GANPAT UNIVERSITY									
FACULTY OF ENGINEERING AND TECHNOLOGY									
Programme	Bachelor of Technology					Branch/Spec.	Computer Science & Engineering (BDA)		
Semester	VII					Version	1.0.0.0		
Effective from Academic Year			2022-23			Effective for the batch Admitted in			June 2019
Subject code	2CSE712		Subject Name			COGNITIVE COMPUTING			
Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(D)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	2	0	5	Theory	40	60	100
Hours	3	0	4	0	7	Practical	60	40	100

Pre-requisites:

Basics of Artificial Intelligence - Knowledge based Agent, Basics of Machine learning and Neural Network

Learning Outcome:

Upon Completion of the course, the students will be able to:

- Understand various concepts of cognitive computing
- Understand the evolution of Watson services from the original DeepQA architecture
- Describe various case studies related to cognitive computing.
- Develop cognitive computing related applications, like Chabot.

Theory syllabus

Unit	Content	Hrs
1	**INTRODUCTION TO COGNITIVE SCIENCE AND COGNITIVE COMPUTING WITH AI:** Cognitive Computing, Cognitive Psychology, The Architecture of the Mind, The Nature of Cognitive Psychology, Cognitive architecture, Cognitive processes, The Cognitive Modeling Paradigms, Declarative / Logic based Computational cognitive modeling, connectionist models –Bayesian models. Introduction to Knowledge-Based AI – Human Cognition on AI – Cognitive Architectures	12
2	**COGNITIVE COMPUTING WITH INFERENCE AND DECISION SUPPORT SYSTEMS:** Intelligent Decision making, Fuzzy Cognitive Maps, learning algorithms: Nonlinear Hebbian Learning, Data driven NHL, Hybrid learning, Fuzzy Grey cognitive maps, Dynamic Random fuzzy cognitive Maps	11
3	**COGNITIVE COMPUTING WITH MACHINE LEARNING:** Machine learning Techniques for cognitive decision making, Hypothesis Generation and Scoring, Natural Language Processing, Representing Knowledge, Taxonomies and Ontologies, N-Gram models, Application	11
4	**CASE STUDIES:** Cognitive Systems in health care, Cognitive Assistant for visually impaired – AI for cancer detection, Predictive Analytics, Text Analytics, Image Analytics, Speech Analytics – IBM Watson – Introduction to IBM's Power AI Platform - Introduction to Google's TensorFlow Development Environment	11

Self learning: CASE studies

Practical content

Practicals will be based on natural language processing pipeline, Visual recognition pipeline and various Watson assistant services - text to speech, speech to text, language translator, chatbot, knowledge discovery.

Text Books

1	Hurwitz, Kaufman, and Bowles, "Cognitive Computing and Big Data Analytics", Wiley, Indianapolis.

Reference Books

1	Jerome R. Busemeyer, Peter D. Bruza, "Quantum Models of Cognition and Decision", Cambridge University Press.
2	Emmanuel M. Pothos, Andy J. Wills, "Formal Approaches in Categorization", Cambridge University Press.
3	Nils J. Nilsson, "The Quest for Artificial Intelligence", Cambridge University Press.
4	Neil Stillings, Steven E. Weisler, Christopher H. Chase and Mark H. Feinstein, "Cognitive Science: An Introduction", MITPress.

Course Outcome

Cos	Description
CO1	Understand various concepts of cognitive computing
CO2	Understand the evolution of Watson services from the original DeepQA architecture
CO3	Describe various case studies related to cognitive computing.
CO4	Develop cognitive computing related applications, like Chabot.

Mapping of CO and PO:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	2	3	1	3	1	2	1	1	1	1
CO2	2	3	2	2	2	3	1	1	1	1	1	1
CO3	2	2	2	1	2	1	2	1	1	1	2	2
CO4	0	3	3	1	3	1	2	3	1	1	3	2
CO5	2	2	3	1	3	2	2	3	1	2	2	1