AI&DS

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

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

Rajampet, Annamayya District, A.P – 516126, INDIA

MEETING MINUTES

of

BOARD OF STUDIES

ACADEMIC YEAR: 2026-27

Agenda of the Meeting:

Item No	Particulars
BoS/2026/AI&DS/1	Welcome and Introduction
BoS/2026/AI&DS/2	Confirmation of the Minutes of the 2nd Board of Studies Meeting
BoS/2026/AI&DS/3	Discussion and Finalization of Course Structure and Syllabus for III-B.Tech. under AU-24 Regulations
BoS/2026/AI&DS/4	Review and address any discrepancies observed in the Secondyear courses(i.e., B.Tech.) under the AU-24 Regulations.
BoS/2026/AI&DS/5	To approve the list of examiners for Third-year courses/subjects
BoS/2026/AI&DS/6	Any other item with permission of the Chair

MINUTES OF THE MEETING

BoS/2026/AI&DS/1	Welcome and Introduction

Welcome:

Dr. P. Phanindra Kumar Reddy, Head, Department of Department of Artificial Intelligence and Data Science has extended warm welcome to all the members.

Introduction:

Dr. P. Phanindra Kumar Reddy expressed his gratitude for their continued support and valuable contributions toward strengthening the academic framework of the Department of Artificial Intelligence and Data Science

Before proceeding with the day's agenda, he recalled the proceedings of the 2nd Board of Studies Meeting held on 11th June 2025. He stated that the meeting had been a significant step in shaping the academic direction of the department, with several key items discussed and approved. These included AU24 course structures and syllabi for III B.Tech.

Dr. P. Phanindra Kumar Reddy informed the members that the minutes of the 2nd meeting 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.

BoS/206/AI&DS/2	Confirmation of the Minutes of the 2nd Board of Studies Meeting

Resolution:

The BOS Confirmed and approved AI&DS Department's 2nd Board of Studies Meeting held on 11th June 2025.

BoS/2026/AI&DS/3	Discussion and Finalization of Course Structure and Syllabus for III-B.Tech. under AU-24 Regulations

Annexure-I attached

Resolution:

1. Semester-wise Subject Adjustment
   - It is proposed and approved to swap the subjects:
     - Automata Theory and Compiler Design (ACD) to I Semester
     - Natural Language Processing (NLP) to II Semester

2. Subject Combination Improvement
   - The Board suggested that combining NLP with Information Retrieval would provide better conceptual and application-oriented learning for students.

3. Subject Replacement
   - The subject "Exploratory Data Analysis with Python" is proposed to be removed.
   - In its place, "Operating Systems" will be introduced, considering its core importance.

4. Automata Theory and Compiler Design Lab Changes
   - Approved modifications:
     - Exercise 3 to be placed at the end of the lab schedule
     - Exercise 11 to be removed

5. Distributed Systems Enhancement
   - It is recommended to add more reference books to strengthen the subject content and provide broader learning resources.

With this the Board unanimously **approved the course structure and syllabus for III-B.Tech.** under the AU-24 Regulations. The BoS further recommended that the finalized version be submitted to the Academic Council for ratification and be implemented from the academic year 2026–27.

BoS/2026/AI&DS/7	To approve the list of examiners for Third-year courses/subjects

Annexure-II attached

Resolution:

BOS Approved the List of Examiners for Third-year Courses/Subjects.

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BoS/2026/AI&DS/9	Any other item with permission of the Chair

Resolution:

- It is Proposed that **all IV Year B.Tech project reports must be prepared and submitted using LaTeX format**, to ensure standardization and improve the quality of technical documentation.
- It is proposed to **introduce internships from IV Year – I Semester onwards**, with a suggestion that **regular classroom sessions may be minimized or removed in IV Year**, allowing students to focus on **industry internships and project work.**

Dr. P. Phanindra Kumar Reddy
Chairman-BOS-AI&DS
Annamacharya University

Internal Members:

1. Dr. P. Phanindra Kumar Reddy -
2. Dr. K Uday Kumar Reddy -
3. Mr. S Ashok Kumar -
4. Mr. B Venkatesu Goud -
5. Mr. U. Naresh kumar -

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Ref.No.:/AU/SoE/AI&DS/BOS-03/2026-27/MOM-03 Date: 02/05/2026

Department of Artificial Intelligence & Data Science 3rd BoS Minutes of Meeting

The 3rd meeting of the Board of Studies (BoS) for the Department of AI&DS was held in offline mode on 2nd May 2026 in Neumann lab of the AI&DS Main Block at 10:30 AM, with the following members of the board present.

Members Present:

Sl.No.	Name	Affiliation	Role in BoS	Signatures
1	Dr. P. Phanindra Kumar Reddy	Associate Professor & Head Dept. of AI&DS Annamacharya University Rajampet. Ph: 8712314387 Email: phanindra.44u@gmail.com	Chairman	
2	Dr. K Uday Kumar Reddy	Associate Professor, Dept. of AI&DS, Annamacharya University. Rajampet. Ph: 9490634569	Senior Faculty – Member	
3	Mr. S Ashok Kumar	Assistant Professor, Dept. of AI&DS, Annamacharya University. Rajampet.	Senior Faculty – Member	
4	Mr. B Venkatesu Goud	Assistant Professor, Dept. of AI&DS, Annamacharya University. Rajampet	Senior Faculty – Member	
5	Mr. U. Naresh Kumar	Assistant Professor, Dept. of AI&DS, Annamacharya University. Rajampet.	Course Coordinator- Member	
6	Dr. P Ravi Kumar	Assistant Professor, Dept., of CSE, IIIT RK Valley, RGUKT-AP India Phone:9490258791, Email:raviua138@gmail.com	Subject Expert Member	
7	Dr. Somesula Manoj Kumar	Assistant Professor, Department of CSE(DS), Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, Punjab-144008, India. Mail: kumarsm@nitj.ac.in, Ph: +91 9642628253	Subject Expert Member	
8	Ms. Sreevidya Pattem	Designation: Associate Trainee role Company Name: Intellipaat Email id: sreevidyapattem@gmail.ccom Mobile: +91 9494880692	Industry Representative Member	
9	Ms. Kandula Bhavitha	Alumni Representative Member Mobile: +91 9390612277, Email: bhavithakandulareddy@gmail.com	Alumni Representative Member	

Members of Absence: 1. Dr. B R Chandavarkar

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Department of Artificial Intelligence & Data Science 3rd BoS

Attendance sheet:

BoS Members:

Sl.No	Name	Role in BoS	Signature with Date
1	Dr. P. Phanindra Kumar Reddy	Chairman	02/05/26
2	Dr. K Uday Kumar Reddy	Senior Faculty Member	
3	Mr. S Ashok Kumar	Senior Faculty Member	
4	Mr. B Venkatesu Goud	Senior Faculty Member	
5	Mr. U. Naresh Kumar	Course Coordinator Member	
6	Dr. P Ravi Kumar	Subject Expert Member	
7	Dr. Somesula Manoj Kumar	Subject Expert Member	
8	Dr. B R Chandavarkar	University Nominee Member	Absent
9	Ms. P SreeVidhya	Industry Representative Member	P. Sreevidhya 02/05/26
10	Ms. K Bhavitha	Alumni Representative Member	K. Bhavitha 02/05/26

HoD

Gmail Dr. P Phanindra Kumar Reddy <phanindra.44u@gmail.con

nnamacharya University:: Request for Approval of Minutes of the 3rd Board of Studies leeting – B.Tech AI&DS, CSE(DS)-reg

messages

: P Phanindra Kumar Reddy <phanindra.44u@gmail.com> Mon, May 11, 2026 at 6:33 P
: Dr Somesula Manoj Kumar <kumarsm@nitj.ac.in>

Dear Sir,

Greetings.

Please find attached the Minutes of the 3rd Board of Studies meeting of the B.Tech Artificial Intelligence & Data Science (AI&DS), Computer Science & Engineering(Data Science) program for your kind review and approval.

Kindly approve the same at your earliest convenience.

Thank you.

Regards,

Dr. P Phanindra Kumar Reddy

--
Live Simply, love Sincerely, care Deeply, speak Kindly, and leave the rest to God.....!

Regard' S,
Dr. P.Phanindra Kumar Reddy.
Assoc. Professor & HoD
Artificial Intelligence & Data Science Department
Annamacharya University, Rajampet.

2 attachments

CSE(DS).pdf
4683K

AI&DS.pdf
3899K

Somesula Manoj Kumar <kumarsm@nitj.ac.in> Mon, May 11, 2026 at 7:21 P
: "Dr. P Phanindra Kumar Reddy" <phanindra.44u@gmail.com>

Dear Sir,

Thank you for forwarding the minutes of the recent Board of Studies (BoS) meeting held on 02nd May 2026.

have reviewed the document and found the minutes to be an accurate representation of the discussions and decisions made during the meeting. I hereby approve the minutes as presented.

Please proceed with the necessary steps for further documentation and distribution.

