	-	-	-	3	2	2
24ACSM61T.4	3	2	-	2	-	-	-	-	-	-	3	2	-	3
24ACSM61T.5	3	3	3	2	2	-	-	-	1	1	3	3	3	2

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RAJAMPET, Annamayya District, AP - 516126,

Title of the Course: INTERNET OF THINGS
Category: PE
Course Code: 24ACSM6AT
Year: III B. Tech
Semester: II Semester
Branch: CSE, CSE(AIML), CSE(IOTCSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	-	-	3	50

Course Objectives:

1. Understand the terminology, technology and its applications of IoT.
2. Know the concept of M2M (machine to machine) with necessary protocols.
3. Memorize the software platforms which are used for developing the applications.
4. Learn the concepts of python programming language which is used to develop the IoT projects.
5. Know the hardware platforms which are necessary to develop the IoT applications.

Course Outcomes:

At the end of the course, the student will be able to Blooms Level of Learning

1. Understand the vision of IoT from a global context
2. Identify the difference between IoT and M2M communication.
3. Determine the usage of 6LoWPAN and select the appropriate network protocols for IoT project.
4. Develop the IoT experiments with the help of Python programs.
5. Design the IoT applications using Raspberry Pi kit.

Unit 1

10

Introduction to Internet of Things

Introduction to Internet of Things, History of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment Templates, Applications of IoT.

Unit 2

9

IoT and M2M & IoT Platforms Design Methodology

IoT and M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT. IoT Platforms Design Methodology: Introduction, IoT Design Methodology.

Unit 3

10

The Wireless Embedded Internet

Introduction to 6LoWPAN, The 6LoWPAN Architecture, The Basic 6LoWPAN Format, Addressing MQ telemetry transport for sensor networks (MQTT-S), ZigBee compact application protocol, Contiki and uIPv6, Wireless RFID Infrastructure.

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V. Sathya
Raf. (S.M. Rafi)
Vani (Karpagavalli)
Bha (Bha)
R. Dilip Chakraborty

Unit 4

11

IoT Systems-Logical Design Using Python

Introduction, Installing Python, Python Data Types and Data Structures, Control Flow, Functions, Modules, Packages and File Handling.

Unit 5

10

IoT Physical Devices and Endpoints:

What is an IoT Device, Exemplary Device: Raspberry Pi, About the Board, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming Raspberry Pi with Python, Other IoT Devices

Prescribed Text Book:

1. Internet of Things, A Hands-On Approach, Arshdeep Bahga, Vijay Madisetti, University Press, 2015.
2. The Wireless Embedded Internet, Zach Shelby and Carsten Bormann, Wiley publications, first edition, 2009. (Unit III).

Reference Books:

1. The Internet of Things Connecting Objects to the Web, Hakima Chaouchi, Wiley Publications, 2010.
2. Designing the Internet of Things, Adrian McEwen, Hakim Cassimally, Wiley 2014.
3. Enterprise IoT, A Definitive Handbook by Naveen Balani.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSM6AT.1	2	2	2	3	3	-	-	2	-	-	3	3	2	-
24ACSM6AT.2	2	3	2	3	3	-	-	2	-	-	3	3	2	-
24ACSM6AT.3	2	3	3	3	3	-	-	2	-	-	3	2	2	-
24ACSM6AT.4	3	3	3	2	3	-	-	2	-	-	3	3	3	-
24ACSM6AT.5	3	3	3	3	3	-	-	3	-	-	3	3	3	2

80

D. Sanku
 Rafi (S.H. Rafi)
 V. Sathya
 Naveen (Naveen)
 S. Ramesh (S. Ramesh)
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RAJAMPET, Annamayya District, AP – 516126,

Title of the Course: SOFTWARE PROJECT MANAGEMENT
Category: PE
Course Code: 24ACSE6AT
Year: III B. Tech
Semester: II Semester
Branch: CSE, CSE(AIML), CSE(IOTCSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	-	-	3	54

Course Objectives:

1. Understand the basics of the project management and requirements management throughout the product development cycle.
2. To Know the distinction between conventional and modern approaches for developing a software project.
3. Learn about the life cycle phases and artifacts in software development process.
4. Understand the importance of Work breakdown structures and responsibilities while working in a real time projects.
5. Know how to measure the software quality and risk management in a modern project profiles

Course Outcomes: Blooms Level of Learning

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

1. Understand the conventional software Management and Software Economics factors that affect the development of a software project.
2. Recognize Artifacts of the software process and can also use artifacts in Software Development lifecycle.
3. Analyze the workflows and can create check points of process in a project management
4. Organize the work breakdown structures and assign the roles & responsibilities in a project organization for establishing an active network.
5. Apply project metrics in managing software project

Unit 1

12

Conventional Software Management: The water fall model, conventional software Management performance Evolution of Software Economics: Software Economics. Pragmatic Software Cost Estimation Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

Unit 2

10

The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

Lifecycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts

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Ref. (S.M. Rafi)
Vani (Chalapathi)
B. Dilip (Chalapathi)
B. Dilip (Chalapathi)

Unit 3**12**

Workflows of the process: Software process workflows, Inter Trans workflows. Check points of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: work break down structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning

Unit 4**10**

Process Automation: Automation Building Blocks, The Project Environment.

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators Tailoring the Process: Process discriminants. Managing people and organizing teams.

Unit 5**10**

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Future Software Project Management: modern Project Profiles, Next generation Software economics, modern process transitions.

Case Study: The Command Center Processing and Display System-Replacement(CCPDS-R)

Text books:

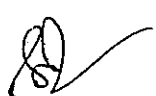
1. Software Project Management, Walker Royce, Pearson Education, 2012
2. Bob Hughes, Mike Cotterell and Rajib Mall—Software Project Management II, 6th Edition, Mc Graw Hill Edition, 2017

Reference Books:

1. Pankaj Jalote,—Software Project Management in practice II, 5th Edition, Pearson Education, 2017.
2. Murali K. Chemuturi, Thomas M. Cagley Jr. II Mastering Software Project Management: Best Practices, Tools and Techniques I, J. Ross Publishing, 2010
3. Sanjay Mohapatra,—Software Project Management II, Cengage Learning, 2011.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning	Core Computing Skills	Emerging Technologies
24ACSE6AT.1	3	2	-	-	-	-	-	-	-	-	2	2	2
24ACSE6AT.2	3	2	1	1	1	-	-	-	-	-	2	2	2
24ACSE6AT.3	2	3	2	2	1	-	-	-	1	1	2	2	- 3
24ACSE6AT.4	2	2	3	1	1	1	-	1	3	2	3	2	2
24ACSE6AT.5	3	3	2	2	2	1	-	1	1	2	3	3	3



V. Sathyaesh

Dr. Senthil

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(Krishnaiah)

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RAJAMPET, Annamayya District, AP - 516126,

Title of the Course: Cryptography and Network Security
Category: PE
Course Code: 24ACSM6BT
Year: III B. Tech
Semester: II Semester
Branch: CSE(AIML) & CSE (IoTCSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	-	-	3	51

Course Objectives: This course aims at training students to master the:

1. The concepts of classical encryption techniques and concepts of finite fields and number theory
2. Working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes, and message digests, and public key algorithms
3. Design issues and working principles of various authentication protocols, PKI standards
4. Various secure communication standards including Kerberos, IPsec, TLS and email
5. Concepts of cryptographic utilities and authentication mechanisms to design secure applications

Course Outcomes:

After completion of the course, students will be able to

1. Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts off in it fields and number theory
2. Compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication
3. Apply the knowledge of cryptographic check sums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes.
4. Demonstrate the ability to apply user authentication principles including Kerberos for secure authentication
5. Gain proficiency in securing web communications using TLS and HTTPS, manage secure remote access with SSH, and design firewall policies

Unit 1 Computer and Network Security Concepts

11

Computer and Network Security Concepts: Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security.

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Steganography.

