Program	Vocational				
Year	I	**Semester**	I		
Course Name	Cyber Security				
Code	NVC11131				
Course Type	VC	**L**	**T**	**P**	**Credit**
Pre-Requisite		2	0	0	2
Course Objectives	This vocational course covers fundamental and advance topics, including network security, cryptography, web application security, incident response, threat intelligence, system hardening, ethical hacking, cloud security, and ethical aspects. Students will gain the knowledge and skills needed to mitigate threats, implement security measures, and adhere to legal/ethical standards.				
Course Outcomes					
CO1	Develop the ability to identify and mitigate cybersecurity threats by analyzing network architectures, securing web applications, responding to security incidents, and adhering to legal and ethical considerations.				
CO2	Apply advance cybersecurity techniques by conducting threat intelligence analysis, implementing network and system hardening measures, performing ethical hacking and penetration testing, and securing cloud environments to protect sensitive data.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction to Cybersecurity**: Definition of cybersecurity, Importance of cybersecurity in the digital age, Common cyber threats and attacks, **Network Security Fundamentals**: Network architecture and protocols, Firewall and Intrusion Detection Systems (IDS), Virtual Private Networks (VPNs), **Operating System Security**: Security features and vulnerabilities of popular operating systems, User access controls and permissions, Patch management and system updates, **Cryptography and Encryption:** Basics of encryption and decryption, Symmetric and asymmetric encryption algorithms, Public-key infrastructure (PKI) and digital certificates, **Web Application Security:** Common vulnerabilities in web applications (e.g., SQL injection, cross-site scripting), Secure coding practices, Web application firewalls (WAF) and secure development frameworks, **Incident Response and Disaster Recovery:** Incident response lifecycle, Incident detection, analysis, and containment, Business continuity planning and disaster recovery strategies.	15	CO1
2	**Threat Intelligence and Cyber Threat Hunting:** Gathering and analyzing threat intelligence**,** Cyber threat hunting methodologies, Security Information and Event Management (SIEM) tools, **Network and System Hardening:** Défense-in-depth strategy, Secure configuration of network devices, Security baselines and secure system hardening techniques, **Ethical Hacking and Penetration Testing:** Introduction to ethical hacking, Penetration testing methodologies (e.g., reconnaissance, vulnerability assessment, exploitation), Reporting and remediation of vulnerabilities, **Cloud Security:** Introduction to cloud computing models (e.g., IaaS, PaaS, SaaS), Cloud security challenges and best practices, Identity and access management in the cloud, **Mobile and IoT Security:** Security risks and challenges in mobile and IoT devices, Mobile app security and secure coding practices, Securing IoT networks and devices, **Legal and Ethical Aspects**	15	CO2

	of Cybersecurity: Cybersecurity laws and regulations, Privacy and data protection, Ethical considerations in cybersecurity practices.		

Suggested Readings

1. Wm. Arthur Conklin, Gregory White, Chuck Cothren, Roger L. Davis, and Dwayne Williams, "Principles of Computer Security: CompTIA Security+ and Beyond," 4th Edition, Pearson, 2018.
2. Charlie Kaufman, Radia Perlman, and Mike Speciner, "Network Security: Private Communication in a Public World," 2nd Edition, Pearson, 2002.
3. William Stallings, "Cryptography and Network Security: Principles and Practice," 8th Edition, Pearson, 2020.
4. Dafydd Stuttard and Marcus Pinto, "The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws," 2nd Edition, Wiley, 2011.
5. Jason T. Luttgens, Matthew Pepe, and Kevin Mandia, "Incident Response & Computer Forensics," 3rd Edition, McGraw-Hill Education, 2018.

Online Resources

1. https://onlinecourses.nptel.ac.in/noc23_cs127/preview
2. https://onlinecourses.swayam2.ac.in/nou19_cs08/preview

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2	1	2	2	1				1			2	2
CO2	2	2	2	2	2	1	1		1	2	1	1	2	2

Program	Vocational				
Year	I	**Semester**	II		
Course Name	E-Governance				
Code	NVC12131				
Course Type	VC	**L**	**T**	**P**	**Credit**
Pre-Requisite		2	0	0	2
Course Objectives	The course aims to provide students with the comprehensive understanding of the concept of E-Governance including its importance, technologies, models and about scope of E-Governance in the State through various sectors and services.				
Course Outcomes					
CO1	Understanding of the principles and practices of e-governance, including the role of technology in government decision-making and service delivery.				
CO2	Awareness and management of data warehouses and data centers.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Overview of E-Governance, Models and its Infrastructure:** Introduction to E-Governance: Needs and Issues in E-Governance applications, Digital Divide; Evolution of E-Governance, its scope and content; Present global trends of growth in E-Governance; E-Governance Models: Broadcasting/Wider Dissemination Model, Critical Flow Model, Comparative Analysis Model, Mobilization and Lobbying Model, Interactive-Service Model / Government-to-Citizen-to-Government Model (G2C2G), E-governance Maturity Model; Evolution in E-Governance, and Maturity Models: Five Maturity Levels; Characteristics of Maturity Levels; Towards Good Governance through E-Governance Models. **E-Governance Infrastructure, Strategies** E-readiness: Digital System Infrastructure, Legal Infrastructural Preparedness, Institutional Infrastructural Preparedness, Human Infrastructural Preparedness, Technological Infrastructural Preparedness; Evolutionary Stages in E-Governance;	15	CO1
2	**Applications of Data Mining in E-Governance:** Introduction of Data warehousing and Data mining in E- Governance; National Data Warehouses: Census Data, Prices of Essential Commodities, Agriculture, Rural Development, Health, Planning, Education, Commerce and Trade. **Case Studies of E-Governance in Indian perspective** NICNET-Role of Nationwide Networking in Governance Smart, Nagarpalika-Computerization of Urban Local Bodies (Municipalities), Ekal Seva Kendra, Aadhar, E-Suvidha, Bhulekh.	15	CO2