Thank you for your attention to this matter.
Quoted text hidden]
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Thanks and Regards

Dr. Somesula Manoj Kumar,
Assistant Professor,
Department of Computer Science and Engineering,
Dr. B. R. Ambedkar National Institute of Technology,
Jalandhar, Punjab - 144008, India.
(Member IEEE, IEEE ComSoc and ACM)

Gmail Dr. P Phanindra Kumar Reddy <phanindra.44u@gmail.con

.nnamacharya University:: Invitation to Attend the 3rd Board of Studies Meeting-reg

messages

r. P Phanindra Kumar Reddy <phanindra.44u@gmail.com> Sat, Apr 25, 2026 at 3:48 P
): Bhavithakandula Reddy <bhavithakandulareddy@gmail.com>

Dear Sir,

Greetings from Annamacharya University, Rajampet.

I am Dr. P. Phanindra Kumar Reddy, HoD – AI & DS Department, Annamacharya University, Rajampet.

I am pleased to inform you that the 3rd Board of Studies Meeting is scheduled to be held on Saturday, 2nd May 2026 at 10:00 a.m. The meeting will be conducted in offline mode at the university campus.

I kindly request you to make it convenient to attend the meeting and offer your valuable suggestions.

The agenda for the meeting is as follows:

Agenda for the 3rd Board of Studies Meeting:
3.1 Confirmation of the minutes of the 2nd Board of Studies Meeting
3.2 Discussion and finalization of the course structure for III and IV B.Tech, and finalization of the syllabus for III B.Tech under AU-24 Regulations
3.3 Approval of the list of examiners for third-year courses/subjects
3.4 Any other item with the permission of the Chair

All members are requested to attend the meeting without fail.

Thanking you.

--
Live Simply, love Sincerely, care Deeply, speak Kindly, and leave the rest to God.....I

Regard' S,
Dr. P.Phanindra Kumar Reddy.
Assoc. Professor & HoD
Artificial Intelligence & Data Science Department
Annamacharya University, Rajampet.

: P Phanindra Kumar Reddy <phanindra.44u@gmail.com> Mon, May 11, 2026 at 6:30 P
): Bhavithakandula Reddy <bhavithakandulareddy@gmail.com>

Dear Sir/Madam,

Greetings.

Please find attached the Minutes of the 3rd Board of Studies meeting of the B.Tech Artificial Intelligence & Data Science (AI&DS), Computer Science & Engineering(Data Science) program for your kind review and approval.

Kindly approve the same at your earliest convenience.

Thank you.

Regards,

Dr. P Phanindra Kumar Reddy

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2 attachments

AI&DS.pdf
3899K

CSE(DS).pdf
4683K

): "Dr. P Phanindra Kumar Reddy" <phanindra.44u@gmail.com>

Approved

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Gmail Dr. P Phanindra Kumar Reddy <phanindra.44u@gmail.con

.nnamacharya University:: Invitation to Attend the 3rd Board of Studies Meeting-reg

messages

r. P Phanindra Kumar Reddy <phanindra.44u@gmail.com> Sat, Apr 25, 2026 at 3:44 P
): raviua138@gmail.com, "raviua138@rguktrkv.ac.in" <raviua138@rguktrkv.ac.in>

Dear Sir,

Greetings from Annamacharya University, Rajampet.

I am Dr. P. Phanindra Kumar Reddy, HoD – AI & DS Department, Annamacharya University, Rajampet.

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Regard' S,
Dr. P.Phanindra Kumar Reddy.
Assoc. Professor & HoD
Artificial Intelligence & Data Science Department
Annamacharya University, Rajampet.

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avi Kumar <raviua138@gmail.com> Sat, Apr 25, 2026 at 3:53 P
): "Dr. P Phanindra Kumar Reddy" <phanindra.44u@gmail.com>

Dear Sir,

Good afternoon, Sir.

Thank you for your email and for inviting me to the 3rd BoS meeting. Would it be possible to share the old documents for my ready reference?

Thank you very much,

Dr. Penugonda Ravikumar

Regards,

Dr. Penugonda Ravikumar
M.E (IISc, Bangalore), PhD (U-AIZU, Japan)
Assistant Professor,
Department of CSE,
IIIT RK Valley, RGUKT-AP.
[Quoted text hidden]

:. P Phanindra Kumar Reddy <phanindra.44u@gmail.com> Sat, Apr 25, 2026 at 4:28 P
): Ravi Kumar <raviua138@gmail.com>

Good Evening Sir,

PFA: Ist and II Year Syllabus for your reference

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2 attachments

AU_24_AIDS_1YEAR-and-2YEAR (1).pdf
1189K

CSE-DS-syllabus-2025-2026.pdf
3252K

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r. P Phanindra Kumar Reddy <phanindra.44u@gmail.com> Mon, May 11, 2026 at 6:31 P
): Ravi Kumar <raviua138@gmail.com>

Dear Sir/Madam,

Greetings.

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Kindly approve the same at your earliest convenience.

Thank you.

Regards,

Dr. P Phanindra Kumar Reddy

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2 attachments

CSE(DS).pdf
4683K

AI&DS.pdf
3899K

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avi Kumar <raviua138@gmail.com> Mon, May 11, 2026 at 7:18 P
): "Dr. P Phanindra Kumar Reddy" <phanindra.44u@gmail.com>

Dear sir,

Approved.

Regards,

Dr. Penugonda Ravikumar
M.E (IISc, Bangalore), PhD (U-AIZU, Japan)
Assistant Professor,
Department of CSE,
IIIT RK Valley, RGUKT-AP.
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Gmail Dr. P Phanindra Kumar Reddy <phanindra.44u@gmail.com

ınnamacharya University:: Subject: Invitation to Attend the 3rd Board of Studies Meeting
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messages

r. P Phanindra Kumar Reddy <phanindra.44u@gmail.com> Sat, Apr 25, 2026 at 3:47 P
›: sreevidyapattem@gmail.com

Dear Sir,

Greetings from Annamacharya University, Rajampet.

I am Dr. P. Phanindra Kumar Reddy, HoD – AI & DS Department, Annamacharya University, Rajampet.

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Regard' S,
Dr. P.Phanindra Kumar Reddy.
Assoc. Professor & HoD
Artificial Intelligence & Data Science Department
Annamacharya University, Rajampet.

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r. P Phanindra Kumar Reddy <phanindra.44u@gmail.com> Mon, May 11, 2026 at 6:29 P
›: sreevidyapattem@gmail.com

Dear Sir/Madam,

Greetings.

Please find attached the Minutes of the 3rd Board of Studies meeting of the B.Tech Artificial Intelligence & Data Science (AI&DS), Computer Science & Engineering(Data Science) program for your kind review and approval.

Kindly approve the same at your earliest convenience.

Thank you.

Regards,

Dr. P Phanindra Kumar Reddy

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2 attachments

AI&DS.pdf
3899K

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ree vidya Pattem <sreevidyapattem@gmail.com> Mon, May 11, 2026 at 7:16 P
): "Dr. P Phanindra Kumar Reddy" <phanindra.44u@gmail.com>

Ok sir Approved.
[Quoted text hidden]

ANNAMACHARYA UNIVERSITY

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(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)
RAJAMPET, Kadapa District, AP – 516126, INDIA

Department of Artificial Intelligence and Data Science

III Year I Sem

Sl. No.	Category	Course Code	Course Title	Hours per Week			Credits
				L	T	P	C
1	PC	24ACSE52T	Computer Networks	3	0	0	3
2	PC	24ACSE53T	Data Mining	3	0	0	3
3	PC	24AAID51T	Automata Theory and Compiler Design	3	0	0	3
4	PE	24ACSE5AT	Software Testing Methodologies	3	0	0	3
		24ACSE5BT	Object Oriented Analysis and Design				
		24AAID5AT	Machine Learning Operations				
		24AAID5BT	Operating Systems				
5	OE	24AAID5CT	MOOC	3	0.	0	3
6	PC	24ACSE52L	Computer Networks Lab	0	0	3	1.5
7	PC	24ACSE53L	Data Mining Lab	0	0	3	1.5
8	PC	24AAID51L	Automata Theory and Compiler Design Lab	0	0	3	1.5
9	MC	24AAUD51T	Gender Sensitization	2	0	0	0
10	Internship	24AAID52I	Summer Internship 2 Months after second year (to be evaluate during V semester)	0	0	0	2
						Total Credits	21.5

Category	Credits
Professional core Courses	13.5
Professional Elective Courses	3
Open Elective Course/ Job Oriented Elective	3
Summer Internship	2
Total Credits	21.5

(B. Venkatesu Goud)

(V. Naresh Kumar)

(Dr. K. Yedaiah Kumar Reddy)

S. Ashok Kumar

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RAJAMPET, Kadapa District, AP – 516126, INDIA