Unit 2 Number Theory

10

The Euclidean Algorithm, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder Theorem, Discrete Logarithms, Finite Fields: Finite Fields of the Form $GF(p)$, Finite Fields of the Form $GF(2^n)$. Public Key Cryptography: Principles, Public Key Cryptography Algorithms, RSA Algorithm, Diffie Hellman Key Exchange, Elliptic Curve Cryptography

V. Sathyaishan D. Sarika
82

Raf.
(S.M. Rafi)

Valli
(Chandrasekhar)

S. R. S. (B. Nandhan)

B. D. Chakraborty

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSM6BT.1	3	2	1	1	2	-	-	-	-	-	2	2	2	-
24ACSM6BT.2	3	3	2	2	2	-	-	-	-	-	2	2	2	-
24ACSM6BT.3	3	3	3	3	2	-	-	-	-	-	2	3	2	-
24ACSM6BT.4	3	2	2	2	2	1	1	-	-	-	2	2	3	-
24ACSM6BT.5	3	3	3	2	3	2	1	-	-	-	3	3	3	-

D. Sanku

Sanku
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(Karpagavalli)
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B. Dhip
Chakraborty



RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course	Big Data Analytics
Category	PC
Year	III
Semester	II
Course Code	24AAID61T
Branch/es	AI&DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

1. Understand the basic concepts and importance of Big Data
2. Understand the design concepts of HDFS
3. Provide good insight for developing a MapReduce application
4. Understand Hadoop environment
5. Explore the concepts of Pig, Hive, Spark and HBase

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

1. Understand the concepts and challenges of big data
2. Outline the operations viz. Collect, manage, store, query, and analyze various forms of big data.
3. Apply large-scale analytic tools to solve some of the open big data problems
4. Analyze the impact of big data for business decisions and strategies.
5. Design different big data applications.

Unit 2	HDFS and MapReduce	10
HDFS: The Design of HDFS, HDFS Concepts, The Command-Line Interface, Hadoop File systems, The Java Interface, Data flow. MapReduce: Developing a MapReduce application, The Configuration API, Setting up the Development Environment, Running Locally on Test Data, Running on a Cluster		

Unit 4	Hadoop Environment	9
Hadoop Environment: Setting up a Hadoop Cluster, Cluster specification, Cluster Setup and Installation, Hadoop Configuration, Security. Pig: Installing and Running Pig, an Example, Comparison with Databases, Pig Latin, UserDefined Functions, Data Processing Operators.		

(R. Venkatesh) (V. S. Kumar) (Dr. P. Phani Kumar Reddy)

Prescribed Text Books:

1. Tom White, "Hadoop: The Definitive Guide" Fourth Edition, O'reilly Media, 2015

References Books:

1. Big Data, Big Analytics: Emerging business intelligence and analytic trends for today's businesses, Michael Minnelli, Michelle Chambers, and Ambiga Dhiraj, Wiley Co Series
2. Glenn J. Myatt, Making Sense of Data , John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O'Reilly, 2011
3. Michael Berthold, David J. Hand, Intelligent Data Analysis, Spingers, 2007
4. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, Understanding Big Data : Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill Publishing, 2012

CO-PO Mapping:

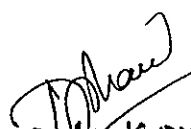
Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative team work	Communication	Project management	Life-long learning
24AAID61T.1	3	2	1	1	2	1	-	-	1	-	2
24AAID61T.2	3	3	2	2	3	1	-	1	1	1	2
24AAID61T.3	3	3	3	3	3	1	-	1	1	1	3
24AAID61T.4	3	3	2	2	2	2	1	1	2	2	2
24AAID61T.5	3	3	3	3	3	1	-	1	2	1	3



(B. Venkatesu Goud)



(U. N. Ananth Kumar)



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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: NATURAL LANGUAGE PROCESSING LAB
Category: PC
Year: III BTech
Semester: II Semester
Course Code: 24ACSM62L
Branch/es: CSE, CSE(AIML) & CSE(IoTCSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	3	1.5

Course Objectives

1. Understand fundamental NLP techniques such as tokenization, stemming, lemmatization, and stopword removal using Python.
2. Apply syntactic and semantic analysis methods including POS tagging, chunking, and Named Entity Recognition.
3. Implement statistical NLP approaches such as n-grams, TF-IDF, and probabilistic language models.
4. Develop parsing and grammar-based models like CYK and chart parsing for sentence structure analysis.
5. Build real-world NLP applications such as sentiment analysis, spam detection, and fake news classification.

