CSE(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/CSE(DS)/1	Welcome and Introduction
BoS/2025/CSE(DS)/2	Confirmation of the Minutes of the 1st Board of Studies Meeting
BoS/2025/CSE(DS)/3	Discussion and Finalization of Course Structure and Syllabus for III-B.Tech. under AU-24 Regulations
BoS/2025/CSE(DS)/4	Review and address any discrepancies observed in the Second-year courses(i.e., B.Tech.) under the AU-24 Regulations.
BoS/2025/CSE(DS)/5	To approve the list of examiners for Third-year courses/subjects
BoS/2025/CSE(DS)/6	Any other item with permission of the Chair

MINUTES OF THE MEETING

BoS/2026/CSE(DS)/1	Welcome and Introduction

Welcome:

Dr. P. Phanindra Kumar Reddy, Head, Department of Department of CSE(DS) 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 CSE(DS)

Before proceeding with the day's agenda, he recalled the proceedings of the 1st 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/2026/CSE(DS)/2	Confirmation of the Minutes of the 2nd Board of Studies Meeting

Resolution:

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

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

Annexure-I attached

Resolution:

The Board of Studies (BoS) convened to review, discuss, and finalize the proposed course structure and syllabus for the III-B.Tech. program under the AU-24 Regulations. The board conducted a detailed evaluation of the curriculum, with particular focus on academic progression, relevance to current industry needs, and alignment with program outcomes.

1. Replacement of Subject

The subject:

- **Text Mining and Data Mining**

shall be replaced with: **Operating Systems**

The proposal was approved considering industry requirements and curriculum balance.

2. NLP and Information Retrieval Combination

The committee recommended that:

- **Natural Language Processing (NLP)** combined with **Information Retrieval (IR)** would be academically more effective and industry relevant.

The proposal was approved for implementation in the revised curriculum.

3. Distributed Systems Subject

The committee recommended adding additional **reference books** for the subject: Distributed Systems
The same was approved.

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 2025–26.

BoS/2026/CSE(DS)/4	Review and Address Any Discrepancies Observed in Second-Year UG Courses (B.Tech.,.) under AU-24 Regulations

Resolution:

Upon thorough examination and verification by the internal faculty members and external subject experts, **no discrepancies or inconsistencies were found** in the course content, learning outcomes, credit distribution, or sequencing.

BoS/2026/CSE(DS)/5	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.

BoS/2026/CSE(DS)/6	Any other item with permission of the Chair

Resolution:

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-CSE(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/CSE(DS)/BOS-03/2026-27/MOM-03 Date: 02/05/2026

Department of Computer Science and Engineering(Data Science) 3rd BoS Minutes of Meeting

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

Members Present:

SLN o.	Name	Affiliation	Role in BoS	Signatures
1	Dr. P. Phanindra Kumar Reddy	Associate Professor & Head Dept. of CSE(DS) Annamacharya University Rajampet. Ph: 8712314387 Email: phanindra.44u@gmail.com	Chairman	
2	Dr. K Uday Kumar Reddy	Associate Professor, Dept. of CSE(DS), Annamacharya University. Rajampet. Ph: 9490634569	Senior Faculty – Member	
3	Mr. S Ashok Kumar	Assistant Professor, Dept. of CSE(DS), Annamacharya University, Rajampet.	Senior Faculty – Member	
4	Mr. B Venkatesu Goud	Assistant Professor, Dept. of CSE(DS), Annamacharya University, Rajampet	Senior Faculty – Member	
5	Mr. U. Naresh Kumar	Assistant Professor, Dept. of CSE(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 Computer Science and Engineering(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.com

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

messages

r. 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

r 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.

I 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.com

ınnamacharya 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
ı: 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.....!

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 6:30 P
ı: 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

[Quoted text hidden]

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

ınnamacharya 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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Thanking you.

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

---

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]

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r. 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

[Quoted text hidden]

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.

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

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.
[Quoted text hidden]

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

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
ɔ: 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.