III Year II Sem

Sl. No.	Category	Course Code	Course Title	Hours per Week			Credits
				L	T	P	C
1	PC	24AAID61T	Big Data Analytics	3	0	0	3
2	PC	24AAID62T	Natural Language Processing and Information Retrieval	3	0	0	3
3	PC	24ACSE62T	Machine Learning	3	0	0	3
4	PE	24ACSM6BT	Cryptography and Network Security	3	0	0	3
		24AAID6AT	Distributed Systems				
		24AAID6BT	Reinforcement Learning				
		24AAID6CT	Computer Vision				
5	OE	24AAID6DT	MOOC	3	0	0	3
6	PC	24AAID61L	Big Data Analytics Lab	0	0	3	1.5
7	PC	24AAID62L	Natural Language Processing and Information Retrieval Lab	0	0	3	1.5
8	PC	24ACSE62L	Machine Learning Lab	0	0	3	1.5
9	SEC	24AENG61L	Soft Skills & Employability Skills	1	0	2	2
10	MC	24AMBA61T	Technical Paper Writing and IPR	2	0	0	0
						Total Credits	21.5
Internship 2 Months (Mandatory) during summer vacation							

Category	Credits
Professional core Courses	13.5
Professional Elective Courses	3
Open Elective Course/ Job Oriented Elective	3
Skill Enhance Course/ Soft Skill Course	2
Total Credits	21.5

(B. Venkatesu Goud) (V. Naresh Kumar) (Dr. K. Uday Kumar Reddy)

S. Ashok kumar

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RAJAMPET, Kadapa District, AP – 516126, INDIA

IV Year I Sem

Sl. No	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	PC	24AAID71T	Internet of Things and its Applications	3	0	0	3
2	PE	24AAID7AT	Cyber Security and Ethical Hacking	3	0	0	3
		24AAID7BT	Graph Analytics & Network Science				
		24AAIM7CT	Generative AI				
		24AAID7CT	High Performance Computing for AI				
3	PE	24AAID7DT	Quantum Computing for AI	3	0	0	3
		24ACSE7FT	Block Chain Technology				
		24ACSE7GT	Cloud Computing				
		24ACSM7HT	Cognitive Science				
4	PE	24ACSE71T	Deep Learning	3	0	0	3
		24ACSE7IT	Mobile Ad hoc Networks				
		24AAID7ET	AI Ethics, Fairness and Governance				
		24AAID7FT	Edge AI and IoT Analytics				
5	PE	24ACIC7LT	Social Network Analysis	2	0	2	3
		24ACSE7NT	R Programming				
		24ACSE7OT	Linux Programming				
		24ACSE7PT	No SQL Databases				
6	OE	24ACIV7NT	Water Resources and Harvesting	3	0	0	3
		24ACIV7MT	Disaster Management				
		24AEEE7UT	Electric Vehicles				
		24AEEE7TT	Renewable Energy Sources				
		24AMEC7HT	Optimization Techniques				
		24AMEC7GT	Entrepreneurship Development				
		24AECE7VT	Introduction to Image Processing				
		24AECE7TT	Introduction to Communications Systems				
		24AMBA71T	Human Resource Management				
		24AMBA72T	Startup Management				
		24AMAT71T	Numerical Methods				
		24ACHE71T	Chemistry of Energy Systems				
		24APHY71T	Smart Materials and Devices .				
		24AENG31T	English for Competitive Examinations				
7	SEC	24ACSE72L	Prompt Engineering	1	0	2	2
8	Internship	24AAID72I	Industrial/Research Internship 2 Months after third year (to be evaluated during VII semester)	0	0	0	2
						Total credits	22

(B. Venkateswarlu) (S. Ashok Kumar) (Dr. K. Venkata Ramana Reddy)

Category	Credits
Professional core Courses	3
Professional Elective courses	9
Open Elective Course	9
Industrial/Research Internship	2
Skill Oriented Course/ Soft Skill Course	2
Total Credits	22

IV Year II Sem

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	PW	24AAID81P	Project work, seminar and internship in Industry	-	-	-	12
Internship (6 months)							
			Total Credits				12

S.NO	Category	AIDS
1	BSC	20
2	MC	0
3	ESC	24.5
4	PCC	525
5	PEC	15
6	OEC	12
7	HSMC	12
8	SKILL COURSES	8
9	INTERNSHIP	4
10	PW	12
	TOTAL	160

List of Courses offered to other branches:

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	OE	24AAID7MT	Introduction Data Science	3	0	0	3

(B. Venkatesu Goud) (V. Naresh Kumar) (Dr. K. Uday Kumar Reddy)

S. Ashok Kumar

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

RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course	:	**Computer Networks**
Category	:	PC
Couse Code	:	24ACSE52T
Year	:	III B. Tech
Semester	:	I Semester
Branch	:	CSE, CSE(AIML) & CSE (IOTCSBCT)

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.

(S.H.Rafi)

Unit 3 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 Transport Layer **10**

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

Unit 5 The Application Layer **10**

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

Textbook:

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 Approachl, 6th edition, Pearson, 2019.
2. Forouzan, Datacommunications and Networking, 5th Edition, McGraw Hill Publication.
3. Youlu Zheng, Shakil Akthar, —Networks for Computer Scientists and Engineersl, 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

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course	:	**Data Mining**
Category	:	PC
Couse Code	:	24ACSE53T
Year	:	III B. Tech
Semester	:	I Semester
Branch	:	CSE, CSE(AIML) & CSE (IOTCSBCT)

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

Course Objectives: This course is designed to

1. Explain the fundamentals of data mining, data preprocessing techniques, and key issues in data mining.
2. Describe data warehousing concepts and association rule mining techniques for large datasets
3. Apply classification and prediction techniques for analyzing data.
4. Analyze different clustering methods and outlier detection techniques for data analysis.
5. Evaluate the effectiveness of data mining techniques using the ORANGE tool on real-world datasets

Course Outcome: Upon completion of the course, the students should be able to:

1. Describe data mining functionalities and perform basic data preprocessing operations.
2. Apply data warehouse models and association rule mining techniques to extract patterns.
3. Analyze and compare classification and prediction techniques based on performance.
4. Evaluate clustering algorithms and identify suitable methods for different data types.
5. Develop data mining models and infer knowledge from datasets using the ORANGE tool.

Unit 1 12

INTRODUCTION: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Major issues in Data Mining, Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

Unit 2 10

Warehousing: Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture
Mining Association Rules In Large Databases: Basic Concepts and a Road Map, Efficient and Scalable Frequent Item set Mining Methods, Mining Various Kinds of Association Rules, From Association Mining to Correlation Analysis.

Unit 3 10

Classification And Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Support Vector Machines, Other Classification Methods, Prediction, Classifier Accuracy.

HOD

Unit 4 12

Cluster Analysis :Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods Density-Based Methods, Grid-Based Methods, Model- Based Clustering Methods, Outlier Analysis.

Unit 5 10

Orange Data Mining Tool: Introduction to Orange, Datasets – Introduction, Iris plants database, CSV File Import, Transform, Association Rule Mining, Decision Tree, KNN, Naïve Bayes, Linear Regression, Clustering algorithms.

TEXT BOOK:

1. Jiawei Han and Micheline Kamber, —Data Mining Concepts and Techniques, Third Edition, Elsevier, 2012.

REFERENCES:

1. Alex Berson and Stephen J.Smith, —Data Warehousing, Data Mining & OLAPI, Tata McGraw – Hill Edition, 35th Reprint 2016.
2. K.P. Soman, Shyam Diwakar and V. Ajay, —Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006.
3. Ian H.Witten and Eibe Frank, —Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second 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
24ACSE53T.1	3	2	1	1	2	-	-	-	-	-	1	2	1	-
24ACSE53T.2	3	3	2	2	3	-	-	-	1	1	2	3	2	1
24ACSE53T.3	3	3	2	3	2	-	-	-	1	-	2	3	2	2
24ACSE53T.4	3	3	2	3	2	1	-	-	1	-	3	3	2	2
24ACSE53T.5	3	3	3	3	3	1	-	1	2	1	3	3	3	3

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RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course	Automata Theory and Compiler Design
Category	PC
Year	III
Semester	I
Course Code	24AAID51T
Branch/es	AI&DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. Able to understand the concept of abstract machines, construct FA, Regular Expressions for the regular languages and equivalent FSMs.
2. Able to construct pushdown automata equivalent to Context free Grammars, construct Turing Machines and understand undecidability.
3. Emphasize the concepts learnt in phases of compiler, lexical analyser and Top-down parser.
4. Able to understand the concepts of Bottom-up parser, Intermediate Code Generation.
5. Able to understand the concepts of Code optimizer and Code Generation.

Course Outcomes:

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

1. Demonstrate knowledge on Automata Theory, Regular Expression and Analyze and Design of finite automata, and prove equivalence of various finite automata.
2. Demonstrate knowledge on context free grammar, Analyze and design of PDA and TM.
3. Understand the basic concept of compiler design, and its different phases which will be helpful to construct new tools like LEX, YACC, etc.
4. Ability to implement semantic rules into a parser that performs attribution while parsing and apply error detection and correction methods.
5. Apply the code optimization techniques to improve the space and time complexity of programs while programming and Ability to design a compiler.

Unit 1 **Introduction to Automata and Regular Expressions** **12**

Introduction, Alphabets, Strings and Languages, Chomsky Hierarchy, Automata and Grammars, Regular Grammar and Language, Finite Automata, Deterministic finite Automata (DFA), Nondeterministic finite Automata (NFA), Equivalence of NFA and DFA, Minimization of Finite Automata, Regular Expressions, Converting Regular Grammar and Expression into Finite Automata, Pumping lemma for regular sets, Closure properties of regular sets (Without proof).