Course Outcomes

1. Perform text preprocessing and normalization using various NLP techniques.
2. Analyze linguistic structures through POS tagging, chunking, and named entity recognition.
3. Apply statistical methods like TF-IDF and n-gram models for text representation and probability estimation.
4. Design and implement NLP-based models for parsing and information extraction tasks.
5. Develop practical NLP applications including sentiment analysis, spam filtering, and fake news detection using Python.

Note: It is suggested for every student to complete all the experiments in the semester.

- a. Write a python program to perform tokenization by word and sentence using nltk.
- b. Write a python program to eliminate stopwords using nltk.
- c. Write a python program to perform stemming using nltk.

V. Sathyanarayanan
D. Santhosh
RQ

Raf
(S.M. Rafi)

Valli
(Kavayathali)

Sruba
(B. Nand Kumar)

B. Raj
Chakraborty

- 2
 - a. Write a python program to perform Parts of Speech tagging using nltk.
 - b. Write a python program to perform lemmatization using nltk.
- 3
 - a. Write a python program for chunking using nltk.
 - b. Write a python program to perform Named Entity Recognition using nltk.
- 4
 - a. Write a python program to find Term Frequency and Inverse Document Frequency (TF-IDF).
 - b. Write a python program for CYK parsing (Cocke- Younger-Kasami Parsing) or Chart Parsing.
- 5
 - a. Write a python program to find all unigrams, bigrams and trigrams present in the given corpus.
 - b. Write a python program to find the probability of the given statement "This is my cat" by taking the an exmple corpus into consideration.
- 6

Use the Stanford named Entity recognizer to extract entities from the documents. Use it programmatically and output for each document which named entities it contains and of which type.
- 7

Choose any corpus available on the internet freely. For the corpus, for each document, count how many times each stop word occurs and find out which are the most frequently occurring stop words. Further, calculate the term frequency and inverse document frequency as The motivation behind this is basically to find out how important a document is to a given query. For e.g.: If the query is say: "The brown crow". "The" is less important. "Brown" and "crow" are relatively more important. Since "the" is a more common word, its tf will be high. Hence we multiply it by idf, by knowing how common it is to reduce its weight.
- 8

Write the python code to perform sentiment analysis using NLP
- 9

Write the python code to develop Spam Filter using NLP
- 10

Write the python code to detect Fake News using NLP.
- 11

Write a python program to perform text preprocessing techniques such as tokenization, stop word removal, stemming, and lemmatization on a given text document.
- 12

Write a python program to implement Word Frequency Analysis and display the top most frequent words from a given corpus using nltk.
- 13

Write a python program to generate Word Cloud visualization for a given text corpus and analyze the important terms.
- 14

Write a python program to classify text documents using Machine Learning algorithms such as Naive Bayes or Logistic Regression with TF-IDF features.

V. Sathya Raj D-Schill

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(S.M.R-f)

Vallu
(Karpagavallu)

S. R. S.
(B. Nandhan)

B. Dilip
Chakraborty

Textbooks

1. Speech and Language Processing – Daniel Jurafsky and James H. Martin, Pearson Education.
2. Natural Language Processing with Python – Steven Bird, Ewan Klein, Edward Loper, O'Reilly Media.

Reference Books

1. Introduction to Natural Language Processing – Jacob Eisenstein, MIT Press.
2. Natural Language Processing with PyTorch – Delip Rao and Brian McMahan, O'Reilly.
3. Transformers for Natural Language Processing – Thushan Ganegedara, Packt Publishing.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSM62L.1	3	2	-	-	-	-	-	-	-	-	2	2	-	-
24ACSM62L.2	3	3	2	-	2	-	-	-	-	-	2	3	2	2
24ACSM62L.3	3	3	3	2	3	-	-	-	-	-	2	3	2	2
24ACSM62L.4	3	3	3	3	3	-	-	-	-	-	3	2	-	3
24ACSM62L.5	3	3	3	3	3	2	-	2	2	-	3	3	3	2