Suggested Readings

1. C.S.R. Prabhu, "E-Governance: Concepts and Case Studies", Prentice-Hall of India Private Limited, 2004.
2. N. Gopalsamy, "Information Technology & e-Governance", New Age Publication, First Edition 2009.
3. Backus, Michiel, "e-Governance in Developing Countries", IICD Research Brief, No. 1, March 2001.
4. Subhash Bhatnagar, "Unlocking E-Government Potential: Concepts, Cases and Practical Insights", SAGE Publications India Pvt. Ltd.

Online Resources

1. https://archive.nptel.ac.in/courses/129/106/129106001/
2. https://onlinecourses.nptel.ac.in/noc22_lw01/preview

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1			1		2	1	2	2	1	1	1			1
CO2	1		1	1	2	1	2		2		1		1	1

Program	Vocational				
Year	II	**Semester**		III	
Course Name	Blockchain Technology				
Code	NVC13231				
Course Type	VC	**L**	**T**	**P**	**Credit**
Pre-Requisite		2	0	0	2
Course Objectives	The objective of this course is to provide conceptual understanding of blockchain technology and its applications.				
Course Outcomes					
CO1	Understand the concept, Features, Tiers, and Types of Blockchain.				
CO2	Understand the application areas of Blockchain Technology and working of Bitcoin.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction**: Introduction to Blockchain Technology, Origin and History, Growth of Blockchain Technology, Distributed System. **Definition and Terminology:** Definition of Blockchain, peer-to-peer, distributed ledger, cryptographically secure, append only and update via consensus. **Blockchain:** Generic elements of a blockchain, working and accumulation of blocks, Benefits, and limitations of blockchain. Tiers and features of blockchain, Types of blockchain, ledger, distributed ledger, Distributed Ledger Technology, Consensus, CAP theorem and blockchain, **Decentralization using blockchain:** Methods, Intermediation, contest driven decentralization.	15	CO1
2	**Blockchain Technology Use Cases:** Financial Services, Multinational Policy Management, Government Sector, Supply Chain Management, Health Care, Hyperledger. **Introduction to Bitcoin:** Bitcoin definition, Digital Keys, Transactions, Structure of Blockchain, Mining Tasks, Bitcoin network Wallets, Bitcoin payments.	15	CO2

Suggested Readings

1. Imran Bashir, "Mastering Blockchain", second edition, packt 2018.
2. Manav Gupta, "Blockchain for dummies", 2nd IBM Limited Edition, Wiley 2018.

Online Resources

1. https://onlinecourses.nptel.ac.in/noc22_cs44/preview
2. https://youtube.com/playlist?list=PLbRMhDVUMngfxxyVLh2t2gKDUfsOdGn56

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	1	1	1	1	2		2			3	2	2	2
CO2	2		1	1	1	2		3			3	2	2	2

Program	Vocational				
Year	II	**Semester**		IV	
Course Name	Mobile Application Development				
Code	NVC14231				
Course Type	VC	**L**	**T**	**P**	**Credit**
Pre-Requisite		2	0	0	2
Course Objectives	To facilitate students to understand android SDK and gain a basic understanding of Android application development with working knowledge of Android Studio development tool				
Course Outcomes					
CO1	Understanding of mobile computing and anatomy of android application.				
CO2	Design basic user interface using common API.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction to Mobile Computing** – Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols – SDMA- TDMA- FDMA- CDMA. **Introduction to Android:** The Android Platform, Android SDK, Eclipse Installation, Android Installation, Understanding Anatomy of Android Application, Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest file and its common settings, Using Intent Filter, Permissions.	15	CO1
2	**Android User Interface Design Essentials:** User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation. **Using Common Android APIs:** Using Android Data and Storage APIs, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World, Publishing Android application.	15	CO2

Suggested Readings

1. Hortan, John "Android Programming for Beginners" Packet Publication,2015.
2. Dixit, Prasanna Kumar "Android" Vikash Publication New Delhi 2014.
3. Dr. Madhu Goel, Chetna Sharma, ER. SHOBHIT "Mobile Application Development “ISHAN PUBLICATIONS 2020.
4. Dr. P. Rizwan Ahmed" Mobile Applications Development" Margham Publication 2020.
5. V.S. Bagad "Mobile Application Development" Technical Publications 2023.

Online Resources

1. https://archive.nptel.ac.in/courses/106/106/106106156/
2. https://onlinecourses.swayam2.ac.in/nou21_ge41/preview

Course Articulation Matrix

PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1			2	1	2					1	1	
CO2	2	1	2	2	3	2	2		1	1		2	1	