Unit 2 **Context Free Grammars and Pushdown Automata** **12**

Context Free Language, Context Free Grammar, Derivation and Parse tree, Ambiguity, Simplification of CFG's, Chomsky Normal Form, Greibach Normal Form, Push Down Automata (PDA), Design of PDA, Equivalence of PDA and CFL/CFG

Unit 3 **Turing Machines and Introduction to Compilers** **10**

Turing Machine, TM Model, Language acceptance, Design of Turing Machine, Compilers, Phases of Compiler, The role of Lexical Analyzer, Input Buffering.

Unit 4 **Parsers and Intermediate Code Generation** **12**

Parser, Top-Down parsers: Recursive Descent Parsers, Predictive Parsers Bottom–up Parsers: Shift-Reduce Parsing, LR parsers, Intermediate Code Generation: Three address codes.

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Unit 5 **Code Optimization and Code Generation** **12**

Code Optimization: Peephole optimization, Basic blocks and flow graphs, DAG, Principles of Source Code Optimization, Code Generation: Issues in Design of Code Generation, Simple Code Generator.

Prescribed Text Books:

1. Introduction to Automata Theory, Languages and Computation, J. E. Hopcroft, R. Motwani and J. D. Ullman, 3rd Edition, Pearson, 2008.
2. Aho, Ullman, Ravisethi, Compilers Principles, Techniques and Tools. Pearson Education.

References Books:

1. Introduction to Languages and Theory of Computation, John C Martin, 1/e, 2009, Tata McGraw Hill Education, Hyderabad, India.
2. Introduction to Theory of Computation, Sipser, 2/e, 2005, Thomson, Australia

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
24AAID51T.1	3	3	2	2	1	-	-	-	1	-	1.
24AAID51T.2	3	3	2	2	1	-	-	1	1	-	1
24AAID51T.3	3	2	3	2	2	-	-	1	1	-	1
24AAID51T.4	3	3	3	3	2	-	-	1	1	-	1
24AAID51T.5	3	3	3	3	3	1	1	1	1	-	2

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RAJAMPET, Annamayya District, AP – 516126, INDIA

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

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

Course Objectives: This course is designed to

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.

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 a 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	–

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Object Oriented Analysis and Design
Category:	PE
Couse Code:	24ACSE5BT
Year:	III B. Tech
Semester:	I Semester
Branch:	CSE

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

Course Objectives: This course is designed to

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

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

1. The importance of modelling in UML.
2. Compare and contrast the object-oriented modes.
3. Design an application using Behavioural Modelling.
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.

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 [illegible]	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24ACSE5BT.1	3	2	1	1	1	–	–	–	–	–	2	2	1	–
24ACSE5BT.2	3	3	2	2	3	–	–	–	–	–	2	3	2	–
24ACSE5BT.3	3	3	2	2	1	–	–	–	–	–	3	2	2	–
24ACSE5BT.4	3	3	3	3	2	–	–	–	–	–	3	2	2	–
24ACSE5BT.5	3	3	3	3	3	–	–	2	2	2	3	3	3	1

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RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course	Machine Learning Operations
Category	PE
Year	III
Semester	I
Course Code	24AAID5AT
Branch/es	AI&DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To introduce MLOps practices for streamlining the ML lifecycle.
2. To understand versioning, reproducibility, automation, and deployment in ML.
3. To provide knowledge of CI/CD pipelines in machine learning workflows.
4. To integrate monitoring, governance, and retraining mechanisms in production ML systems.
5. To explore MLOps platforms and tools like MLflow, Kubeflow, and TFX.

Course Outcomes:

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

1. Understand the end-to-end ML lifecycle from experimentation to deployment.
2. Apply DevOps practices in ML system design and implementation.
3. Utilize tools for tracking, testing, and automating ML workflows.
4. Deploy and monitor scalable ML systems in cloud or hybrid environments.
5. Implement robust and reproducible MLOps pipelines using industry-standard tools.

Unit 1 **Introduction to MLOps and ML Lifecycle** **10**

Introduction to MLOps: Principles and Need, Differences between DevOps and MLOps, ML Lifecycle: Data, Model, Code, Deployment, Roles and Responsibilities in MLOps Teams – (R), Experiment Tracking and Management, Data and Model Versioning, Reproducibility and Reusability, Case Study: MLOps in a Real-World Project.

Unit 2 **Data Engineering for MLOps** **9**

Data Ingestion Pipelines and Orchestration, Data Validation and Profiling, Feature Engineering and Feature Stores, Handling Data Drift and Concept Drift, Batch vs Streaming Data Processing, DataOps for MLOps: Tools and Techniques, Tools: Apache Airflow, TFX Data Validation, Case Study: Building a Scalable Data Pipeline.

Unit 3 **Model Training, Tracking, and Versioning** **10**

Automated ML Training Pipelines, Model Tracking with MLflow, Weights &Biases, Model Version Control and Registry, Hyperparameter Tuning Automation, Training on Cloud Platforms (GCP, AWS, Azure ML), Performance Metrics and Evaluation, Reproducibility Using Docker & Conda Environments, Case Study: Hyperparameter Tuning Pipeline

Unit 4 **CI/CD in Machine Learning** **9**

CI/CD Concepts and Pipelines for ML, Infrastructure as Code: Terraform, YAML, ML Testing: Data, Model, Pipeline, Integration, Model Validation and Bias Testing, Continuous Training and Automated Retraining, Tools: Jenkins, GitHub Actions, Kubeflow Pipelines, Containerization with Docker and Orchestration with Kubernetes, Case Study: Implementing End-to-End CI/CD for ML – (E)

Unit 5 **Model Deployment, Monitoring, and Governance** **12**

(B Venkatesu Garu) (V Balaji Kumar) (Dr K. Uday Kumar Reddy) (S. Ashok Kumar)

Deployment Strategies: A/B Testing, Blue-Green, Model Serving: REST APIs, gRPC, TensorFlow Serving, Monitoring Models in Production: Accuracy, Drift, Logging, Alerts, and Rollbacks, Model Governance, Explainability and Fairness, Privacy and Security in ML Systems, Case Study: ML Monitoring using Prometheus and Grafana – (C), Capstone: Building an End-to-End MLOps Pipeline – (C)

Prescribed Text Books:

1. Mark Treveil, Alok Shukla – —Introducing MLOps: How to Scale Machine Learning Projects with Continuous Delivery, Monitoring, and Governance, O'Reilly.

References Books:

1. Emmanuel Raj – —Machine Learning Engineering with MLOps, Packt Publishing.
2. Carl Osipov – —MLOps Engineering at Scale, Wiley.
3. Andrew Ng – —Machine Learning B.Techning (Online Resource).
4. Chris Fregly & Antje Barth – —Data Science on AWS, O'Reilly.
5. Chip Huyen – —Designing Machine Learning Systems, 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	Life-long learning
24AAID5AT.1	3	2	2	1	3	1	-	1	1	1	2
24AAID5AT.2	3	3	3	2	3	1	-	1	1	2	2
24AAID5AT.3	3	3	2	2	3	-	-	1	1	1	2
24AAID5AT.4	3	3	3	3	3	1	-	1	2	2	3
24AAID5AT.5	3	3	3	3	3	1	-	1	1	2	3

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RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course	Operating Systems
Category	PE
Year	III
Semester	I
Course Code	24AAID5BT
Branch/es	AI&DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To provide a grand tour of the operating system architecture and its functions.
2. To gain knowledge in process & thread synchronization, scheduling.
3. To know the paging & memory management techniques.
4. To understand memory, files, i/o and mass storage.
5. To know about protection and security in operating systems.

Course Outcomes:

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

1. Understand operating system functionalities, process concepts, scheduling criteria and scheduling algorithms.
2. Apply the concepts of process synchronization in real computing problems.
3. Analyse and investigate the local and global impacts of deadlocks and efficient utilization of memory Management techniques.
4. Suggest appropriate file system and disk organizations for a variety of computing scenario.
5. Evaluate security mechanisms in operating computing systems

Unit 1 **Operating Systems Overview and Systems structures** **10**

Operating Systems Overview: Introduction, what operating systems do? Computer system Organization & architecture, Operating system operations.

Systems structures: Operating system services, systems calls, types of System calls.

Process Management: Process concepts; process Scheduling, operations on process, Process Scheduling Basic Concepts, Scheduling Criteria, scheduling algorithms, IPC, communication in Client-Server systems.

Unit 2 **Multithreaded Programming and Concurrency** **10**

Multithreaded Programming: Overview, Multithreading models, thread libraries, thread issues and thread scheduling, multiprocessor scheduling.

Concurrency: Process synchronization, the critical-section problem, Petersons Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors.

Unit 3 **Principles of Deadlock and Memory Management** **9**

Principles of Deadlock: System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock.

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation.

Virtual Memory Management: Demand paging, page-replacement algorithms, Allocation of frames, Thrashing.