---

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

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Department of Computer Science and Engineering (Data Science)

III Year I Sem

Sl. No.	Category	Course Code	Course Title	Hours per Exercise			Credits
				L	T	P	C
1	PC	24ACSE51T	Artificial Intelligence	3	0	0	3
2	PC	24ACSE52T	Computer Networks	3	0	0	3
3	PC	24ACSE53T	Data Mining	3	0	0	3
4	PE	24ACSE5AT	Software Testing Methodologies	3	0	0	3
		24ACSE5BT	Object Oriented Analysis and Design				
		24ACSD5AT	Data Engineering Pipelines				
		24AAID5BT	Operating Systems				
5	OE	24ACSD5CT	MOOC	3	0	0	3
6	PC	24ACSE51L	Artificial Intelligence Lab	0	0	3	1.5
7	PC	24ACSE52L	Computer Networks Lab	0	0	3	1.5
8	PC	24ACSE53L	Data Mining Lab	0	0	3	1.5
9	MC	24AAUD51T	Gender Sensitization	2	0	0	0
10	Internship	24ACSD51I	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

(Dr K. Uday Kumar Reddy)

(B. Venkatesu Goud) (U. Naresh Kumar)

S. Ashok Kumar

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RAJAMPET, Annamayya District, AP – 516126, INDIA

III Year II Sem

Sl. No.	Category	Course Code	Course Title	Hours per Exercise			Credits
				L	T	P	C
1	PC	24ACSD61T	Data Visualization and Product Design	3	0	0	3
2	PC	24ACSE62T	Machine Learning	3	0	0	3
3	PC	24ACSE61T	Automata Theory and Compiler Design	3	0	0	3
4	PE	24ACSM6BT	Cryptography and Network Security	3	0	0	3
		24AAID6BT	Distributed Systems				
		24ACSE6AT	Software Project Management				
		24AAID62T	Natural Language Processing and information retrieval				
5	OE	24ACSD6AT	MOOC	3	0	0	3
6	PC	24ACSM61L	Data Visualization Lab	0	0	3	1.5
7	PC	24ACSE62L	Machine Learning Lab	0	0	3	1.5
8	PC	24ACSE61L	Automata Theory and Compiler Design 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

(Dr. K. Uday Kumar Reddy)

(B. Venkatesu Goud) (V. Kaleshkumar)

S. Ashokkumar

ANNAMACHARYA UNIVERSITY

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Artificial Intelligence
Category:	PC
Couse Code:	24ACSE51T
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. Understand fundamentals of AI, agents, and environments
2. Apply search strategies and problem-solving techniques
3. Analyze and represent knowledge using logic and planning methods
4. Evaluate reinforcement learning and NLP techniques
5. Create intelligent solutions using robotics, vision, and ethical AI concepts

Course Outcomes:

1. Explain AI concepts, history, and agent structures
2. Implement uninformed and informed search algorithms
3. Apply propositional and first-order logic for problem solving
4. Analyze RL models and NLP applications
5. Design AI-based systems in robotics and computer vision with ethical considerations.

Unit 1 Introduction 10

Introduction: What is AI, Foundations of AI, History of AI, The State of Art
Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, The Structure of Agents

Unit 2 Solving Problems by searching 10

Problem Solving Agents, Example problems, Searching for Solutions, Uninformed Search Strategies, Informed search strategies, Heuristic Functions, Beyond Classical Search: Local Search Algorithms and Optimization Problems, Local Search in Continues Spaces, Searching with Nondeterministic Actions, Searching with partial observations, online search agents and unknown environments.

Unit 3 Knowledge Representation and Planning 12

Knowledge-Based Agents and the Wumpus World, Propositional Logic: Syntax, Semantics, and Theorem Proving, Agents based on Propositional Logic and Model Checking, First-Order Logic: Syntax, Semantics, and Inference Mechanisms, Unification, Forward and Backward Chaining, and Resolution, Knowledge Engineering and Ontological Representation, Introduction to Classical Planning and Planning Algorithm.

Unit 4 Reinforcement Learning & Natural Language Processing 8

Reinforcement Learning: Introduction, Passive Reinforcement Learning, Active Reinforcement Learning, Generalization in Reinforcement Learning, Policy Search, applications of RL Natural Language Processing: Language Models, Text Classification, Information Retrieval, Information Extraction.