Dr. Sanku

Raf
(S.M. Rafi)

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course: AI FOR CLOUD COMPUTING LAB
Category: PC
Year: III
Semester: II
Course Code: 24ACAI62L
Branch/es: AI&ML, CSE(AI)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives: This course will be able to

1. To introduce the concepts, models, and services of cloud computing and its role in AI.
2. To explore the architecture and deployment of AI applications on cloud platforms.
3. To equip students with skills in using cloud-based tools and services for AI/ML workloads.
4. To understand data storage, processing, and security in cloud for AI tasks.
5. To apply cloud computing principles to real-world AI-based solutions.

Course Outcomes:

At the end of the course

1. Explain cloud computing architecture, services, and deployment models.
2. Utilize cloud platforms (AWS, GCP, Azure) for training and deploying AI models.
3. Handle large-scale data storage and processing in the cloud environment.
4. Integrate AI workflows using serverless and container-based architectures.
5. Analyze challenges in security, cost, scalability, and performance of cloud-based AI systems.

Exercise 1: Exploring Cloud Service Models (IaaS, PaaS, SaaS)

3

- a) Study IaaS, PaaS, SaaS models using AWS/Azure/GCP.
- b) Explore Public, Private, Hybrid, and Community cloud models.
- c) Deploy a basic cloud service or virtual machine.
- d) Compare cloud providers for AI applications.

Exercise 2: AI Services in Cloud Platforms

3

- a) Explore NLP, Vision, and Analytics services in AWS/Azure/GCP.
- b) Test one AI cloud API service.
- c) Analyze benefits and challenges of AI-cloud integration.

Exercise 3: Cloud Storage Services

3

- a) Manage objects in Amazon S3 and Azure Blob Storage.
- b) Query datasets using Google BigQuery.
- c) Compare storage performance and pricing.

Exercise 4: Data Ingestion and Processing Pipelines

3

- a) Create a cloud-based data ingestion pipeline.
- b) Store and process data in cloud platforms.

J. Krishna
(Dr. J. KRISHNA)

Dr. C.V. Laxshmi Narayana
(Dr. C.V. Laxshmi Narayana)

Sr
(Dr. S. SUREKHA)

SN SIVA
(CN SIVA)

Dr. N. Penhalalaiah
(Dr. N. PENHALALAIAH)

c) Generate analytics reports using Spark.

Exercise 5: Distributed Computing using Hadoop and Spark

3

a) Setup Hadoop pseudo-distributed mode.

b) Execute MapReduce and Spark jobs.

c) Compare distributed and local processing performance.

Exercise 6: Cost Optimization for Cloud Resources

3

a) Monitor compute/storage usage and billing.

b) Apply cost optimization techniques.

c) Analyze pricing for cloud services.

Exercise 7: ML Model Training and Deployment using Cloud Services

3

a) Train ML models using SageMaker/Azure ML/Vertex AI.

b) Deploy and test ML models in cloud platforms.

c) Evaluate model performance.

Exercise 8: AutoML and Notebook Integration

3

a) Train models using AutoML platforms.

b) Integrate Jupyter/Colab with cloud storage.

c) Compare AutoML and custom ML workflows.

Exercise 9: Deep Learning using GPUs/TPUs

3

a) Train deep learning models using GPU/TPU acceleration.

b) Compare CPU and GPU/TPU performance.

c) Track experiments and results..

Exercise 10: Containerization and Kubernetes Deployment

3

a) Create Docker containers for AI applications.

b) Deploy applications using Kubernetes.

c) Implement auto-scaling and monitoring.

Exercise 11: Serverless Computing and CI/CD for AI Applications

3

a) Create serverless functions using AWS Lambda/Azure Functions.

b) Integrate storage triggers and inference APIs.

c) Build CI/CD pipelines for automated deployment.

3

Exercise 12: IAM, Security, Ethics, and Case Study Implementation

a) Configure IAM users, roles, and policies.

b) Implement cloud security and privacy controls.

c) Study ethical issues in cloud AI systems.

d) Develop and deploy a cloud-based AI mini project with monitoring and billing analysis.

