Uka Tarsadia University

B. Tech.

CSE / CSE (AI&ML) / CSE (CC) / CSE (CS) / CE / CE (SE) / IT

Semester VI

Program Elective -IV

DATA PRIVACY

CY5016

Effective from December-2024

Syllabus version: 1.00

Subject Code	Subject Title
CY5016	Data Privacy

Teaching Scheme				Examination Scheme			
Hours		Credits		Theory Marks		Practical Marks	Total Marks
Theory	Practical	Theory	Practical	Internal	External	CIE	
3	0	3	0	40	60	0	100

Objectives of the course:

- To understand the basic concepts of data privacy fundamentals.
- To understand multidimensional data, complex data structure, threats to anonymized data used in data piracy.
- To understand privacy preserving data mining, dynamic data protection tokenization in data piracy.

Course outcomes:

Upon completion of the course, the student shall be able to,

CO1: Understand the basic concepts of data privacy.
CO2: Understand multidimensional data used in of data privacy.
CO3: Describe complex data structures in of data privacy.
CO4: Understand threats to anonymized data in of data privacy.
CO5: Understand privacy preserving data mining in of data privacy.
CO6: Analyse dynamic data protection: tokenization in of data privacy.

Sr. No.	Topics	Hours
	Unit – I	
1	**Introduction to Data Privacy:** Introduction, Methods of protecting data, Importance of balancing data Privacy and Utility, Introduction to anonymization design principles, Nature of data in the enterprise.	6
	Unit – II	
2	**Static Data Anonymization – Multidimensional Data:** Multidimensional data classification of privacy preserving methods, Classification of data in a multidimensional data Set – Protecting explicit identifiers, Protecting quasi-identifiers, Protecting Sensitive Data (SD),	9

	Group-Based Anonymization – k-Anonymity, l-Diversity, t-Closeness.	
Unit – III		
3	**Static Data Anonymization – Complex Data Structures:** Introduction, Privacy preserving graph data – structure of graph data, Privacy preserving time series data, Challenges in privacy preservation of time series data – Time series data protection methods, Privacy preservation of longitudinal data, Privacy preservation of transaction data.	8
Unit – IV		
4	**Static Data Anonymization – Threats to Anonymized Data:** Threats to anonymized data, Threats to data structures – multidimensional data, Longitudinal data, Graph data, Time series data, Transaction data, Threats by anonymization techniques – Randomization (Additive), k – Anonymization, l – Diversity, t – Closeness.	8
Unit – V		
5	**Privacy Preserving Data Mining:** Key functional areas of multidimensional data, Privacy preserving test data manufacturing – Testdata fundamentals, Utility of test data - Test coverage, Privacy preservation of test data, Quality of test data.	8
Unit – VI		
6	**Dynamic Data Protection – Tokenization:** Understanding tokenization – Dependent tokenization, Independent tokenization, Benefits of tokenization compared to other methods, Components for tokenization.	6

Text Book:

1. NatarajVenkataramanan, AshwinShriram, “Data Privacy: Principles and Practice”, Chapman & Hall/CRC.

Reference Books:

1. Nishant Bhajaria, “Data Privacy: A Runbook for Engineers”, Manning Publications.
2. Katharine Jarmul, “Practical Data Privacy”, O'Reilly Media.

Course objectives and Course outcomes mapping:

- To understand the basic concepts of data privacy fundamentals: CO1
- To understand multidimensional data, complex data structure, threats to anonymized data used in data piracy: CO2, CO3, and CO4
- To understand privacy preserving data mining, dynamic data protection tokenization in data piracy: CO5 and CO6

Course units and Course outcomes mapping:

Unit No.	Unit Name	Course Outcomes					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Introduction to Data Privacy	✓					
2	Static Data Anonymization: Multidimensional Data		✓				
3	Static Data Anonymization: Complex Data Structures			✓			
4	Static Data Anonymization: Threats to Anonymized Data				✓		
5	Privacy Preserving Data Mining					✓	
6	Dynamic Data Protection: Tokenization						✓

Programme outcomes:

PO 1: Engineering knowledge: An ability to apply knowledge of mathematics, science, and engineering.

PO 2: Problem analysis: An ability to identify, formulates, and solves engineering problems.

PO 3: Design/development of solutions: An ability to design a system, component, or process to meet desired needs within realistic constraints.

PO 4: Conduct investigations of complex problems: An ability to use the techniques, skills, and modern engineering tools necessary for solving engineering problems.

PO 5: Modern tool usage: The broad education and understanding of new engineering techniques necessary to solve engineering problems.

PO 6: The engineer and society: Achieve professional success with an understanding and appreciation of ethical behavior, social responsibility, and diversity, both as individuals and in team environments.

PO 7: Environment and sustainability: Articulate a comprehensive world view that integrates diverse approaches to sustainability.

PO 8: Ethics: Identify and demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work.

PO 9: Individual and team work: An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able

to comprehend and write effective reports and design documentation, make effective presentations, and give/receive clear instructions.

PO 11: Project management and finance: An ability to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: A recognition of the need for, and an ability to engage in life-long learning.

Programme outcomes and Course outcomes mapping:

Programme Outcomes	Course Outcomes					
	CO1	CO2	CO3	CO4	CO5	CO6
PO1	✓					
PO2		✓	✓	✓	✓	✓
PO3			✓		✓	
PO4		✓		✓		✓
PO5						✓
PO6	✓			✓	✓	
PO7						
PO8	✓			✓	✓	
PO9						✓
PO10	✓		✓			✓
PO11						
PO12		✓		✓	✓	✓