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Unit 4 **File System Interface and Implementation** **9**

File System Interface and Implementation: File Concept, Access Methods, Directory structure, File system mounting, allocation methods in Disk Space, free-space management.

Mass-storage Structure: Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, RAID structure, stable-storage implementation.

Unit 5 **I/O Systems and Protection** **9**

I/O Systems: I/O Hardware, Transforming I/O requests to hardware operations.

Protection: Protection, Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights.

Security: The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, firewalls to protect systems and networks, computer –security classifications.

Prescribed Text Books:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 10th edition, John Wiley.

References Books:

1. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education
2. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
3. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
4. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition
5. Operating Systems, A Concept based Approach-D.M.Dhamdhere, Second 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	Life-long learning
24AAID5AT.1	3	2	2	1	3	1	-	1	1	1	2
24AAID5AT.2	3	3	3	2	3	1	-	1	1	2	2
24AAID5AT.3	3	3	2	2	3	-	-	1	1	1	2
24AAID5AT.4	3	3	3	3	3	1	-	1	2	2	3
24AAID5AT.5	3	3	3	3	3	1	-	1	1	2	3

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Computer Networks Lab
Category:	PC
Couse Code:	24ACSE52L
Year:	III B. Tech
Semester:	I Semester
Branch:	CSE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives: This course is designed to:

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. 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. 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 Dijkastra's algorithm to compute the shortest path through a network
5. Implement and simulate algorithm for Distance vector routing protocol.
6. Implement and simulate algorithm for Link state routing protocol.
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. MathanNagan, T. Mahalakshmi- Charulatha Publications PrivateLimited-2019.
4. Computer Networks-Dr.Amol V. Dhumane Nitin N. Sakhare-NiraliPrakashan Publishers-2024 5. Data Communications and Networking with TCPIP 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

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

Title of the Course: Data Mining Lab
Category: PC
Couse Code: 24ACSE53L
Year: III B. Tech
Semester: I Semester
Branch: CSE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5.

Course Objectives: This course is designed to

1. Explain fundamental concepts of data mining and data exploration.
2. Describe data preprocessing and transformation techniques.
3. Illustrate association rule mining and classification methods.
4. Examine different data mining algorithms and their evaluation methods
5. Discuss prediction and clustering techniques using the Orange Data Mining tool.

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

1. Perform data exploration and preprocessing on datasets
2. Apply data transformation techniques to prepare data for analysis.
3. Implement association rule mining and classification methods for pattern discovery.
4. Analyze and evaluate the performance of data mining algorithms.
5. Develop prediction and clustering models using the Orange Data Mining tool.

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

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

1. Demonstration on basic data exploration and identification of interesting patterns.
2. Load datasets and perform saving/loading operations using a data mining tool.
3. Perform data preprocessing on Melbourne Housing dataset (handling missing values, normalization).
4. Apply data transformation and visualization techniques for better understanding of datasets.
5. Generate frequent itemsets using association rule mining techniques.
6. Perform association rule discovery and interpret support, confidence, and lift.
7. Compare different association rule strategies and analyze their effectiveness.
8. Implement decision tree induction using Information Gain and Gain Ratio.
9. Perform classification on heart disease dataset using Naïve Bayes and Neural Networks.
10. Perform classification using Support Vector Machines and Decision Tree.
11. Compare classification algorithms and identify the best method using evaluation metrics.
12. Predict class labels using classification tree models for test samples.
13. Evaluate regression models to predict numerical values of test samples.
14. Implement k-means clustering and analyze clustering results.

Task Resources:

Download and install Orange data mining tool from
https://orangedatamining.com/download/#windows Orange data mining tool tutorials.

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
24ACSE53L.1	3	2	1	2	2	-	-	-	-	-	1	2	2	-
24ACSE53L.2	3	3	1	2	3	-	-	-	-	-	2	3	2	1
24ACSE53L.3	3	3	2	3	3	-	-	-	1	-	2	3	2	2
24ACSE53L.4	3	3	2	3	2	1	-	-	1	-	3	3	2	2
24ACSE53L.5	3	3	3	3	3	1	-	1	2	1	3	3	3	3

(S.M.Rafi)

(B.Naresh Kumar)

D.Dilip Chakravarthy

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RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course	:	Automata Theory and Compiler Design Lab
Category	:	PC
Year	:	III
Semester	:	I
Course Code	:	24AAID51L
Branch/es	:	AI&DS, CSE(DS)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives: This course will be able to

1. Learn deterministic and non-deterministic machines
2. Explain the importance of compiler design
3. Design and implementation of lexical analyzer using Lex tools.
4. Design compiler components..
5. Enlighten the student with knowledge base in compiler design and its applications

Course Outcomes:

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

1. Construct finite state diagrams while solving problems of computer science
2. Design a LEX analyzer for identification of tokens and lexemes
3. Design Recursive Descent parser for the given language
4. Evaluate top down parser and bottom up parser
5. Implement intermediate code forms and run time storage.

Exercise 1

Write a program to Deterministic Finite Automata (DFA).

Exercise 2

Write a program to FA to regular grammar conversion.

Exercise 3

Write a program to Construct a Lexical Analyzer for validating identifiers, operators, comments, looping statements, key words.

Exercise 4

Write a program to compute FIRST and FOLLOW sets

Exercise 5

Write a program to construct a Recursive Parser

Exercise 6

Write a program to construct a Recursive Descent Parser.

Exercise 7

Write a program to remove left factoring

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Exercise 8

Write a program to remove left recursion

Exercise 9

Write a program to implement Bottom-up parsers.

Exercise 10

Write a program to Converting CFG to PDA (LL)

Reference Books:

1. Hopcraft H.E and Ullman J.D., Introduction to Automata Theory, Languages and computation. Pearson education.

Reference Books:

1. Principles of compiler design -A.V. Aho. J.D.Ullman; Pearson Education..
2. Lex&yacc – John R. Levine, Tony Mason, Doug Brown, O"reilly.

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

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
24AAID51L.1	3	3	2	2	2	-	-	1	1	-	1
24AAID51L.2	3	3	3	2	3	-	-	1	1	-	1
24AAID51L.3	3	3	3	3	3	-	-	1	1	-	1
24AAID51L.4	3	3	3	3	3	-	-	1	1	-	1
24AAID51L.5	3	3	2	3	3	1	1	1	1	-	2

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S. Ashok kumar

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RAJAMPET, YSR Kadapa District, AP – 516126, INDIA

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

Lecture Hours	Tutorial Hours	Practice Hours	Credits
2	0	0	0

Course Objectives:

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.

Course Outcomes:

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

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

Unit 1 UNDERSTANDING GENDER 6

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male.

Unit 2 GENDER ROLES AND RELATIONS 6

Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and its Consequences- Declining Sex Ratio-Demographic Consequences-Gender Spectrum.

Unit 3 GENDER AND LABOUR 7

Division and Valuation of Labor-Housework: The Invisible Labor- "My Mother doesn't Work". "Share the Load"- Unrecognized and Unaccounted work -Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

(C V B. CHITTIRA) (Dr. PVC - NARAYANA) (Prof. P. PADMA)

(Dr. L. OBULAM) (M. PRAVEENA) (P. SUNEETHA NAIDU)

Unit 4 GENDER-BASED VIOLENCE 7

The Concept of Violence- Types of Gender-based Violence- Human Rights Perspective-Sexual Harassment - Domestic Violence - Different forms of violence against women - Causes of violence, impact of violence against women - Consequences of gender-based violence

Unit 5 GENDER AND CULTURE 6

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

Prescribed Textbooks:

1. A.Suneetha, Uma Bhrugubanda, et al. Towards a World of Equals: A Bilingual Textbook on Gender‖, Telugu Akademi, Telangana, 2015.

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.

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	-	
24AAUD51T.2	-	-	-	-	-	-	3	-	1	-	
24AAUD51T.3	-	-	-	-	-	-	3	-	1	-	
24AAUD51T.4	-	-	-	-	-	-	3	-	1	-	
24AAUD51T.5	-	-	-	-	-	-	3	-	1	-	

(V.B.CHITHRA) (Dr PVC NIRMALA) (Prof. P. Madhu)
(Dr. L. OBULAPATHI) (M. PRAVEENA) (P. SUNEETHA NAIDU)

ANNAMACHARYA UNIVERSITY

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

Course Objectives:

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

Course Outcomes:

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 1 **Introduction to Big Data** **10**

What is Big Data? Why Big Data is Important? Meet Hadoop, Data, Data Storage and Analysis, Comparison with other systems, History of Apache Hadoop, Hadoop Ecosystem, VMWare Installation of Hadoop. Analyzing the Data with Hadoop, Scaling.

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 3 **MapReduce Types and Formats** **9**

How MapReduce Works: Anatomy of a MapReduce, Job Run, Failures, Shuffle and Sort, Task Execution. MapReduce Types and Formats: MapReduce Types, Input formats, output formats

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.