Unit 5 Robotics and Computer Vision 12

Robotics: Introduction, Robot Hardware, Robotic Perception, planning to move, planning uncertain movements, Moving, Robotic software architectures, application domains. .
Philosophical foundations: The Limits of AI, Can Machines Really Think? The Ethics of AI.

Prescribed Textbook:

1. Stuart J.Russell, Peter Norvig, —Artificial Intelligence: A Modern Approachl, 3rd Edition, Pearson Education, 2019.

Reference Books:

1. Nilsson, Nils J., and Nils Johan Nilsson. Artificial intelligence: a new synthesis. Morgai Kaufmann, 1998.
2. Johnson, Benny G., Fred Phillips, and Linda G. Chase. "An intelligent tutoring system fo the accounting cycle: Enhancing textbook homework with artificial intelligence." Journa of Accounting Education 27.1 (2009): 3039.

Online Learning Resources:

http://peterindia.net/AILinks.html
http://nptel.ac.in/courses/106106139/
https://nptel.ac.in/courses/106/105/106105152/

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	Communication	Project management and	Life-long learning	PSO1	PSO2	PSO3
24ACSE51T.1	3	2	1	1	1	-	-	-	-	-	3	2	2	-
24ACSE51T.2	3	3	2	2	2	-	-	-	-	-	3	2	2	-
24ACSE51T.3	3	3	3	2	2	-	-	-	-	-	3	2	2	-
24ACSE51T.4	3	3	2	3	2	-	-	-	-	-	3	2	2	-
24ACSE51T.5	3	3	3	3	3	-	-	-	-	-	3	2	2	-

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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.

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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

(S.M.Rafi) (B.Naveen Kumar)

B.Dilip Chakravarthy

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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.

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

V. Sathyadevi (S.M. Rafi) (Chandrasekaran) (B. Dilip Chakravarthy)

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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.

Raf. (S. M. Rafi)

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	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, Annamayya District, AP – 516126, INDIA

Title of the Course:	Data Engineering Pipelines
Category:	PE
Couse Code:	24ACSD5AT
Year:	III B. Tech
Semester:	I Semester
Branch:	CSE(DS)

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

1. To understand the fundamentals of data engineering and modern data pipelines.
2. To learn data ingestion, transformation and storage techniques.
3. To study batch and stream processing frameworks.
4. To design scalable and reliable ETL/ELT pipelines.
5. To explore monitoring, orchestration and optimization of data workflows.

Course Outcomes:

1. Explain the architecture and components of data engineering pipelines.
2. Design and implement data ingestion and transformation workflows.
3. Apply batch and stream processing techniques for large-scale data.
4. Build and orchestrate reliable ETL/ELT pipelines.
5. Analyze performance, scalability and cost of data pipelines.

Unit 1: Introduction to Data Engineering **10**

Introduction to Data Engineering: Role of Data Engineer, Data Engineering Lifecycle, Data Pipeline Architecture, Types of Data Pipelines, Overview of ETL vs ELT, Data Sources and Data Formats.

Unit 2: Data Ingestion and Storage **10**

Data Ingestion and Storage: Batch and Real-time Ingestion, Data Collection Tools, Message Queues, Data Lakes and Data Warehouses, Distributed File Systems, Data Modeling for Analytics.

Unit 3: Data Processing Frameworks **09**

Data Processing Frameworks: Batch Processing Concepts, Stream Processing Concepts, Apache Spark Fundamentals, Data Transformation Techniques, Handling Data Quality and Validation.

Unit 4: Pipeline Orchestration and Workflow Management **09**

Pipeline Orchestration and Workflow Management: Workflow Scheduling, Dependency Management, Apache Airflow Concepts, Pipeline Automation, Error Handling and Recovery, CI/CD for Data Pipelines.

Unit 5: Monitoring, Optimization and Case Studies **09**

Monitoring, Optimization and Case Studies: Pipeline Monitoring and Logging, Performance Tuning,

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

Cost Optimization, Security and Governance, Real-world Case Studies in Data Engineering.