Note: All the prescribed laboratory exercises shall be completed by the students within a duration of fourteen (14) weeks during the semester.

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(Dr. T. KRISHAN)

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(Dr. G. Lakshmi Narayana)

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(Dr. N. PENCHALAIAN)

Text Book:

1. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, Mastering Cloud Computing, McGraw-Hill.

Reference Books:

1. Judith Hurwitz et al., Cloud Computing for Dummies, Wiley.
2. Aurélien Géron, Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, O'Reilly.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The Engineer and world	Ethics	Individual and Collaborative teamwork	Communication	Project management and finance	Life-long learning
24ACAI62L.1	3	2	-	-	1	3	-	-	-	-	2
24ACAI62L.2	2	3	2	2	3	-	-	-	-	3	2
24ACAI62L.3	2	2	3	2	3	-	-	-	-	-	3
24ACAI62L.4	2	2	3	2	3	-	-	2	-	2	2
24ACAI62L.5	2	2	2	-	2	3	-	-	-	3	2

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RAJAMPET, Annamayya District, AP – 516126,

Title of the Course: Data Visualization Lab
Category: PC
Year: III BTech
Semester: II Semester
Course Code: 24ACSM61L
Branch/es: CSE(AIML)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	3	1.5

Course Objectives

1. To understand perceptron limitations and basic neural network learning.
2. To implement ANN and deep feed-forward networks using backpropagation.
3. To develop image classification models using deep neural networks.
4. To design CNN architectures with optimization, normalization, and regularization.
5. To evaluate model accuracy, epochs, and CPU-GPU performance with data augmentation.

Course Outcomes

1. Analyze perceptron behavior on linearly and non-linearly separable data.
2. Build and test ANN and deep feed-forward neural networks.
3. Implement image classification using neural networks and CNNs.
4. Apply padding, batch normalization, dropout, and regularization in CNN design.
5. Evaluate performance using accuracy, epochs, augmentation, and hardware comparison.

Note: It is suggested for every student to complete all the experiments in the semester.

- 1
 - a. Design a single unit perceptron for classification of a linearly separable binary dataset without using pre-defined models. Use the Perceptron() from sklearn.
 - b. Identify the problem with single unit Perceptron. Classify using Or-, And- and Xor-ed data and analyze the result.
- 2 Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets. Vary the activation functions used and compare the results.
- 3 Build a Deep Feed Forward ANN by implementing the Backpropagation algorithm and test the same using appropriate data sets. Use the number of hidden layers ≥ 4 .

V. Sathya Narayanan

D. Sathya

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(S.M. Rafi)

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Chapagavalli

S. N. Sathya
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- 4 Design and implement an Image classification model to classify a dataset of images using Deep Feed Forward NN. Record the accuracy corresponding to the number of epochs. Use the MNIST, CIFAR-10 datasets.
- 5 Design and implement a CNN model (with 2 layers of convolutions) to classify multi category image datasets. Record the accuracy corresponding to the number of epochs. Use the MNIST, CIFAR-10 datasets.
- 6 Design and implement a CNN model (with 4+ layers of convolutions) to classify multi category image datasets. Use the MNIST, Fashion MNIST, CIFAR-10 datasets. Set the No. of Epoch as 5, 10 and 20. Make the necessary changes whenever required. Record the accuracy corresponding to the number of epochs.
Record the time required to run the program, using CPU as well as using GPU in Colab.
- 7 Design and implement a CNN model (with 2+ layers of convolutions) to classify multi category image datasets. Use the concept of padding and Batch Normalization while designing the CNN model. Record the accuracy corresponding to the number of epochs. Use the Fashion MNIST/MNIST/CIFAR10 datasets.
- 8 Design and implement a CNN model (with 4+ layers of convolutions) to classify multi category image datasets. Use the concept of regularization and dropout while designing the CNN model. Use the Fashion MNIST datasets. Record the Training accuracy and Test accuracy corresponding to the following architectures:
Base Model
Model with L1 Regularization
Model with L2 Regularization
Model with Dropout
Model with both L2 (or L1) and Dropout
- 9 Use the concept of Data Augmentation to increase the data size from a single image.
- 10 Design and implement a CNN model to classify CIFAR10 image dataset. Use the concept of Data Augmentation while designing the CNN model. Record the accuracy corresponding to the number of epochs.
- 11 Design and implement a Multilayer Perceptron (MLP) model for classification of the Iris dataset. Compare the training and testing accuracy for different hidden layer sizes.
- 12 Implement an ANN model using different optimization algorithms such as SGD, Adam, and RMSProp. Compare their performance using suitable datasets.
- 13 Design and implement a CNN model to classify handwritten digit images using the MNIST dataset and display sample predictions with output labels.
- 14 Implement Transfer Learning using a pre-trained CNN model such as VGG16 or ResNet for image classification on a small custom dataset. Compare the accuracy before and after fine-tuning.

