



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Information Technology

Subject Code : ME02023021

Subject Name : Security and Privacy in Social Media

WEF Academic Year :	A.Y 2024-25
Semester :	2
Category of the Course :	Professional Elective Course

Prerequisite :	Nil
Rationale :	This course aims to provide students with a comprehensive understanding of the security and privacy issues associated with social media platforms. Students will learn about various security threats, privacy risks, data protection methods, and regulations related to social media. The course also incorporates research aspects to encourage the exploration of emerging threats, privacy-preserving techniques, and future trends in social media security.

Course Outcome:

After Completion of the Course, Student will able to :

No	Course Outcomes	RBT Level*
01	Understand the architecture and evolution of social media platforms.	UN
02	Examine various security breaches and privacy violations in social networks.	UN
03	Develop a critical research approach to identify gaps and propose solutions for emerging security and privacy challenges in social media.	AP

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Teaching and Examination Scheme :

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Practical		
				ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150



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Course Content:

Sr. No.	Course Content	No. of Hours	% of Weightage
1	<p>Introduction to Social Media: Overview of Social Media platforms (Facebook, Instagram, Twitter, etc.), History and evolution of social media, Social media network architecture</p> <p>Types of Social Media and Their Uses :Social networking, media sharing, microblogging, and other categories, Popular platforms and their functionalities</p> <p>Privacy and Security Concerns in Social Media :Authentication and Access Control, Authentication mechanisms in social media platforms, Access control models (Role-Based Access Control, Attribute-Based Access Control)</p> <p>Phishing and Social Engineering Attacks ,spear phishing, Prevention and mitigation strategies</p> <p>Malware, Ransomware, and Exploits, Types of malware affecting social media platforms, Case studies and prevention strategies</p> <p>Distributed Denial-of-Service (DDoS) Attacks</p> <p>Dark side Cybercrime, Hacked accounts, cyberstalking, cyberbullying, predators, hackers, Imposter accounts, Vulnerable third-party apps, Password theft, Privacy settings and data security, botnets, Fake News, and Information Manipulation, Cross-Site Scripting (XSS) and SQL Injection attacks, Impersonation, Hate Speech, Blackmarkets</p> <p>Hate speech case study – Truth Social</p> <p>Study of Terms and Services -</p> <ol style="list-style-type: none">1. Twitter - https://x.com/en/tos/previous/version_132. Facebook - https://www.facebook.com/terms.php/	6	15



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Sample social network visualization and analysis using Gephi			
2	Privacy Risks in Social Media : Data Privacy in Social Media, User Profiling and Tracking, Social Media Privacy Settings and Tools, Privacy settings on popular platforms, Tools for managing privacy on social media, Data Mining and Big Data in Social Media, Data collection and analysis in social media, Big data's impact on privacy Security and Privacy Preservation Mechanisms :Encryption in Social Media, End-to-end encryption, Encryption protocols used in social media platforms, Secure Messaging Systems , Case study: WhatsApp and Signal Anonymization and Pseudonymization, Secure Data Storage and Access Control, Techniques for securing data storage on social media platforms ,Cloud storage and data access control mechanisms	6	15
3	Legal and Ethical Aspects of Social Media Privacy : Data protection regulations (GDPR, CCPA, etc.), Balancing privacy with freedom of speech, Role of governments in social media data collection Data ownership and control <b style="color: red;">India's Digital Personal Data Protection Act (DPDPA): https://www.meity.gov.in/writereaddata/files/Digital%20Personal%20Data%20Protection%20Act%202023.pdf	3	5
4	Research and Emerging Topics in Social Media Security and Privacy :Research Methods in Social Media Security, Approaches to research in cybersecurity and privacy in social media, Tools and techniques for conducting research Privacy-Preserving Techniques for Social Media: Emerging research on privacy-preserving social media techniques, Differential privacy, homomorphic encryption, etc. Data Analytics and Social Media Data mining and sentiment analysis: Analyzing user behavior and activity, <b style="color: red;">Graph modeling of social networks , Predictive analysis based on social media data	8	25



