CURRICULUM AND SYLLABUS

B.Tech. (Honours) *in*
COMPUTER SCIENCE AND ENGINEERING
(Cyber Security)
2024 SCHEME

CURRICULUM

B.Tech (Honours) is an enhanced version of the Bachelor of Technology degree, offering the students the opportunity to undertake additional courses within their own discipline. This pathway allows students to deepen their knowledge in emerging or advanced areas of Engineering relevant to their field of study, providing a stronger foundation for specialized career paths or further academic pursuits.

For the award of B.Tech (Honours) in Computer Science and Engineering (Cyber Security), the student shall fulfill all the curricular requirements for B.Tech in Computer Science and Engineering (Cyber Security) as per SJCET B.Tech Academic Regulations 2024 and shall earn 15 additional credits by undergoing the following courses, which shall be further governed by clause R16 of the Regulations.

Sl.No	Semester	Course Code	Course Name/Type	Weekly hours				Total Marks		Credits
				L	T	P	SS	CIE	ESE	
1	4	24SJHNCCT409	Secure Mobile Application Development	3	1	0	5	40	60	4
2	5	24SJHNCCT509	Cyber Security and Privacy	3	1	0	5	40	60	4
		24SJHNCCM5XX	Approved MOOC *							
3	6	24SJHNCCT609	Privacy and Security in Online Social Media	3	1	0	5	40	60	4
		24SJHNCCM6XX	Approved MOOC *							
4	7	24SJHNCACT709	Practical Cyber Security for Cyber Security Practitioners	3	0	0	5	40	60	3
		24SJHNCCM7XX	Approved MOOC *							
Total Credits										15

*MOOC to be approved by the Academic Council on recommendation of the Board of Studies.

SECURE MOBILE APPLICATION DEVELOPMENT
Honours -S4

Course Code	24SJHNCCT409	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:1:0	ESE Marks	60
Credits	4	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None	Course Type	Theory

Course Objective: This course helps the learners to make awareness about strong theoretical concept in the development of mobile applications and its challenges. It covers the concepts of Mobile App and Mobile Interface, key concepts of Android, 2D graphics and multimedia in Android, User interface design, SQLite database, mobile embedded system architecture and mobile cloud. This course enables the learners to develop the ability to create Android based applications for different domains.

Module No.	Syllabus Description	Contact Hours
1	**Overview of Mobile App and Mobile Interface-** Mobile Systems. Mobile Interface and Applications - Optimizations in Mobile Systems, Mobile Embedded System. Mobile Cloud - Big Data Application in Mobile Systems, Data Security and Privacy Protection in Mobile Systems, Concept of Mobile Apps, Brief Introduction of Android and its Framework. Installation and creation of Android application. Introduction to Key Concepts of Android- App Components, App Resources, App Manifest.	**8**
2	2D Graphics and Multimedia in Android- Introduction to 2-D Graphics Techniques. Advanced UI Design. Overview of Multimedia in Android. Audio Implementation in Android. Executing Video in Android. **Mobile Embedded System Architecture** Embedded Systems. Scheduling algorithms – FCFS, SJF, Multiprocessors, Priority scheduling, As- Soon-As-Possible (ASAP) and As-Late-As-Possible (ALAP). Memory Technology. Mobile Embedded systems. Messaging and Communication mechanisms	**14**
3	Data storage and SQLite Operations - Local Data - Internal and External Storage, Save a File on Internal Storage, Save a File on External Storage, Delete a File, Query the Space. SQLite Database - Table Structure, CRUD Operations, Usage of SQLite Techniques. Content Provider.	**9**

4	Mobile Cloud Computing in Mobile Applications Deployment - Concepts of mobile cloud computing - Technological Structure, Differences between Cloud Computing and Mobile Cloud, Mobile Computing, Wireless LAN, Wireless, WAN and Cellular networks. Main techniques of mobile cloud computing – Virtualization, Parallel Programming Model, Mass Distributed Storage. Mobile Cloud Computing Architecture.	**8**

