DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE & Affiliated to Anna University, Chennai)
Re-Accredited by NAAC with 'A' Grade
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PERAMBALUR-621212, TAMILNADU, INDIA.
Website: www.dsengg.ac.in

M.E COMPUTER SCIENCE AND ENGINEERING REGULATIONS – 2023

Name of the Faculty				
Designation/Department	AP/CSE			
Course Code/Name	**P23CSE08/ COGNITIVE COMPUTING**			
Year/Section/Department	I/A/CSE			
Credits Details	L: 3	T: 0	P: 0	C:3
Total Contact Hours Required	45			

Syllabus:

UNIT I - FOUNDATION OF COGNITIVE COMPUTING	**No. of Periods: 9**
Foundation of Cognitive Computing: cognitive computing as a new generation, the uses of cognitive systems, system cognitive, gaining insights from data, Artificial Intelligence as the foundation of cognitive computing, understanding cognition Design Principles for Cognitive Systems: Components of a cognitive system, building the corpus, bringing data into cognitive system, machine learning, hypotheses generation and scoring, presentation, and visualization services.	
UNIT II - NATURAL LANGUAGE PROCESSING IN COGNITIVE SYSTEMS	**No. of Periods: 9**
Natural Language Processing in support of a Cognitive System: Role of NLP in a cognitive system, semantic web, Applying Natural language technologies to Business problems Representing knowledge in Taxonomies and Ontologies: Representing knowledge, Defining Taxonomies and Ontologies, knowledge representation, models for knowledge representation, implementation considerations	
UNIT III - BIG DATA AND COGNITIVE COMPUTING	**No. of Periods: 9**
Relationship between Big Data and Cognitive Computing: Dealing with human-generated data, defining big data, architectural foundation, analytical data warehouses, Hadoop, data in motion and streaming data, integration of big data with traditional data Applying Advanced Analytics to cognitive computing: Advanced analytics is on a path to cognitive computing, Key capabilities in advanced analytics, using advanced analytics to create value, Impact of open source tools on advanced analytics	
UNIT IV - BUSINESS IMPLICATIONS OF COGNITIVE COMPUTING	**No. of Periods: 9**
Preparing for change ,advantages of new disruptive models , knowledge meaning to business, difference with a cognitive systems approach , meshing data together differently, using business knowledge to plan for the future , answering business questions in new ways , building business specific solutions , making cognitive computing a reality , cognitive application changing the market The process of building a cognitive application: Emerging cognitive platform, defining the objective, defining the domain, understanding the intended users and their attributes, questions and exploring insights, training and testing	
UNIT V - APPLICATION OF COGNITIVE COMPUTING	**No. of Periods: 9**
Building a cognitive health care application: Foundations of cognitive computing for healthcare, constituents in healthcare ecosystem, learning from patterns in healthcare Data, Building on a foundation of big data analytics,	

cognitive applications across the health care eco system, starting with a cognitive application for healthcare, using cognitive applications to improve health and wellness, using a cognitive application to enhance the electronic medical record Using cognitive application to improve clinical teaching

TOTAL: 45 PERIODS

Objectives:

1. To familiarize Use the Innovation Canvas to justify potentially successful products
2. To learn various ways in which to develop a product idea.
3. To understand about how Big Data can play vital role in Cognitive Computing
4. To know about the business applications of Cognitive Computing
5. To get into all applications of Cognitive Computing.

Text Book:

T1- Cognitive Computing: Theory and Applications
T2 -Big Data: Principles and Best Practices of Scalable Real-Time Data Systems
T3 - Machine Learning: A Probabilistic Perspective.

Reference Book:

R1-Judith H Hurwitz, Marcia Kaufman, Adrian Bowles, "Cognitive computing and Big Data Analytics", Wiley, 2015.
R2 - Robert A. Wilson, Frank C. Keil, "The MIT Encyclopedia of the Cognitive Sciences", The MIT Press, 2013.
R3 - Noah D. Goodman, Joshua B. Tenenbaum, The ProbMods Contributors, "Probabilistic Models of Cognition", Second Edition, 2016

Website:

W1: https://www.statlect.com/probability-distributions
W2: https://www.khanacademy.org/math/statistics-probability
W3: https://stattrek.org/probability/probability-rules.aspx
W4: https://www.geeksforgeeks.org/probability-in-maths//

Online Mode of Study:

W1: https://onlinecourses.nptel.ac.in/noc24_ma23/preview
W2: https://www.coursera.org/courses?query=probability%20and%20statistics
W3: https://www.khanacademy.org/math/statistics-probability
W4: https://stattrek.org/statistics/tutorials.aspx
W5: https://www.statlect.com/

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I - FOUNDATION OF COGNITIVE COMPUTING						
1	Foundation of Cognitive Computing	T1	1-5	BB	1	1

2	Types of Virtual Machines	T1	6-10	BB	1	2
3	System Cognition	T1	11-15	BB	1	3
4	Gaining Insights from Data	T1	16-20	BB	1	4
5	Design Principles of Cognitive Systems	T1	21-25	BB	1	5
6	Data Integration	T1	26-30	BB	1	6
7	Machine Learning & Hypotheses	T1	31-35	BB	1	7
8	Data Integration groups	T1	36-40	BB	1	8
9	Presentation & Visualization	T1	41-45	BB	1	9

Outcome of Unit I:

At the end of unit, Students should be able to

- Explain applications in Cognitive Computing.