Unit 5 **Hive, Spark, HBase** **9**

Hive: Installing Hive, Running Hive, Comparison with traditional Databases, HiveQL, Tables, Querying Data. Spark: Installing Spark, Resilient Distributed Datasets, Shared Variables, Anatomy of a Spark Job Run. HBase: HBasics, Installation, clients, Building an Online Query Application.

(B. Venkatesu Goud) (U. Lakshmi) (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,Uderstanding 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

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(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)
RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course	Natural Language Processing and Information Retrieval
Category	PC
Year	III
Semester	II
Course Code	24AAID62T
Branch/es	AI&DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. Understand the basics of Natural Language Processing and Information Retrieval.
2. Learn text preprocessing and text representation techniques.
3. Apply machine learning methods for text analysis.
4. Understand transformer models and modern NLP techniques.
5. Explore applications and ethical issues in NLP systems.

Course Outcomes:

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

1. Explain basic concepts of NLP and Information Retrieval.
2. Apply preprocessing and text representation methods.
3. Implement machine learning techniques for text classification and analysis.
4. Use transformer models for advanced NLP tasks.
5. Analyze real-world NLP applications and ethical challenges.

Unit 1 **Fundamentals of Natural Language Processing** **10**

Introduction to NLP: Definitions, Applications, Challenges, Linguistic Essentials: Syntax, Semantics, Pragmatics, Text Processing: Tokenization, Lemmatization, Stemming, Stopword Removal, Normalization, and N-gram Generation, POS Tagging and Named Entity Recognition, NLP Libraries: NLTK, SpaCy Overview.

Unit 2 **Text Representation and Retrieval Models** **9**

Bag of Words, TF-IDF, Vector Space Model, Boolean Retrieval Model, Probabilistic Retrieval Models, Document Indexing, Inverted Indexing, Query Processing, Ranking Algorithms, Cosine Similarity and Distance Measures.

Unit 3 **Machine Learning for NLP and IR** **9**

Text Classification using Naïve Bayes, SVM, and Decision Trees, Clustering Techniques for Text Mining, Information Extraction, Sentiment Analysis, Topic Modeling, Recommendation Systems, Evaluation Metrics: Precision, Recall, F1-Score, MAP and NDCG.

Unit 4 **Transformers and Advanced NLP** **9**

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** **9**

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.

(B. Venkatesu Goud) (V. Lokesh Kumar) (S. Ashok Kumar) (Dr. K. Uday Kumar Reddy)

Prescribed Text Books:

1. Daniel Jurafsky and James H. Martin, Speech and Language Processing, Pearson Education.
2. Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, *Introduction to Information Retrieval*, Cambridge University Press, 2008.

References Books:

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

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
24AAID62T.1	3	2	1	1	2	1	-	-	1	-	2
24AAID62T.2	3	3	2	2	3	-	-	1	1	-	2
24AAID62T.3	3	3	3	2	3	1	-	1	1	1	2
24AAID62T.4	3	3	3	3	3	1	-	1	1	1	3
24AAID62T.5	2	2	2	2	3	1	-	1	2	-	2

(B. Venkatesu Gowd) (U. Naresh Kumar) (Dr. K. Reddy Kumar Reddy)

S. Ashok Kumar

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course	:	MACHINE LEARNING
Category	:	PC
Couse Code	:	24ACSE62T
Year	:	III B. Tech
Semester	:	II Semester
Branch	:	CSE ,CSE(AIML)

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

Course Objectives: This course is designed to

1. To introduce the fundamental concepts and types of machine learning
2. To develop a deep understanding of supervised and unsupervised learning algorithms.
3. To understand mathematical foundations of learning models and algorithms.
4. To evaluate model performance using appropriate statistical and analytical tools.
5. To apply machine learning techniques to solve real-world problems using tools such as Scikit learn.

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

1. Understand and distinguish among different types of learning methods.
2. Apply supervised and unsupervised learning algorithms to datasets
3. Analyze model performance using cross-validation and error metrics
4. Build, test, and improve machine learning models for classification and prediction.
5. Use Python-based libraries (e.g., Scikit-learn) to implement ML algorithms.

Unit 1 Introduction to Machine Learning and Linear Models 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.

Unit 3 Support Vector Machines and Ensemble Methods 10

Support Vector Machines: Concepts, Kernels, Hyperplane and Margin Concepts, Kernel Tricks: RBF and Polynomial, 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, Hierarchical Clustering, DBSCAN and Density-Based Methods, Principal Component Analysis (PCA) for Dimensionality Reduction, Silhouette Score, Davies-Bouldin Index for Cluster Validation.

Unit 5 Advanced Topics and Application 12

Reinforcement Learning Basics and Markov Decision Processes, Introduction to Neural Networks and Deep Learning, 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.

Textbook:

1. Tom Mitchll, 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 Starme.

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
24ACSE62T.1	3	2	1	1	2	-	-	1	1	-	2	3	2	1
24ACSE62T.2	3	3	2	2	3	-	-	1	1	-	2	3	3	2
24ACSE62T.3	3	3	3	2	3	-	-	1	1	1	2	3	3	3
24ACSE62T.4	2	3	2	3	3	-	-	1	1	-	2	2	3	2
24ACSE62T.5	2	2	3	2	3	1	1	2	2	1	3	3	3	3

(S.M. Rafi) (B. Dalip)

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RAJAMPET, Annamayya District, AP – 516126,

Title of the Course:	Cryptography and Network Security
Category:	PE
Couse 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 crypto graphic 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, I Psec, 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 crypto graphic 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(2n) .Public Key Cryptography: Principles, Public Key Cryptography Algorithms, RSA Algorithm, Diffie Hellman Key Exchange, Elliptic Curve Cryptography

Block Ciphers: Traditional Block Cipher Structure, The Data Encryption Standard, Advanced Encryption Standard: AES Structure, AES Transformation Functions

Unit 3 Cryptographic Hash Functions: 10

Cryptographic Hash Functions: Application of Cryptographic Hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication Functions, Requirements & Security, HMAC &CMAC. Digital Signatures: NIST Digital Signature Algorithm, Distribution of Public Keys, X.509 Certificates, Public- Key Infrastructure.

Unit 4 User Authentication 10

User Authentication : Remote User Authentication Principles, Kerberos. Electronic Mail Security: Pretty Good Privacy (PGP) And S/MIME.

IP Security: IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange.

Unit 5 Transport Level Security 10

Transport Level Security: Web Security Requirements, Transport Layer Security (TLS), HTTPS, Secure Shell (SSH).

Firewalls: Fire wall Character is tics and Access Policy, Types of Fire walls, Fire wall Location and Configurations.

Textbooks:

1) Cryptography and Network Security – William Stallings, Pearson Education, 8th Edition.
2) Cryptography, Network Security and Cyber Laws–Bernard Menezes,Cengage Learning, 2010 edition.

Reference Books:

1) Cryptography and Network Security-BehrouzA Forouzan, Debdeep Mukhopadhyaya, Mc-Graw Hill, 3rd Edition, 2015.
2) Network Security Illustrated, Jason Albanese and Wes Sonnenreich, MGH Publishers, 2003.

Online Learning Resources:

1) https://nptel.ac.in/courses/106/105/106105031/lecture
2) https://nptel.ac.in/courses/106/105/106105162/lecturebyDr.SouravMukhopadhyayIIT Kharagpur[Video Lecture]
3) https://www.mitel.com/articles/web-communication-cryptography-and-network-security web articles by Mitel Power Connections

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	-

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RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course	Distributed Systems
Category	PE
Year	III
Semester	II
Course Code	24AAID6AT
Branch/es	AI&DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. This course focuses on the fundamentals of cryptography and its application to network security.
2. Acquire the depth knowledge on distributed objects and remote invocations.
3. Apply various domain naming services.
4. Compare the different issues of Global clocks, process states coordination and agreement.

Course Outcomes:

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

1. Understand the characteristics of distributed systems and system models.
2. Describe knowledge on distributed objects and remote invocations
3. Use various domain naming services.
4. Distinguish different issues of Global clocks, process states coordination and agreement.
5. Estimate the optimistic concurrency control and distributed transactions.

Unit 1 **Introduction** 9

Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models: Introduction, Architectural and Fundamental models, networking and Inter-networking, Inter-process Communication.

Unit 2 **Operating system support** 10

Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI. Operating system support: Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture. Distributed File Systems-Introduction, File Service architecture.

Unit 3 **Name Services** 9

NAME SERVICES: Introduction, Name Services and the Domain Name System, Case study of the Global Name Service. Peer to Peer Systems: Introduction, Napster and its legacy, Peer to Peer middleware, routing overlays.

Unit 4 **Coordination and Agreement** 8

Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging. Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

Unit 5 **Distributed Transactions** 10

Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering. Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery, Replication Introduction, Fault tolerant services,

Transactions with replicated data.