Prescribed Text Book:

1. Joe Reis and Matt Housley, Fundamentals of Data Engineering, O'Reilly Media.

Reference Books:

1. Tyler Akidau et al., Streaming Systems, O'Reilly Media.
2. Holden Karau et al., Learning Spark, O'Reilly Media.

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
24ACSD5AT.1	3	2	1	1	2	-	-	-	1	-	1
24ACSD5AT.2	3	3	3	2	3	-	-	1	1	-	1
24ACSD5AT.3	3	3	3	3	3	-	-	1	1	-	1
24ACSD5AT.4	3	2	3	2	3	-	-	1	1	1	1
24ACSD5AT.5	3	3	2	3	2	1	1	1	1		

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S. Ashok Kumar

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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:	Artificial Intelligence Lab
Category:	PC
Couse Code:	24ACSE51L
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 teach the methods of implementing algorithms using artificial intelligence techniques
2. To illustrate search algorithms
3. To demonstrate the building of intelligent agents

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

1. Implement search algorithms.
2. Solve Artificial intelligence problems
3. Design chatbot and virtual assistant

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

1. Write a program to implement DFS and BFS
2. Write a program to implement Crypt Algorithm
3. Write a Program to find the solution for traveling salesman Problem
4. Write a program to implement Simulated Annealing Algorithm
5. Write a program to find the solution for the wumpus world problem
6. Write a program to implement 8 puzzle problem
7. Write a program to implement Towers of Hanoi problem
8. Write a program to implement A* Algorithm.
9. Write a program to implement A0* Algorithm
10. Write a program to implement Hill Climbing Algorithm
11. Build a Chatbot using AWS Lex, Pandora bots.
12. Build a bot that provides all the information related to your college.
13. Write a program to implement Magic square.

(S. M. Rafi) (B Naresh Kumar)

References:

1. David Poole, Alan Mack worth, Randy Goebel,‖ Computational Intelligence: a logical approachl, Oxford University Press, 2004.
2. G.Luger, —Artificial Intelligence: Structures and Strategies for complex problem solvingl, Fourth Edition, Pearson Education, 2002.
3. J. Nilsson, —Artificial Intelligence: A new Synthesisl, Elsevier Publishers, 1998.
4. Artificial Neural Networks, B. Yagna Narayana, PHI
5. Artificial Intelligence, 2nd Edition, E.Rich and K.Knight, TMH.
6. Artificial Intelligence and Expert Systems, Patterson, PH

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
24ACSE51L.1	3	3	2	2	2	-	-	-	-	-	3	2	2	-
24ACSE51L.2	3	3	3	3	2	-	-	-	-	-	3	2	2	-
24ACSE51L.3	3	3	3	2	2	-	-	-	-	-	3	2	2	-
24ACSE51L.4	3	2	3	2	3	-	-	-	-	-	3	2	3	-
24ACSE51L.5	3	3	3	3	3	-	-	-	-	-	3	2	2	-

D. Saville

Rafi (S.M.Rafi)

Vani (Chaitanyavalli)

(B. Naveen Kumar)

(V. Sathyanarayana Raju)

B. Dilip Chakravarthy

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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

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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

CV.B.CHITTIRA (Dr. PVS NARAYANA) (Prof. P. PADMA)

Dr. L. OBULAP (Ms. 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 NARAYANA) (Prof. P. Madan)

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

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RAJAMPET, Annamayya District, AP – 516126,

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

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

COURSE OBJECTIVES

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

COURSE OUTCOMES

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

UNIT 1 - INTRODUCTION TO DATA VISUALIZATION & PERCEPTION 10

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

UNIT 2 - VISUALIZATION TECHNIQUES FOR CATEGORICAL & QUANTITATIVE DATA 10

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

Prof. (S.M. Rafi)

R. Dilip Chakravarthy

UNIT 3- MULTIDIMENSIONAL, TEMPORAL AND HIERARCHICAL DATA VISUALIZATION 12

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

UNIT 4 - DATA VISUALIZATION USING PYTHON AND DASHBOARD 10

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

UNIT 5 - STORYTELLING WITH DATA AND ETHICAL VISUALIZATION 10

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

TEXT BOOKS

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

REFERENCE BOOKS

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

ONLINE LEARNING RESOURCES

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

CO-PO MAPPING:

