GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Master of Technology	Branch/Spec.	Computer Engineering (Artificial Intelligence)
Semester	II	Version	1.0.0.0
Effective from Academic Year	2025-26	Effective for the Batch admitted in	July 2025
Course Code	3CEAI201	Course Name	Information Retrieval and Web Search

Teaching Scheme						Examination Scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	-	1	-	4	Theory	50	50	100
Hours	3	-	2	-	5	Practical	30	20	50

Pre-requisites

NIL

Course Outcomes

On successful completion of the course, the students will be able to:

CO1	Describe the fundamentals of information retrieval, models and techniques in the context of data security requirements.
CO2	Apply secure indexing, text representation and privacy-preserving evaluation techniques for information retrieval systems handling sensitive data.
CO3	Analyze the integration of security features into existing information retrieval models to balance utility and data protection.
CO4	Develop solutions leveraging emerging techniques like machine learning and NLP to build secure, privacy-preserving information retrieval systems.

Theory Syllabus

Unit	Content	Hrs.
1	**Introduction to Information Retrieval in Data Security:** Overview of Information Retrieval in the context of Data Security, Importance of effective information retrieval for securing data, Key Challenges and considerations in Information Retrieval for Data Security.	04
2	**Information Retrieval Models in Data Security:** Relevance of information retrieval models (e.g., Boolean, Vector Space) in the context of data security, Integration of security features into retrieval models, Evaluation metrics for Information Retrieval in the data security domain.	06
3	**Secure Indexing and Retrieval Techniques:** Secure indexing methods and techniques, Encryption and secure transmission of retrieval queries, Techniques for protecting sensitive information during retrieval.	06
4	**Text Representation and Preprocessing for Secure Retrieval:** Secure text representation techniques, Privacy-preserving text preprocessing methods, Balancing security and utility in document representation.	06
5	**Retrieval Evaluation in Data Security:** Evaluation measures focusing on security considerations, Privacy-preserving evaluation methodologies, and Experimentation with secure retrieval systems.	06
6	**Privacy-preserving Web Search:** Privacy challenges in web search, Techniques for anonymous web search, Balancing user privacy and search relevance.	05
7	**Multimedia Information Retrieval in a Secure Environment:** Security challenges in multimedia retrieval, Secure retrieval of multimedia content (images, videos), and Protection of sensitive multimedia information.	06
8	**Advanced Security Topics in Information Retrieval:** Integration of Natural Language Processing (NLP) and Information Retrieval for security, Machine learning approaches to enhance security in retrieval, Emerging trends and future directions in Information Retrieval for data security.	06

Practical Content	
Practicals, Assignments and tutorials are based on the above syllabus.	
Text Books	
1	“Introduction to Information Retrieval” by Christopher D. Manning, Prabhakar Raghavan, and Hinrich Schütze.
Reference Books	
1	“Search Engines: Information Retrieval in Practice” by Bruce Croft, Donald Metzler, and Trevor Strohman.
2	“Secure Data Management in Decentralized Systems” by Eduardo B. Fernandez.
ICT/MOOCs Reference	
1	https://www.coursera.org/learn/text-retrieval
2	https://www.udemy.com/course/information-retrieval-and-mining-massive-data-sets/
3	https://www.coursera.org/courses?query=information%20retrieval

Mapping of CO with PO and PSO:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	1	0	1	1	0	1	0	1	0	1	2	1
CO2	1	3	2	1	3	0	0	0	1	1	1	3	2	2
CO3	1	3	3	1	1	1	0	0	1	1	1	1	2	2
CO4	0	2	3	1	2	1	0	1	2	2	2	3	2	3