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	<p>Challenges in data anonymization: Re-identification risks in anonymized datasets, De-anonymization techniques and their ethical implications</p> <p>Blockchain for Social Media Privacy: How blockchain can enhance privacy and security in decentralized social media platforms, Blockchain-based identity verification and its use in social media Research Aspects: The potential of blockchain in preventing data, manipulation on social media , Decentralized social networks (e.g., Mastodon, Steemit)</p> <p>Machine Learning in Social Media Security</p> <p>AI-based security solutions: Identifying patterns of harmful content, cyberbullying, and fake news using machine learning, Automated detection of malicious accounts or activities (e.g., spam bots)</p> <p>Deep learning models for security: Neural networks for anomaly detection, Natural language processing (NLP) for detecting hate speech or inappropriate content</p>		
5	<p>Social Media Privacy Policies and Case Studies: Case Study: Facebook Data Breach: Detailed analysis of the Facebook data breach, Lessons learned and security measures post-breach Case Study: Cambridge Analytica Scandal: Privacy and security aspects of the Cambridge Analytica scandal, Public backlash and regulatory response Privacy Violations in Social Media Apps: Case studies of privacy violations in social media apps (e.g., TikTok, Snapchat), Analysis of privacy breach responses</p>	5	10
6	<p>Future Trends in Social Media Security: Internet of Things (IoT) and Social Media : Security implications of IoT integration with social media, Potential risks and solutions</p>	5	10



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	The Role of 5G in Social Media Privacy : 5G network rollout and its impact on social media security, Privacy implications of high-speed networks Cybersecurity in Virtual Reality (VR) and Augmented Reality (AR) :Security and privacy challenges in VR and AR applications linked to social media, Research trends in VR/AR security		
7	Data collection from social networks, challenges, opportunities, and pitfalls in online social networks, APIs; Collecting data from Online Social Media (also listing techniques used by the social media to prevent data scraping - https://www.gerrishlegal.com/blog/global-dpas-urge-social-media-platforms-to-prevent-unlawful-data-scraping) Open Source Intelligence (OSINT) , Mobile OSNs, Non-US centric OSNs: .kr, .cn, .jp, Special purpose OSNs: Pinterest, SnapChat, Ask.fm, WhatsApp , Privacy settings in OSNs, PII leakage in OSNs	7	15
8	Research Work and Project Identifying Research Gaps in Social Media Security Conducting Empirical Research in Social Media Security: Methods for conducting empirical research in social media security, Data collection and analysis techniques	5	5
Total		45	100

Reference Book:

- Network Science by Albert-László Barabási (<https://networksciencebook.com/>)
- "Social Media Security: Leveraging Social Media for Security and Privacy" by Guy Gable.
- "Network Security Essentials" by William Stallings.
- "Security and Privacy in Social Media: A Survey" by Ravi Sandhu et al.
- Thuraisingham B., Abrol Raymond Heatherly S., Kantarcioglu M., Khadilkar V., Khan L, "Analyzing and Securing Social Networks", Taylor & Francis Group.
- Michael Cross, "Social Media Security", Elsevier,
- Altshuler Y., Elovici Y., Cremers A.B., Aharony N., Pentland, "Security and Privacy in Social Networks", Springer,
- Gavin Bell, "Building Social Web Applications", O'Reilly, .
- Carminati, B., Ferrari, E., Viviani, M, " Security and Trust in Online Social Networks" , Switzerland: Morgan & Claypool Publishers,



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Research Papers:

- Recent papers from IEEE, ACM, and other cybersecurity journals related to social media security and privacy.

Online Resources:

- Research papers and technical blogs on emerging security threats and privacy protection in social media.

Suggested Course Practical List:

1. Collecting data from social media – Collect data, analyze, and report
2. Text analysis of social media data – Analyze data and report
3. Cyber crime on social media – Analyze data and report

Student will be able to collect data from OSM, analyze, and visualize the data within the context of Privacy & Security in Online Social Media

4. Each student will undertake a research project focused on a particular aspect of social media security or privacy, such as improving privacy-preserving technologies, detecting bots or misinformation, or studying the ethical implications of social media data mining. The project will include a literature review, methodology, implementation, and a final research paper.

For example:

- Investigating the role of Artificial Intelligence in detecting and preventing fake news on social media
- Developing a privacy-preserving social media model using blockchain technology
- Exploring the potential of federated learning in social media data privacy
- Machine learning-based detection of harmful content and hate speech

List of Laboratory/Learning Resources Required:

Latest Research papers, freeware tool to implement research idea

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