Prescribed Text Books:

1. G Coulouris, J Dollimore and T Kindberg, Distributed Systems Concepts and Design, Pearson Education, 4thEd.

References Books:

1. Distributed Systems: Concepts and Design by George Coulouris, Jean Dollimore, Tim Kindberg , Pearson.
2. Andrew S. Tanenbaum and Maarten Van Steen, *Distributed Systems: Principles and Paradigms*, Pearson Education, 2nd Edition.
3. Nancy A. Lynch, *Distributed Algorithms*, Morgan Kaufmann Publishers.
4. Martin Kleppmann, *Designing Data-Intensive Applications*, O'Reilly Media.
5. Mukesh Singhal and Niranjan G. Shivaratri, *Advanced Concepts in Operating Systems and Distributed Systems*, McGraw Hill 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	Life-long learning
24AAID6AT.1	3	2	1	1	2	1	-	1	1	-	2
24AAID6AT.2	3	3	2	2	3	1	-	1	1	-	2
24AAID6AT.3	3	2	2	1	3	1	-	1	1	-	2
24AAID6AT.4	3	3	3	3	2	1	-	1	2	1	2
24AAID6AT.5	3	3	3	3	3	1	-	1	2	1	3

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RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course	Reinforcement Learning
Category	PE
Year	III
Semester	II
Course Code	24AAID56BT
Branch/es	AI&DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. Learn how to define RL tasks and the core principals behind the RL, including policies, value functions.
2. Understand and work with tabular methods to solve classical control problems.
3. Recognize current, advanced techniques and applications in RL.
4. Understand reinforcement learning framework and discover how to define intelligent agents and logic agents to solve real-world problems
5. Apply deep reinforcement learning techniques to solve decision problems.

Course Outcomes:

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

1. Understand reinforcement learning framework and discover how to define intelligent agents and logic agents to solve real-world problems.
2. Apply Markov Decision Processes and dynamic programming to solve real-world problems.
3. Model the Monte Carlo Methods and Temporal Difference Learning policies.
4. Apply deep reinforcement learning techniques to solve decision problems.
5. Explore evolutionary algorithms, Reinforce algorithm policy optimization methods.

Unit 1 **Reinforcement Learning Primitives** 9

Introduction and Basics of RL, Defining RL Framework, Probability Basics: Probability Axioms, Random Variables, Probability Mass Function, Probability Density Function, Cumulative Distribution Function and Expectation. Introduction to Agents, Intelligent Agents – Problem Solving – Searching, Logical Agents.

Unit 2 **Markov Decision Process and Dynamic Programming** 10

Markov Property, Markov Chains, Markov Reward Process (MRP), Bellman Equations for MRP, Dynamic Programming: Polices (Evaluation, Improvement, Iteration, Value Iteration), Asynchronous Dynamic Programming, Generalized Policy Iteration, Efficiency of Dynamic Programming.

Unit 3 **Monte Carlo Methods and Temporal Difference Learning** 10

Monte Carlo: Prediction, Estimation of Action Values, Control and Control without Exploring Starts, Off-Policy Control, Temporal Difference Prediction: TD (0), SARSA: On-Policy TD control, Q-Learning: Off-Policy TD control, Games, After states, and Other Special Cases.

Unit 4 **Deep Reinforcement Learning** 9

Deep Q-Networks, Double Deep-Q Networks (DQN, DDQN, Dueling DQN, Prioritized Experience Replay).

Unit 5 **Policy Optimization in Reinforcement Learning** 8

Introduction to Policy-based Methods, Vanilla Policy Gradient, REINFORCE Algorithm and Stochastic Policy Search, Asynchronous Actor-Critic and Asynchronous Advantage Actor-Critic (A2C, A3C), Advanced Policy Gradient (PPO, TRPO, DDPG).

Prescribed Text Books:

1. Richard S. Sutton and Andrew G. Barto, "Reinforcement learning: An Introduction", Second Edition, MIT Press, 2019.

References Books:

1. Russell, Stuart J., and Peter Norvig. "Artificial intelligence: a modern approach.", Pearson Education Limited, 2016.
2. Ian Goodfellow, YoshuaBengio, and Aaron Courville. "Deep learning." MIT press, 2017.
3. Marco Wiering, Martijn van Otterlo(Ed),"Reinforcement Learning, State-of-the-Art, Adaptation, Learning, and Optimization book series, ALO, volume 12, Springer, 2012.
4. Keng, Wah Loon, Graesser, Laura, "Foundations of Deep Reinforcement Learning: Theory and Practice in Python", Addison Wesley Data & Analytics Series, 2020.

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
24AAID6BT.1	3	2	2	1	2	1	-	1	1	-	2
24AAID6BT.2	3	3	3	2	3	1	-	1	1	1	2
24AAID6BT.3	3	3	3	3	3	-	-	1	1	1	2
24AAID6BT.4	3	3	3	3	3	1	-	1	2	1	3
24AAID6BT.5	3	3	3	2	3	1	-	1	1	1	3

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RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course	Computer Vision
Category	PE
Year	III
Semester	II
Course Code	24AAID56CT
Branch/es	AI&DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. Understand Fundamental Concepts of Computer Vision
2. Study Linear Filtering Techniques
3. Learn Image Segmentation using Clustering Methods
4. Understand Edge Detection Methods
5. Analyze and Extract Texture Features

Course Outcomes:

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

1. Identify basic concepts, terminology, theories, models and methods in the field of computer vision,
2. Describe known principles of human visual system,
3. Describe basic methods of computer vision related to multi-scale representation, edge detection and detection of other primitives, stereo, motion and object recognition,
4. Suggest a design of a computer vision system for a specific problem,
5. Analyze texture features and apply recognition techniques in computer vision.

Unit 1 **Linear filters** **9**

Introduction to Computer Vision, Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing Filters as Templates, Technique: Normalized Correlation and Finding Patterns, Technique: Scale and Image Pyramids.

Unit 2 **Edge detection** **9**

Noise- Additive Stationary Gaussian Noise, Why Finite Differences Respond to Noise, Estimating Derivatives - Derivative of Gaussian Filters, Why Smoothing Helps, Choosing a Smoothing Filter, Why Smooth with a Gaussian? Detecting Edges-Using the Laplacian to Detect Edges, Gradient-Based Edge Detectors, Technique: Orientation Representations and Corners.

Unit 3 **Texture** **10**

Representing Texture –Extracting Image Structure with Filter Banks, Representing Texture using the Statistics of Filter Outputs, Analysis (and Synthesis) Using Oriented Pyramids –The Laplacian Pyramid, Filters in the Spatial Frequency Domain, Oriented Pyramids, Application: Synthesizing Textures for Rendering, Homogeneity, Synthesis by Sampling Local Models, Shape from Texture, Shape from Texture for Planes.

Unit 4 **Segmentation by clustering** **9**

What is Segmentation, Human Vision: Grouping and Gestalt, Applications: Shot Boundary Detection and Background Subtraction. Image Segmentation by Clustering Pixels, Segmentation by Graph- Theoretic Clustering. The Hough Transform, Fitting Lines, Fitting Curves

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Unit 5 **Reorganization by relations between templates** **8**

Finding Objects by Voting on Relations between Templates, Relational Reasoning Using Probabilistic Models and Search, Using Classifiers to Prune Search, Hidden Markov Models, Application: HMM and Sign Language Understanding, Finding People with HMM.

Prescribed Text Books:

1. David A. Forsyth, Jean Ponce, Computer Vision – A modern Approach, PHI, 2003.

References Books:

1. Geometric Computing with Clifford Algebras: Theoretical Foundations and Applications in Computer Vision and Robotics, Springer;1 edition,2001by Sommer.
2. Digital Image Processing and Computer Vision,1/e, by Sonka.
3. Computer Vision and Applications: Concise Edition (With CD) by Jack Academy Press, 2000.

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
24AAID6CT.1	3	2	1	1	2	1	-	1	1	-	2
24AAID6CT.2	3	2	1	1	2	1	-	-	1	-	2
24AAID6CT.3	3	3	3	2	3	1	-	1	1	1	2
24AAID6CT.4	3	3	3	3	3	1	-	1	2	1	3
24AAID6CT.5	3	3	3	3	3	1	-	1	2	1	3

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RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course	:	Big Data Analytics Lab
Category	:	PC
Year	:	II
Semester	:	I
Course Code	:	24AAID61L
Branch/es	:	AI&DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives: This course will be able to

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 applications
4. Understand Hadoop environment
5. Explore the concepts of Pig, Hive, Spark and HBase

Course Outcomes:

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

1. Identify fundamental concepts, terminology, theories, models, and methods used in the field of computer vision.
2. Describe known principles of human visual system,
3. Describe core computer vision techniques, including multi-scale representation and edge detection.
4. Analyze methods for detecting visual primitives, stereo vision, motion analysis, and object recognition.
5. Design a basic computer vision system tailored to solve a specific real-world problem.

Exercise 1

i. Installation of VMWare to setup the Hadoop environment and its ecosystems.
ii. Perform setting up and Installing.Hadoop in its three operating modes.
a. Standalone.
b. Pseudo distributed.
c. Fully distributed.