V. Sathya *[Signature]* D. Suresh *[Signature]*

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(Karpagavai) *[Signature]* (B. Nandhan)

[Signature]

B. Dilip

Chaharethy

TEXTBOOKS:

1. Tamara Munzner, Visualization Analysis and Design, CRC Press 2014

REFERENCE BOOKS:

1. Alberto Cairo, the truthful art: Data, charts, and Maps for communications, New Riders 2016
2. Cole Nussbaumer Knaflic, storytelling with Data : A Data visualization guide for Business Professionals.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSM61L.1	3	3	1	2	2	-	-	-	-	-	2	3	2	-
24ACSM61L.2	3	3	2	2	3	-	-	-	-	-	2	3	3	-
24ACSM61L.3	3	3	3	2	3	-	-	-	-	-	2	3	3	-
24ACSM61L.4	3	3	3	3	3	-	-	-	-	-	2	3	3	-
24ACSM61L.5	3	3	3	3	3	-	-	-	-	-	2	3	3	-

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Raf
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RAJAMPET, Annamayya District, AP - 516126,

Title of the Course	Soft Skills
Category	SEC
Course Code	24AENG61S
Branch	CE, ME, ECE, CSE, AIDS, AIML, CSE(AI), CSE(DS), CSE(AIML), CSE(ICB)
Year:	III B.Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
1	-	-	2	51

Course Objectives:

1. To encourage all round development of the students by focusing on soft skills
2. To make the students aware of critical thinking and problem-solving skills
3. To enable appropriate communication in socio-cultural and professional contexts
4. To enhance students' skills of making presentations confidently.
5. To suggest some measures to function effectively with heterogeneous teams

Course Outcomes: Student will be able to

1. Express himself/herself fluently in societal and professional contexts.
2. Describe methods for building professional image
3. Evaluate the situation and take necessary decisions.
4. Make presentations assertively and confidently
5. Create a productive workplace atmosphere using social and work-life skills.

Unit 1 Soft Skills & Resume Preparation

12

Soft Skills - Introduction, Need - Mastering Techniques of Soft Skills

Resume-Structure, formats and styles -projecting one's strengths and skills - creative self-marketing—sample resumes - cover letter

Unit 2 Critical Thinking & Interview Skills

9

Active Listening - Observation - Analytical Thinking -Open-mindedness Creative Thinking - Positive Thinking-Reflection Concept and process of Interviews - Body language - Answering strategies — FAQs

Unit 3 Problem Solving & Decision Making

9

Effective decision making in teams - Methods & Styles :-GD Skills: communicating views and opinions -discussing - intervening - agreeing and disagreeing —asking for and giving clarifications -substantiating one's views/points- arriving at a consensus on any given topic across a cross-section of individuals - modulation of voice and clarity - body language

Unit 4 Oral Presentations(Individual and Team)

9

Collection of data from various sources —planning, preparation and practice — attention grabbing strategies -transition — handling questions from audience. Appropriate use of visual aids — Using Power Point for presentations.

[Handwritten signatures and initials]
 V. Sathya Narayan
 D. Sarma
 Raf.
 (S.M. Raf.)
 Vani
 Chalapagavalli
 S. Sube
 (B. Sube)
 B. K. Chaitanya

Unit 5 Corporate Etiquette

9

Etiquette- Introduction, Concept, Significance - Corporate Etiquette - meaning, modern etiquette, benefits - Global and Local Culture Sensitivity - Gender Sensitivity - Etiquette in Interaction- Cell phone Etiquette - Dining Etiquette - Netiquette - Job Interview Etiquette - Corporate Grooming tips -Overcoming challenges.

