E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with 'A' Grade | Accredited by NBA (CSE, EEE, MECH)

NAGAPATTINAM – 611 002

M.E. COMPUTER SCIENCE AND ENGINEERING

Full Time Curriculum and Syllabus

Second Year – Third Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1703CP004	**Elective III** - Cloud Computing	3	3	0	3	40	60	100
1703CP010	**Elective IV** - Network And Information Security	3	0	0	3	40	60	100
1703CO036	**Elective V** - Network Engineering And Management	3	0	0	3	40	60	100
Laboratory Course								
1704CP301	Project Work Phase-I	0	0	12	6	50	50	100
Open Electives								
1703CP017	Embedded Software Development	3	0	0	3	40	60	100
1703CP026	Design And Management Of Computer Networks	3	0	0	3	40	60	100
1703CP027	Design And Analysis Of Parallel Algorithms	3	0	0	3	40	60	100
1703CP028	Research Methodology	3	0	0	3	40	60	100

L – Lecture | T – Tutorial | P – Practical | C – Credit | CA – Continuous Assessment | ES – End Semester

1703CP004	CLOUD COMPUTING	L	T	P	C
		3	0	0	3

PREREQUISITE :

1. Distributed Systems
2. Grid and Cloud Computing

COURSE OBJECTIVES:

1. To introduce the broad perceptive of cloud architecture and model.
2. To understand the concept of Virtualization.
3. To be familiar with the lead players in cloud.

UNIT I CLOUD ARCHITECTURE AND MODEL 9 Hours

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models: - Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT II VIRTUALIZATION 9 Hours

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

UNIT III CLOUD INFRASTRUCTURE 9 Hours

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT IV PROGRAMMING MODEL 9 Hours

Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim

UNIT V SECURITY IN THE CLOUD 9 Hours

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

1. Cloud Technologies
2. Advanced Multiprocessors

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1 Compare the strengths and limitations of cloud computing
CO2 Identify the architecture, infrastructure and delivery models of cloud computing
CO3 Apply suitable virtualization concept.
CO4 Write programming paradigms
CO5 Handle cloud resource management

REFERENCES:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
4. Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India, 2011.

1703CP010	NETWORK AND INFORMATION SECURITY	L	T	P	C
		3	0	0	3

PREREQUISITE :

1. Cryptography and Network Security
2. Security in Computing

COURSE OBJECTIVES:

1. To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity
2. To understand the various key distribution and management schemes
3. To understand how to deploy encryption techniques to secure data in transit across data networks

UNIT I INTRODUCTION **9 Hours**

An Overview of Computer Security-Security Services-Security Mechanisms-Security Attacks- Access Control Matrix, Policy-Security policies, Confidentiality policies, Integrity policies and Hybrid policies.

UNIT II CRYPTOSYSTEMS & AUTHENTICATION **9 Hours**

Classical Cryptography-Substitution Ciphers-permutation Ciphers-Block Ciphers-DES- Modes of Operation-AES-Linear Cryptanalysis, Differential Cryptanalysis- Hash Function - SHA 512- Message Authentication Codes-HMAC - Authentication Protocols.

UNIT III PUBLIC KEY CRYPTOSYSTEMS **9 Hours**

Introduction to Public key Cryptography- Number theory- The RSA Cryptosystem and Factoring Integer-Attacks on RSA-The ELGamal Cryptosystem- Digital Signature Algorithm-Finite Fields- Elliptic Curves Cryptography- Key management – Session and Interchange keys, Key exchange and generation-PKI.

UNIT IV SYSTEM IMPLEMENTATION **9 Hours**

Design Principles, Representing Identity, Access Control Mechanisms, Information Flow and Confinement Problem

Secure Software Development: Secured Coding - OWASP/SANS Top Vulnerabilities – Buffer Overflows - Incomplete mediation - XSS - Anti Cross Site Scripting Libraries - Canonical Data Format - Command Injection - Redirection - Inference – Application Controls.

