

DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE



(AUTONOMOUS)
(Approved by AICTE & Affiliated to Anna University, Chennai)
Accredited with 'A' Grade by NAAC, Accredited by TCS
Accredited by NBA with BME, ECE & EEE
PERAMBALUR - 621 212. Tamil Nadu.
website : www.dsengg.ac.in



COURSE PLAN

Designation/Department	Artificial Intelligence and Data Science			
Course Code/Name	U23AIV12/ RECOMMENDER SYSTEMS			
Year/Section/Department	III			
Credits Details	L:3	T:0	P:0	C:3
Total Contact Hours Required	45			

Syllabus:

UNIT I /INTRODUCTION	No. of Periods:9
Introduction and basic taxonomy of recommender systems - Traditional and non-personalized Recommender Systems - Overview of data mining methods for recommender systems- similarity measures- Dimensionality reduction – Singular Value Decomposition (SVD)	
UNIT II/ CONTENT-BASED RECOMMENDATION SYSTEMS	No. of Periods 9
High-level architecture of content-based systems - Item profiles, Representing item profiles, Methods for learning user profiles, Similarity-based retrieval, and Classification algorithms.	
UNIT III /COLLABORATIVE FILTERING	No. of Periods 9
A systematic approach, Nearest-neighbor collaborative filtering (CF), user-based and item-based CF, components of neighborhood methods (rating normalization, similarity weight computation, and neighborhood selection	
UNIT IV ATTACK-RESISTANT RECOMMENDER SYSTEMS	No. of Periods 9
Introduction – Types of Attacks – Detecting attacks on recommender systems – Individual attack – Group attack – Strategies for robust recommender design - Robust recommendation algorithms.	
UNIT V EVALUATING RECOMMENDER SYSTEMS	No. of Periods 9
Evaluating Paradigms – User Studies – Online and Offline evaluation – Goals of evaluation design – Design Issues – Accuracy metrics – Limitations of Evaluation measures	

Objective:

- ❖ To understand the foundations of the recommender system.
- ❖ To learn the significance of machine learning and data mining algorithms for Recommender systems
- ❖ To learn about collaborative filtering
- ❖ To make students design and implement a recommender system.
- ❖ To learn collaborative filtering.

Text Book:

- T1. Charu C. Aggarwal, "Recommender Systems: The Textbook", Springer, 2016.
- T2. Dietmar Jannach, Markus Zanker, Alexander Felfernig and Gerhard Friedrich, "Recommender Systems: An Introduction", Cambridge University Press (2011), 1st ed.

Website:

- W1: W1: <https://www.geeksforgeeks.org/computer-organization-performance-of-computer>
- W2: <https://edurev.in/studytube/Sub-Word-Parallelism-Arithmetic-Operations>
- W3: <https://courses.engr.illinois.edu/cs232/sp2010/lectures/l11.pdf>
- W4: <https://www.sop.inria.fr/oasis/Denis/ProgRpt/COURS/IntroductionToParallelProgramming.pdf>
- W5: https://www.idconline.com/Accessing_io_devices_in_system_memory.pdf

Online Mode of Study:

NPTEL details can be listed.

- ❖ <https://www.edx.org/learn/computer-architecture>
- ❖ <https://www.coursera.org/learn/comparch>
- ❖ <https://www.classcentral.com/course/comparch-342>

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I – OVERVIEW AND INSTRUCTIONS						9
1	Components Of a Computer System	T1	10 - 13	BB	1	1
2	Technology	T1	24 – 26	BB	1	2
3	Performance	T1, W1	26-36	BB	1	3
4	Power Wall -Uniprocessors To Multiprocessors	T1	39 - 41	PPT	1	4
5	Instructions	T1, R1	105 - 111	BB	1	5
6	Operations and Operands	T1	77 – 80	BB	1	6
7	Representing Instructions- Logical Operations	T1	81 - 86	PPT	1	7
8	Control Operations	T1	102 - 105	BB	1	8
9	Addressing And Addressing Modes	T1	111 - 115	BB	1	9
Outcome of Unit I:						
CO1: Understand the basics structure of computers, operations and instructions						
UNIT II -						
10	Addition and Subtraction	T1, R1	178- 182	BB	1	10
11	Addition and Subtraction	T1	178- 182	BB	1	11
12	Multiplication	T1	183- 188	PPT	1	12
13	Multiplication	T1	183- 188	BB	1	13
14	Division	T1	189- 195	BB	1	14
15	Division	T1	189- 195	BB	1	15