Exercise 2

Implement the following file management tasks in Hadoop:

i. Adding files and directories

ii. Retrieving files

iii. Deleting files

Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities

Exercise 3

Perform the following operations in HDFS.

i. Review the commands available for the Hadoop Distributed File System
ii. Copy file foo.txt from local disk to the user"s directory in HDFS
iii. Get a directory listing of the user"s home directory in HDFS
iv. Get a directory listing of the HDFS root directory
v. Display the contents of the HDFS file user/fred/bar.txt
vi. Move that file to the local disk, named as baz.txt
vii. Create a directory called input under the user"s home directory

viii. Delete the directory input old and all its contents
Verify the copy by listing the directory contents in HDFS

Exercise 4

i) Run a basic word count Map Reduce program to understand Map Reduce Paradigm.

ii) Implement matrix multiplication with Hadoop Map Reduce

Exercise 5

Write a Map Reduce program that mines weather data. Hint: Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with Map Reduce, since it is semi structured and record-oriented.

Exercise 6

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

ii. Run the Pig Latin Scripts to find Word Count

iii. Run the Pig Latin Scripts to find a max temp for each and every year.

Exercise 7

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

Exercise 8

Implementing Bloom Filter using Map-Reduce.

Exercise 9

Implementing Frequent Item set algorithm using Map-Reduce.

Exercise 10

Implementing Clustering algorithm using Map-Reduce

Exercise 11

Implementing Page Rank algorithm using Map-Reduce

Exercise 12

Case studies:

i. Case Study on Twitter data analysis

ii. Case Study on Fraud Detection

Prescribed Text Books:

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

Reference Books:

1. Big Data, Big Analytics: Emerging business intelligence and analytic trends for today"s businesses, Michael Minnelli, Michelle Chambers, and Ambiga Dhiraj, Wiley Cio Series

2. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden,Big Data Glossary, O"Reilly, 2011

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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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
24AAID61L.1	3	2	1	1	2	1	-	1	1	-	2
24AAID61L.2	3	2	1	1	2	1	-	-	1	-	2
24AAID61L.3	3	3	3	2	3	1	-	1	1	1	2
24AAID61L.4	3	3	3	3	3	1	-	1	2	1	3
24AAID61L.5	3	3	3	3	3	1	-	1	2	1	3

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RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course	:	Natural Language Processing and Information Retrieval Lab
Category	:	PC
Year	:	II
Semester	:	I
Course Code	:	24AAID62L
Branch/es	:	AI&DS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives: This course will be able to

1. Understand the basics of NLP and Information Retrieval.
2. Learn text preprocessing techniques using Python.
3. Apply NLP methods for text analysis.
4. Develop simple NLP and IR applications.
5. Explore real-world NLP applications.

Course Outcomes:

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

1. Implement basic NLP preprocessing techniques.
2. Apply tagging, parsing, and entity recognition methods.
3. Perform text representation and information retrieval.
4. Develop NLP applications using Python.
5. Analyze text data using NLP techniques.

Exercise 1

a. Write a Python program to perform tokenization (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*.

Exercise 2

a. Write a Python program to perform Parts of Speech (POS) tagging using *NLTK*.
b. Write a Python program to perform lemmatization using *NLTK*.

Exercise 3

a. Write a Python program for chunking using *NLTK*.
b. Write a Python program to perform Named Entity Recognition (NER) using *NLTK*.

Exercise 4

a. Write a Python program to find Term Frequency (TF) and Inverse Document Frequency (IDF).
b. Write a Python program for CYK Parsing (Cocke–Younger–Kasami Algorithm) or Chart Parsing.

Exercise 5

a. Write a Python program to find all unigrams, bigrams, and trigrams present in a given corpus.
b.Write a Python program to find the probability of the given sentence: "This is my cat" using an example corpus.

Exercise 6

Use the Stanford Named Entity Recognizer to extract entities from documents.
a. Implement it programmatically.
b. Output the named entities along with their types for each document.

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Exercise 7

Choose any freely available corpus from the internet and perform the following:

a. Count how many times each stopword occurs in each document.

b. Identify the most frequently occurring stopwords.

c. Compute Term Frequency (TF) and Inverse Document Frequency (IDF).

Exercise 8

Write Python code to perform Sentiment Analysis using NLP techniques.

Exercise 9

Write Python code to develop a Spam Filter using NLP.

Exercise 10

Write Python code to detect Fake News using NLP techniques.

Exercise 11

Write a Python program to implement Information Retrieval using the Vector Space Model.

a. Create document vectors using TF-IDF.

b. Compute cosine similarity between query and documents.

c. Retrieve and rank relevant documents based on similarity score.

Exercise 12

Write a Python program to implement Document Indexing and Boolean Information Retrieval.

a. Create an inverted index for a collection of documents.

b. Process Boolean queries using AND, OR, and NOT operations.

c. Display the matched documents for the given query.

Prescribed Text Books:

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

Reference Books:

1. Jurafsky, D., & Martin, J. H., Speech and Language Processing, 3rd Edition.
2. Bird, S., Klein, E., & Loper, E., Natural Language Processing with Python, O'Reilly.
3. Manning, C. D., & Schütze, H., Foundations of Statistical NLP, MIT Press.

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

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
24AAID62L.1	3	2	2	1	3	-	-	1	1	-	2
24AAID62L.2	3	3	2	2	3	1	-	1	1	-	2
24AAID62L.3	3	3	3	2	3	-	-	1	1	1	2
24AAID62L.4	3	3	2	3	2	1	-	1	2	-	2
24AAID62L.5	3	3	3	3	3	1	-	1	2	1	3

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course	:	Machine Learning Lab
Category	:	PC
Couse Code	:	24ACSE62L
Year	:	III B. Tech
Semester	:	II Semester
Branch		CSE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives: The course is introduced for students

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

1. Understand the Mathematical and statistical prospective 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

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

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 Python.
c) Data sets can be taken from standard repositories https://archive.ics.uci.edu/ml/datasets.html) or constructed by the students.

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.
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

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
24ACSE62L.1	3	2	1	1	2	-	-	-	-	2	3	2	2	-
24ACSE62L.2	3	3	2	2	2	1	-	-	-	2	3	2	2	-
24ACSE62L.3	3	3	3	3	2	1	-	1	-	2	3	2	2	-
24ACSE62L.4	3	3	3	3	3	2	1	2	1	2	3	2	2	-
24ACSE62L.5	3	3	3	3	3	2	2	3	2	3	3	2	2	-

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, YSR Kadapa District, AP – 516126, INDIA

Title of the Course	Soft Skills & Employability Skills
Category	SEC
Course Code	24AENG61L
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	Practical	Credits
1	0	2	2

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: Introduction 9

Soft Skills: Introduction, need - Mastering Techniques of Soft Skills

Unit 2 Critical Thinking& Interview Skills 12

Active Listening – Observation - Analytical Thinking – Open-mindedness – Creative Thinking – Positive Thinking – Reflection

Resume Preparation: Structure, formats and styles -Projecting one's strengths and skills - Creative self-marketing - Sample resumes - Cover letter

Concept and process of Interviews - Body language - Answering strategies — FAQs in Job Interviews

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 and Clarity of voice - Body language

(Dr. V.B. CHAITHRA) (CD & PVC NARAYANA) (Dr. P. Padma) (Dr. L. OBULAPATHI) (M. PRAVEENA) (P. SUNEETHA DAIRI)

Unit 4 Oral Presentations (Individual and Team) 9

Collection of Data from various sources —Planning, Preparation and Practice — Attention-grabbing Strategies -Transitions — Handling questions from Audience - Appropriate use of Visual aids — Using PowerPoint for presentations.

Unit 5 Corporate Etiquette & Emotional Intelligence 9

Etiquette: Introduction, Concept, Significance - Corporate Etiquette: Meaning and 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. New Delhi: Oxford University Press, 2016.

Reference Books:

1. Sharma, Prashant, Soft Skills: Personality Development for Life Success, BPB Publications 2018.
2. Alex K, Soft Skills, S.Chand & Co, 2012 (Revised edition)
3. Gajendra Singh Chauhan & Sangeetha Sharma, Soft Skills: An Integrated Approach to Maximize Personality Published by Wiley, 2013
4. Pillai, Sabina & Fernandez Agna, Soft Skills and Employability Skills, Cambridge University Press, 2018
5. Soft Skills for a Big Impact (English, Paperback, Renu Shorey) Publisher: Notion Press
6. Dr. Rajiv Kumar Jain, Dr. Usha Jain, Life Skills (Paperback, English) Publisher : Vayu Education of India, 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 society	Ethics	Individual and Collaborative team work	Communication	Project management and finance	Life-long learning
24AENG61.1	-	-	-		-	-	2	-	3	-	3
24AENG61.2	-	-	-	-	-	-	2	-	3	-	3
24AENG61.3	-	-	-	-	-	-	2	-	3	-	3
24AENG61.4	-	-	-	-	-	-	2	-	3	-	3
24AENG61.5	-	-	-	-	-	-	2	-	3	-	3

V.B. CHITHRA

P.V. SYAM

CPVC NARAYANAN

COL. L. OBULAPATHI

ANNAMACHARYA UNIVERSITY

EXCELLENCE IN EDUCATION; SERVICE TO SOCIETY

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

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
2	0	0	0

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.

Unit3	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.

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

1.	2.	3.	4.
5.	6.	7.	8. Sudam Jena 9.