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

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RAJAMPET, Annamayya District, AP – 516126, 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

(S.M.Rafi) (B.Balaji Naik)

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

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	**Automata Theory and Compiler Design**
Category:	PC
Couse Code:	24CSE61T
Year:	III B. Tech
Semester:	II Semester
Branch:	CSE,CSE(AIML) & CSE(IOTCSBCT)

Lecture Hours	Tutorial Hours	Practice Hours	Credits	Total Hours
3	-	-	3	58

Course Objectives: This course is designed to:

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 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 Automat (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.

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 Textbook:

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

Reference 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	Problem Analysis	Design/Development of solutions	Conduct investigations of	Engineering tool usage	The engineer and The world	Ethics	Individual and Collaborative team	Communication	Project management and finance	Life-long learning	PSO1	PSO2	PSO3
24CSE61T.1	3	2	-	-	-	-	-	-	-	-	-	2	-	-
24CSE61T.2	3	3	2	-	-	-	-	-	-	-	-	3	2	2
24CSE61T.3	3	3	2	1	-	-	-	-	-	-	-	3	2	2
24CSE61T.4	3	2	-	2	-	-	-	-	-	-	3	2	-	3
24CSE61T.5	3	3	3	2	2	-	-	-	1	1	3	3	3	2

(S.M. Rafi)

(B. Vallikumar)

B. Dilip Chakravarthy

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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

(Dr. K. Uday Kumar Reddy)

(B. Venkatesu Gowd) (G. Naresh Kumar)

S. Ashok Kumar

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, (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	:	SOFTWARE PROJECT MANAGEMENT
Category	:	PE
Couse Code	:	24ACSE6AT
Year	:	III B. Tech
Semester	:	II Semester
Branch	:	CSE,CSE(AIML), CSE(IOTCSBCT)

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

Course Objectives: The course is introduced for students

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

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

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

Unit 1 **12**

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

Unit 2 **10**

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

Lifecycle phases: Engineering and production stages, inception, Elaboration, construction,

transition phases. Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

Unit 3 **12**

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

Unit 4 **10**

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

Unit 5 **10**

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. Future Software Project Management: modern Project Profiles, Next generation Software economics, modern process transitions.Case Study: The Command Center Proessing and Display System-Replacement(CCPDS-R)

Text books:

1. Software Project Management, Walker Royce,Pearson Education,2012
2. BobHughes,MikeCotterellandRajibMall–SoftwareProjectManagement‖,6thEdition, Mc Graw Hill Edition, 2017.

Reference Books:

1. PankajJalote,–SoftwareProjectManagementinpractice‖,5thEdition,PearsonEducation, 2017.
2. Murali K.Chemuturi,Thomas M.Cagley Jr.‖Mastering Software Project Management: Best Practices, Tools and Techniques‖, J.Ross Publishing, 2010
3. SanjayMohapatra,–SoftwareProjectManagement‖,CengageLearning,2011

CO-PO MAPPING:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of complex problems	Engineering tool usage	The engineer and the world	Ethics	Individual and Collaborative Team work	Communication	Project management and finance	Life-long learning	Core Computing Skills	Emerging Technologies	PSO1	PSO2	PSO3
24ACSE6AT.1	3	2	-	-	-	-	-	-	-	-	2	2	2	2	-	-
24ACSE6AT.2	3	2	1	1	1	-	-	-	-	-	2	2	2	2	2	2
24ACSE6AT.3	2	3	2	2	1	-	-	-	1	1	2	2	3	2	3	-
24ACSE6AT.4	2	2	3	1	1	1	-	1	3	2	3	2	2	2	2	2
24ACSE6AT.5	3	3	2	2	2	1	-	1	1	2	3	3	3	3	3	3

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RAJAMPET, Annamayya 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**

(B Venkatesu Goud) (C. Naresh Kumar) (Dr K. Uday Kiran Reddy) (S. Ashok Kumar)

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.