Course Assessment Method (CIE: 40 marks, ESE: 60 marks)
Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment / Quiz	Internal Examination-1 (Written)	Internal Examination-2 (Written)	Total
5	**15**	**10**	**10**	**40**

End Semester Examination Marks (ESE)
In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes*: After the completion of the course the student will be able to*

CO	Description	Bloom's Knowledge Level (KL)
CO1	Explain the fundamentals of mobile systems, mobile interfaces, and Android application architecture.	K2
CO2	Design and implement 2D graphics, multimedia features, and advanced UI in Android applications.	K3
CO3	Apply data storage and SQLite operations to manage local and persistent data in Android apps.	K3
CO4	Analyze and deploy mobile applications using mobile cloud computing concepts and architectures.	K4

Note: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	✓	✓						✓			
CO2	✓	✓	✓		✓			✓			
CO3	✓	✓	✓					✓			
CO4	✓	✓						✓			

Text Books				
Sl. No	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
1	Mobile Applications Development with Android Technologies and Algorithms	Meikang Qiu, Wenyun Dai, and Keke Gai	Taylor and Francis	2017

References			
Sl. No	Title of the Book	Name of the Author/s	Edition and Year
1	Android Boot Camp for Developers using Java™, Comprehensive: A Beginner's Guide to Creating Your First Android Apps	Corinne Hoisington	3rd Edition, 2017
2	Android Application Development for Java	James C. Sheusi	2nd Edition, 2013

Video Links (NPTEL, SWAYAM…)	
Module No.	Link ID
1	https://onlinecourses.swayam2.ac.in/aic20_sp02/preview
2	https://onlinecourses.swayam2.ac.in/nou25_ge63/preview

CYBER SECURITY AND PRIVACY
Honours S5

Course Code	24SJHNCCT509	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:1:0:0	ESE Marks	60
Credits	4	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None	Course Type	Theory

Course Objective: This course aims to develop an understanding of cybersecurity and information privacy. It introduces the fundamental concepts of protecting digital assets, managing cyber risks, implementing security governance frameworks, and addressing the legal and ethical aspects of privacy. Students will also explore how cybersecurity and privacy shape business strategy and organizational resilience.

Module No.	Syllabus Description	Contact Hours
1	**Foundations of Cybersecurity** – Introduction to cybersecurity, confidentiality, integrity, and availability (CIA triad). Cyber threats, vulnerabilities, and attack vectors. Organizational implications of cyber incidents. Case Study: Target data breach.	10
2	**Security Governance, Risk, and Compliance (GRC)** – Security management, GRC frameworks, and risk-based approaches. Security policies (ESSP, ISSP, SYSSP). Security standards (ISO 27001, NIST, COBIT). Risk identification, assessment, control, and mitigation. Incident response, disaster recovery, and business continuity planning (BCP).	10
3	**Cybersecurity Technologies and Emerging Applications** – Access control, authentication mechanisms, encryption techniques, network security tools (firewalls, IDS/IPS), and defense technologies. Cybersecurity in AI, blockchain, and Industry 4.0 environments.	10
4	**Information Privacy and Strategy** – Foundations and theories of information privacy. Privacy measurement, data breach implications, and ethical aspects. Regulatory frameworks: GDPR, India's DPDP Act, and Aadhaar. Economic valuation of privacy (WTA/WTP), privacy in business strategy, espionage, and privacy vs. safety.	10

Course Assessment Method (CIE: 40 marks, ESE: 60 marks)
Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment / Quiz	Internal Examination-1 (Written)	Internal Examination-2 (Written)	Total
5	15	10	10	40

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

***Course Outcomes**: After the completion of the course the student will be able to*

Course Outcomes (CO)	Description	Bloom's Knowledge Level (KL)
CO1	Explain the fundamental principles of cybersecurity and information assurance.	K2
CO2	Apply governance, risk, and compliance (GRC) frameworks in managing cybersecurity within organizations.	K3
CO3	Demonstrate understanding of key cybersecurity technologies and their application in securing systems.	K3
CO4	Analyze privacy regulations, ethical issues, and economic aspects of information privacy.	K4