16	Floating Point Representation	T1	196-202	BB	1	16
17	Floating Point Operations	T1	203-208	PPT	1	17
18	Subword Parallelism	T1, W2	56-59	BB	1	18
Outcome of Unit II:						
CO2: Design arithmetic and logic unit.						
UNIT III - PROCESSOR AND CONTROL UNIT						9
19	A Basic MIPS implementation	T1	244-250	BB	1	19
20	Building a Datapath	T1	250-258	BB	1	20
21	Control Implementation Scheme	T1	259-271	PPT	1	21
22	Pipelining	T, R2	272-280	BB	1	22
23	Pipelined datapath and control	T1, W3	286-301	BB	1	23
24	Pipelined datapath and control	T1	286-301	BB	1	24
25	Handling Data Hazards	T1, R2	303-312	PPT	1	25
26	Handling Control Hazards	T1, R2	316-324	BB	1	26
27	Exceptions	T1	324-325	BB	1	27
Outcome of Unit III:						
CO3: Understand pipelined execution and design control unit.						
UNIT IV - PARALLELISM						9
28	Instruction-level-parallelism	T1, W4	212	PPT	2	29
29	Parallel processing challenges	T1	5-10	BB	2	31
30	Flynn's classification	T1	509-511	BB	2	33
31	Hardware multithreading	T1	444-449	PPT	2	35

32	Multi core processors	T1, W4	519- 523	BB	1	36
Outcome of Unit IV:						
CO4: Understand parallel processing architectures						
UNIT V - MEMORY AND I/O SYSTEMS						9
33	Memory hierarchy	T1, W4	519- 523	BB	1	37
34	Memory technologies	T1	288- 289	BB	1	38
35	Cache basics	T1	305- 310	BB	1	39
36	Measuring and improving cache performance	T1	289- 304	BB	1	40
37	Virtual memory	T1	237- 239	BB	1	41
38	TLBs, Input/output system	T1	401- 440	BB	1	42
39	Programmed I/O	T1	440- 444	BB	1	43
40	DMA and interrupts	T1	450- 454	BB	1	44
41	I/O Processors	T1	455- 459	BB	1	45
Outcome of Unit V:						
CO5: Understand the various memory systems and I/O communication. Describe staff selection and Motivation						

Course Outcome:

At the end of course: Students should be able to do:

CO1: Outline the basic concepts of recommender systems.

CO2: Explain machine-learning and data-mining algorithms in recommender systems data sets.

CO3: Illustrate the Collaborative Filtering in carrying out performance evaluation of recommender systems based on various metrics.

CO4: Contrast and implement a simple recommender system.

CO5: Summarize the advanced topics of recommender systems.

CO6: Summarize the advanced topics of recommender systems applications.

Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	1	2	-	-	-	-	-	-	-	-	-
CO 2	2	3	1	-	-	-	-	-	-	-	-	-

CO 3	1	2	1	-	-	-	-	-	-	-	-	-
CO 4	1	1	2	-	-	-	-	-	-	-	-	-
CO 5	1	3	1	-	-	-	-	-	-	-	-	-
AVG.	1.4	2	1.4	-	-	-	-	-	-	-	-	-

Content beyond Syllabus:

- ❖ Coarse-grained multithreading
- ❖ Simultaneous multithreading

Internal Evaluation Components:

Web portal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
Webportal 1	--	Assessment - I (60)	Unit I and II	CO 1 & CO2
	1	Assignment - Handwritten (20)	5. Instructions in Processor 6. operations and operands 7. Logical operations 8. Control operations 7. Floating Point operations	CO 1 & CO2
	2	Assignment - Poster Presentation / PPT (20)	1. Various components of computer system 9. Addressing modes with example	CO 1 & CO2
Webportal 2	--	Assessment - II (60)	Unit III and IV	CO3 & CO4
	3	Seminar (20)	24. Pipelined data path and control 25. Handling Data Hazards 26. Handling Control Hazards	CO3 & CO4
	4	Case Study Report (20)	30. FLYNN'S CLASSIFICATION 32. MULTICORE PROCESSORS 34. MEMORY HIEREACHY	CO3 & CO4
Webportal 3	--	Model Exam (75)	Unit I to V	CO1 to CO6

	5	MCQ (15)	Unit I to V	CO1 to C06
	-	Course Attendance (10)	--	--

Submission Details:

Phase 1(Before AT 1)		Phase 2 (Before AT 2)		Phase 3 (Model)
Assignment 1	Assignment 2	Assignment 3	Assignment 4	Assignment 5

Google Class Code Details: 66o7ym4

Class Name: II AIDS

PLAN OF ASSESSMENT TEST -DISTRIBUTION OF MARKS:

TEST	CO- MARK WISE DISTRIBUTION						BLOOM'S LEVEL MARK WISE DISTRIBUTION					
	CO1	CO2	CO3	CO4	CO5	CO6	BTL1	BTL2	BTL3	BTL4	BTL5	BTL6
AT-1												
AT-2												
MODEL												