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:

(B. Venkatesu Gud) (Dr. K. Uday Kumar Reddy)

U. Mahesh Kumar

S. Ashok Kumar

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
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

(Dr. K. Reddy Kumar Reddy)

(Venkatesu Gouni)

(U. Naresh Kumar)

S. Ashok Kumar

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RAJAMPET, Annamayya District, AP – 516126,

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

Lecture Hours	Tutorial Hours	Practice Hours	Credits
-	-	3	1.5

Course Objectives

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

Course Outcomes

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

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

1 a. Design a single unit perceptron for classification of a linearly separable binary dataset without using pre-defined models. Use the Perceptron() from sklearn.

b. Identify the problem with single unit Perceptron. Classify using Or-, And- and Xor-ed data and analyze the result.

2 Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets. Vary the activation functions used and compare the results.

3 Build a Deep Feed Forward ANN by implementing the Backpropagation algorithm an test the same using appropriate data sets. Use the number of hidden layers >=4.

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

V. Sathyadevan D-Service

Ref (S. M. Ratd)

Vani Chaitanya Vani

B. Naveen (Asst)

B. Dilip Chakravarthy

TEXTBOOKS:

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

REFERENCE BOOKS:

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

CO-PO Mapping:

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

ANNAMACHARYA UNIVERSITY

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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	:	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	-

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RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course	:	Compiler Design Lab
Category	:	PC
Couse Code	:	24ACSE61L
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. Understand the fundamental concepts of automata, formal languages, and compiler design.
2. Apply knowledge of DFA, CFG, and PDA to solve language recognition and conversion problems.
3. Analyse different parsing techniques including top-down and bottom-up approaches.
4. Design lexical analysers and parsers for validating programming constructs.
5. Develop programs for grammar transformations such as left recursion removal and left factoring.

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

1. Design deterministic finite automata (DFA) and convert between different formal representations.
2. Apply automata theory concepts to convert FA to regular grammar and CFG to PDA
3. Implement parsing techniques including recursive descent and bottom-up parsers.
4. Develop lexical analyzers Using Lex.
5. Implement syntax Analziers using parsing technique and tools like Yacc.

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

1. Write a program to Deterministic Finite Automata (DFA).
2. Write a program to FA to regular grammar conversion.
3. Write a program to Converting CFG to PDA (LL)
4. Write a program to Construct a Lexical Analyzer for validating identifiers, operators, comments, looping statements, key words.
5. Write a program to remove left recursion.
6. Write a program to remove left factoring.
7. Write a program to compute FIRST and FOLLOW sets,
8. Write a program to construct a Recursive Parser.
9. Write a program to construct a Recursive Descent Parsers.
10. Write a program to implement Bottom-up parsers.

11. Write a program to implement Nondeterministic Finite Automata (NFA) and convert it into an equivalent DFA.
12. Write a program to check whether a given string is accepted by a Push Down Automata (PDA).
13. Write a program to generate Intermediate Code using Three Address Code (TAC) representation.
14. Write a program to implement Shift Reduce Parsing for a given grammar and input string.

Prescribed Text Books:

1. Hopcraft H.E and Ullman J.D., Introduction to Automata Theory, Languages and computation. Pearson education.
2. Principles of compiler design -A.V. Aho. J.D.Ullman; Pearson Education.

Reference Books:

1. C. Andrew, W.Appel, Modern Compiler Construction, Cambridge University Press.
2. Louden, Compiler Construction, Cengage Learning.
3. V.Raghavan, Principles of Compiler Design, TMH.
4. Kamala Krithivasan and Rama R, Introduction to Formal Languages and Automata Theory and Computation. Pearson.

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
24ACSE61L.1	2	2	2	1	2	-	-	1	1	-	2	2	1	1
24ACSE61L.2	2	3	2	1	2	-	-	1	1	-	2	2	2	1
24ACSE61L.3	3	2	3	1	3	-	-	1	1	1	2	3	2	1
24ACSE61L.4	3	3	3	2	3	-	-	1	2	1	2	3	2	2
24ACSE61L.5	3	3	3	2	3	1	1	1	2	1	3	3	3	2

(S.M. Rafi)

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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

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

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.	9.