Note: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5-Evaluate, K6- Create

Mapping of course outcomes with program outcomes

Course Outcomes (CO)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	✓	✓						✓			
CO2	✓	✓	✓		✓			✓			
CO3	✓	✓	✓					✓			
CO4	✓	✓						✓			

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Principles of Information Security	Michael E. Whitman, Herbert J. Mattord	Cengage Learning, New Delhi	6th Edition, 2018

References			
Sl. No	**Title of the Book**	**Name of the Author/s**	**Edition and Year**
1	Technology	Darktrace	Online Resource, Accessed Nov 2018
2	Is Cyber Security About More Than Protection?	Van Kessel, P.	EY Global Information Security Survey 2018-2019

Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://nptel.ac.in/courses/106106248

PRIVACY AND SECURITY IN ONLINE SOCIAL MEDIA
Honours S6

Course Code	24SJHNCCT609	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:1:0:0	ESE Marks	60
Credits	4	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None	Course Type	Theory

Course Objective: *This course provides a comprehensive introduction to privacy and security issues in online social media (OSM). Students will explore trust, credibility, phishing, data privacy, and security mechanisms in social networks. The course also emphasizes practical aspects of data collection, analysis, and research discussion to understand and mitigate privacy and security risks in social media.*

Module No.	Syllabus Description	Contact Hours
1	**Introduction to Online Social Networks** – Overview of OSM, data collection techniques, challenges, opportunities, pitfalls, APIs for social media.	8
2	Collecting Data from Online Social Media – Methods for extracting and structuring data from social networks.	8
3	Trust, Credibility, and Reputation in Social Systems – Understanding trust metrics, credibility assessment, reputation management.	8
4	Privacy, Security, and Research in OSM – Information disclosure, privacy risks, phishing, identifying fraudulent entities, policing in online social media. Advanced Topics, Case Studies, and Research Paper Discussions in Privacy and Security of Online Social Media.	14

Course Assessment Method (CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment / Quiz	Internal Examination-1 (Written)	Internal Examination-2 (Written)	Total
5	15	10	10	40

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

***Course Outcomes**: After the completion of the course the student will be able to*

CO	Description	Bloom's Knowledge Level (KL)
CO1	Explain fundamental concepts of online social networks, data collection methods, and associated challenges.	K2
CO2	Apply methods for analyzing trust, credibility, reputation, and identifying phishing or fraudulent behavior in social media.	K3
CO3	Evaluate privacy risks, security challenges, and regulatory considerations in online social media environments.	K5
CO4	Analyze case studies, advanced issues, and research findings in privacy and security of online social media.	K4

Note: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping of course outcomes with program outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	✓	✓						✓			
CO2	✓	✓	✓		✓			✓			
CO3	✓	✓	✓					✓			
CO4	✓	✓		✓				✓			

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Mining the Social Web	Matthew A. Russell & Mikhail Klassen	O'Reilly Media	2023

Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://onlinecourses.nptel.ac.in/noc25_cs79/preview

B. Tech. CC Honours Courses

Sl. No:	Semester	Course Code	Course Title (Course Name)	Credit Structure			Total Marks		Credits	Hrs./ Week
				L	T	P	CIA	ESE		
1	4	**24SJHNCCT409**	Secure Mobile Application Development	3	1	0	40	60	4	4
2	5	**24SJHNCCT509**	Cyber Security and Privacy / MOOC	3	1	0	40	60	4	4
3	6	**24SJHNCCT609**	Privacy and Security in Online Social Media / MOOC	3	1	0	40	60	4	4
4	7	**24SJHNCCT709**	Practical Cyber Security for Cyber Security Practitioners / MOOC	3	0	0	40	60	3	3
Total									**15**	**15**