UNIT II - NATURAL LANGUAGE PROCESSING IN COGNITIVE SYSTEMS						
10	Introduction to NLP in Cognitive Systems	T1	46-50	BB	1	10
11	NLP Concepts	T1	51-55	BB	1	11
12	Semantic Web	T1	56-60	BB	1	12
13	NLP in Business Applications	T1	61-65	BB	1	13
14	Knowledge Representation	T1	66-70	BB	1	14
15	Taxonomies	R1	71-75	BB	1	15
16	Ontologies	T1	76-80	PPT	1	16
17	Models for Knowledge Representation	T1	81-85	BB	1	17
18	Implementation Considerations	T1	86-90	BB	1	18

- **Outcome of Unit II:**

  At the end of this unit, students should be able to:
- Describe Natural language processor role in Cognitive computing..

UNIT-III - BIG DATA AND COGNITIVE COMPUTING						
19	Introduction to Big Data & Cognitive Computing	T1	91-95	BB	1	19
20	Big Data Architecture	T1	96-100	BB	1	20
21	Hadoop Ecosystem	T1	101-105	BB	1	21
22	Data in Motion	T1	106-110	BB	1	22
23	Data Integration	T1	111-115	BB	1	23
24		T1	116-120	BB	1	24

	Introduction to Advanced Analytics					
25	Analytics for Value Creation	T1	121-125	BB	1	25
26	Open Source Tools	T1	126-130	BB	1	26
27	Summary & Applications	T1	131-135	BB	1	27

Outcome of Unit III:

At the end of this unit, students should be able to:

- Explain future directions of Cognitive Computing.

UNIT-IV- BUSINESS IMPLICATIONS OF COGNITIVE COMPUTING						
28	Preparing for Change	T2	136-140	BB	1	28
29	Disruptive Business Models	T2	141-145	BB	1	29
30	Knowledge in Business	T2	146-150	BB	1	30
31	Cognitive Systems Approach	T2	151-155	BB	1	31
32	Data Integration in Business in IoT	T2	156-160	BB	1	32
33	Business Planning with Knowledge	T2	161-165	BB	1	33
34	Modern Business Solutions	T2	166-170	BB	1	34
35	Cognitive Computing in Practice	T2	171-175	BB	1	35
36	Building a Cognitive Application	T2	176-180	BB	1	36

Outcome of Unit IV:

At the end of this unit, students should be able to:

- Evaluate the process of taking a product to market.

UNIT-V - APPLICATION OF COGNITIVE COMPUTING						
37	Introduction to Cognitive Healthcare	T2	181-185	**BB**	**1**	37
38	Healthcare Ecosystem	T2	186-190	BB	1	38
39	Healthcare Data	T2	191-195	BB	1	39
40	Big Data in Healthcare	T2	196-200	BB	1	40
41	Cognitive Applications in Healthcare Applications	T2	201-205	BB	1	41

42	Developing Healthcare Applications	T2	206-210	BB	1	42
43	Improving Health & Wellness	T2	211-215	BB	1	43
44	Electronic Medical Records	T2	216-220	BB	1	44
45	Clinical Teaching	T2	221-225	BB	1	45

Outcome of Unit V:

At the end of this unit, students should be able to:

- Comprehend the applications involved in this domain..

Course Outcome:

At the end of the course the students would be able to

CO1: Explain applications in Cognitive Computing.
CO2: Describe Natural language processor role in Cognitive computing
CO3: Explain future directions of Cognitive Computing
CO4: Evaluate the process of taking a product to market
CO5: Comprehend the applications involved in this domain
CO6: Apply cognitive computing for health care eco system.

Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	2	1	-	-	-	-	-	-	-	1	-	-	2	1
CO 2	3	2	1	1	1	-	-	-	-	1	-	2	2	1
CO 3	2	1	-	-	-	-	-	-	-	1	-	-	2	1
CO 4	2	1	-	-	-	-	-	-	-	1	-	-	2	1
CO 5	2	1	-	-	-	-	-	-	-	1	1	-	2	1
CO 6	2	1	-	-	1	-	-	-	2	1	1	2	2	1
AVG	**2**	**1**	**1**	**1**	**1**	**-**	**-**	**-**	**2**	**1**	**1**	**2**	**2**	**1**

Internal Evaluation Components:

Webportal	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)	1 Explain the foundation of cognitive computing in detail 2 Explain the design principles of cognitive systems.	CO1
	2	Assignment – Poster Presentation / PPT (20)	1 Explain NLP and its role in cognitive systems. 2 Explain taxonomies and ontologies in detail.	CO2
Webportal 2	--	Assessment – II (60)	Unit III and IV	CO3 & CO4
	3	Seminar (20)	1 Explain data streaming and real-time processing... 2. Explain the impact of open-source tools on advanced analytics	CO3
	4	Case Study Report (20)	**1**. Explain the business implications of cognitive computing. **2** . Explain how cognitive applications are changing the market.	CO4
Webportal 3	--	Model Exam (75)	Unit I to V	CO1 to CO6
	5	MCQ (15)	Unit I to V	CO1 to CO6
	-	Course Attendance (10)	--	--

Submission Details:

Phase 1(Before AT 1)	Phase 2 (Before AT 2)	Phase 3(Before Model Exam)
Assignment 1	Assignment 2	Assignment 3

PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:

TEST	CO- MARK WISE DISTRIBUTION	BLOOM'S LEVEL MARK WISE DISTRIBUTION

AT-1	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**BTL1**	**BTL2**	**BTL3**	**BTL4**	**BTL5**	**BTL6**
	37	**23**	**-**	**-**	**-**	**-**						
AT-2	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**BTL1**	**BTL2**	**BTL3**	**BTL4**	**BTL5**	**BTL6**
	-	**-**	**37**	**23**	**-**	**-**						
MODEL	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**BTL1**	**BTL2**	**BTL3**	**BTL4**	**BTL5**	**BTL6**
	20	**20**	**20**	**20**	**10**	**10**						

Prepared By **Verified By**

Approved By