Minimum Requirements: Advanced English Language Communication Skills Lab

Prescribed Text Book:

1. Mitra Barun K, Personality Development and Soft Skills, Oxford University Press, Pap/Cdr edition 2012
2. Dr Shikha Kapoor, Personality Development and Soft Skills: Preparing for Tomorrow, I K International Publishing House, 2018

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and society	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning
24AENG61S.1	-	-	-	-	-	-	1	-	3	-	3
24AENG61S.2	-	-	-	-	-	-	1	-	3	-	3
24AENG61S.3	-	-	-	-	-	-	1	-	3	-	3
24AENG61S.4	-	-	-	-	-	-	1	-	3	-	3
24AENG61S.5	-	-	-	-	-	-	1	-	3	-	3

Dr. S. S. S. S.

Raj
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RAJAMPET, Annamayya District, AP - 516126,

Title of the Course:	TECHNICAL PAPER WRITING AND INTELLECTUAL PROPERTY RIGHTS
Category:	MC
Year	III Year
Semester:	II Semester
Course Code:	24AMBA61T
Branch/es:	EEE, ECE, CSE & CSE Allied Branches

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
2	-	-	-	30

Course Objectives:

1. To enable the students to practice the basic skills of research paper writing.
2. To make the students understand the importance of IP and to educate them on the basic concepts of Intellectual Property Rights.
3. To practice the basic skills of performing quality literature review.
4. To help them in knowing the significance of real-life practice and procedure of Patents.
5. To enable them learn the procedure of obtaining Patents, Copyrights, & Trade Marks.

Course Outcomes:

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

1. Identify key secondary literature related to their proposed technical paper writing.
2. Explain various principles and styles in technical writing.
3. Use the acquired knowledge in writing a research/technical paper.
4. Analyze rights and responsibilities of holder of Patent, Copyright, Trademark, International Trademark etc.
5. Evaluate different forms of IPR available at national & international level and search of various forms of IPR by using modern tools and techniques.

Unit 1 Principles of Technical Writing

6

Principles of Technical Writing: styles in technical writing; clarity, precision, coherence and logical sequence in writing-avoiding ambiguity- repetition, and vague language -highlighting your findings-discussing your limitations -hedging and criticizing -plagiarism and paraphrasing.

Unit 2 Research Paper Writing

6

Technical Research Paper Writing: Abstract- Objectives-Limitations-Review of Literature- Problems and Framing Research Questions- Synopsis.

Unit 3 Process of research

6

Process of research: publication mechanism: types of journals- indexing-seminars- conferences- proof reading - plagiarism style; seminar & conference paper writing; Methodology-discussion-results- citation rules.

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D. Sanku

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Chakraborty

Unit 4 Introduction to Intellectual property

6

Introduction, types of intellectual property, International organizations, agencies and treaties, importance of intellectual property rights Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

Unit 5 Fundamentals of copy right law

6

Fundamentals of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law. Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer. Patent law, intellectual property audits.

Prescribed Textbooks:

1. Deborah. E. Bouchoux, Intellectual Property Rights, Cengage Learning India, 2013.

Reference Books:

1. R.Myneni, Law of Intellectual Property, 9th Ed, Asia law House, 2019.
2. Prabuddha Ganguli, Intellectual Property Rights Tata McGraw Hill, 2001.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering Tool usage	The Engineer and The World	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2
24AMBA61T-1	3	2	2	2	1	2	-	-	-	1	-	2	1
24AMBA61T-2	2	3	3	2	2	1	-	-	-	-	-	2	2
24AMBA61T-3	3	2	3	2	2	1	1	-	-	-	-	1	1
24AMBA61T-4	2	3	2	2	2	1	1	-	-	-	-	1	2
24AMBA61T-5	2	2	2	1	3	1	1	-	-	1	1	1	2

D. S. S. S.

Ref.
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