UNIT V NETWORK SECURITY **9 Hours**

Secret Sharing Schemes-Kerberos- Pretty Good Privacy (PGP)-Secure Socket Layer (SSL)- Intruders – HIDS-NIDS - Firewalls – Viruses.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

1. Security Technologies
2. Protocol implementation

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

- CO1 Implement basic security algorithms required by any computing system.
- CO2 Analyze the vulnerabilities in any computing system and hence be able to design a security solution
- CO3 Analyze the possible security attacks in complex real time systems and their effective countermeasures
- CO4 Identify the security issues in the network and resolve it.
- CO5 Formulate research problems in the computer security field

REFERENCES:

1. William Stallings, “Cryptography and Network Security: Principles and Practices”, Third Edition, Pearson Education, 2006.
2. Matt Bishop ,“Computer Security art and science ”, Second Edition, Pearson Education, 2002.
3. Wade Trappe and Lawrence C. Washington, “Introduction to Cryptography with Coding Theory” Second Edition, Pearson Education, 2007.
4. Jonathan Katz, and Yehuda Lindell, Introduction to Modern Cryptography, CRC Press, 2007.
5. Douglas R. Stinson, “Cryptography Theory and Practice”, Third Edition, Chapman & Hall/CRC, 2006.

1703CO036 NETWORK ENGINEERING AND MANAGEMENT L T P C
3 0 0 3

PREREQUISITE :

1. Wireless Networks
2. Ad hoc and Sensors Networks

COURSE OBJECTIVES:

1. To understand the need for interoperable network management
2. To learn to the concepts and architecture behind standards based network management
3. To understand the concepts and terminology associated with SNMP and TMN
4. To understand network management as a typical distributed application
5. To study the current trends in network management technologies

UNIT I FUNDAMENTALS OF COMPUTER NETWORK TECHNOLOGY 9 Hours

Network Topology, LAN, Network node components- Hubs, Bridges, Routers, Gateways, Switches, WAN, ISDN Transmission Technology, Communications protocols and standards. Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network

UNIT II OSI NETWORK MANAGEMENT 9 Hours

OSI Network management model-Organizational model-Information model, communication model. Abstract Syntax Notation - Encoding structure, Macros Functional model CMIP/CMIS.

UNIT III INTERNET MANAGEMENT(SNMP) 9 Hours

SNMP(V1 and V2)-Organizational model-System Overview, The information model, communication model-Functional model, SNMP proxy server, Management information, protocol remote monitoring- , RMON SMI and MIB, RMON1,RMON2 - A Case Study of Internet Traffic Using RMON.

UNIT IV BROADBAND NETWORK MANAGEMENT 9 Hours

Broadband networks and services, ATM Technology-VP,VC, ATM Packet, Integrated service, ATMLAN emulation, Virtual LAN. ATM Network Management-ATM Network reference model, integrated local management Interface.ATM Management Information base, Role of SNMD and ILMI in ATM Management, M1, M2, M3, M4Interface. ATM Digital Exchange Interface Management- , TMN conceptual Model- TM Architecture, TMN Management Service Architecture

UNIT V NETWORK MANAGEMENT APPLICATIONS 9 Hours

Configuration management, Fault management, performance management, Event Correlation Techniques security Management, Accounting management, Report Management, Policy Based Management Service Level Management- Network Management Tools, Network Statistics Measurement Systems – Web Based Management, XML Based Network Management - : Future Directions.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

1. Broadband implementing technologies
2. Communication networks

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1 Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.
CO2 Apply network management standards to manage practical networks.
CO3 Formulate possible approaches for managing OSI network model.
CO4 Use on SNMP for managing the network
CO5 Use RMON for monitoring the behavior of the network

REFERENCES:

1. Mani Subramanian, “Network Management Principles and practice ", Pearson Education, New Delhi, 2010..
2. William Stallings, , “SNMP, SNMPv2, SNMPv3, and RMON 1 and 2,” Pearson Education,2012
3. Salah Aiidarous, Thomas Plevayk, “Telecommunications Network Management Technologies and Implementations ", eastern Economy Edition IEEE press, New Delhi, 1998.
4. Lakshmi G. Raman, “Fundamentals of Telecommunication Network Management ", Eastern Economy Edition IEEE Press, New Delhi, 1999.