Savitribai Phule Pune University, Pune First year of MCA (2020 Course) 310916: Elective I (Cyber Security)		
Teaching Scheme: TH: 03 Hours/Week	Credit 03	Examination Scheme: Internal: 30 Marks External : 70 Marks

Prerequisites: if any: NA

Course Objectives:
- To prepare students with the technical knowledge and skills needed to protect and defend computer systems and networks.
- To develop students that can plan, implement, and monitor cyber security mechanisms to help ensure the protection of information technology assets.
- To develop graduates that can identify, analyze, and remediate computer security breaches

Course Outcomes:
On completion of the course, learner will be able to–
CO1: Analyze and evaluate the cyber security needs of an organization.
CO2: Conduct a cyber security risk assessment.
CO3: Measure the performance and troubleshoot cyber security systems.
CO4: Implement cyber security solutions.
CO5: Be able to study cyber security, information assurance, and cyber/computer forensics software/tools.
CO6: Identify the key cyber security vendors in the marketplace.

Course Contents		
Unit I	**Overview of Cyber Security**	**06 Hours**
Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.		
Unit II	**Vulnerabilities and Access Control**	**06 Hours**
Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.		
Unit III	**Intrusion detection and Prevention**	**06 Hours**
Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.		
Unit IV	**Cryptography**	**06 Hours**
Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.		
Unit V	**Roles and Regulations**	**06 Hours**
Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.		

Unit VI	Cyber Forensics	06 Hours

Introduction to Cyber Forensics, Handling Preliminary Investigations, Controlling an Investigation, Conducting disk-based analysis, Investigating Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time.

Learning Resources:

Text Books:
 1.The Hacker Playbook: Practical Guide To Penetration Testing – @Peter Kim.
 2.Applied Network Security Monitoring: Collection, Detection, and Analysis – @Chris Sanders, @Jason Smith.

Reference Books:
 1. Network Security Through Data Analysis: Building Situational Awareness – Michael Collins.

e-Books: <web links>
 1. https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf
 2. http://larose.staff.ub.ac.id/files/2011/12/Cyber-Criminology-Exploring-Internet-Crimes-and-Criminal-Behavior.pdf
 3. http://docshare04.docshare.tips/files/21900/219006870.pdf

MOOC Courses: <web links>
 1. https://swayam.gov.in/nd2_cec20_cs15/preview