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, IT, CIVIL, ECE)

NAGAPATTINAM – 611 002

B.TECH INFORMATION TECHNOLOGY

Fourth Year – Seventh Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1701MGX01	Professional Ethics	3	0	0	3	40	60	100
1702IT701	Data Analytics	3	2	0	4	40	60	100
1702IT702	Security in Computing	3	0	2	4	50	50	100
1702IT703	Cloud Infrastructure and Computing	3	0	2	4	50	50	100
1703IT015	Information Management (Elective 5)	3	0	0	3	40	60	100
1703ED001 / 1703ME027 / 1703CE035	Open Elective (Elective 6): Start Up Entrepreneurship / Universal Human Values and Ethics / Industrial Pollution, Prevention and Control	3	0	0	3	40	60	100
Laboratory Course								
1704IT751	Software Development (Mini Project III)	0	0	2	1	50	50	100
1704GE751	Life Skills: Competitive Exam Preparation	2	0	0	2	100	-	100
1704IT752	In Plant / Internship Training Presentation	0	0	0	1	100	0	100
	Total	20	2	6	25	510	390	900

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

1701MGX01	PROFESSIONAL ETHICS	L	T	P	C
		3	0	0	3

PREREQUISITE:

1. Basic understanding of business management
2. Basic understanding of human values

COURSE OBJECTIVES:

1. To provide basic knowledge about engineering Ethics, Variety of moral issues and Moral dilemmas, Professional Ideals and Virtues
2. To provide basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards, Exposure to Safety and Risk, Risk Benefit Analysis
3. To have an idea about the Collegiality and Loyalty, Collective Bargaining, Confidentiality, Occupational Crime, Professional, Employee, Intellectual Property Rights
4. To have an adequate knowledge about MNC‟s, Business, Environmental, Computer Ethics, Honesty, Moral Leadership, sample Code of Conduct.
5. To use the engineering principles to update and maintain the technical skills.

UNIT I ENGINEERING ETHICS **9 Hours**

Senses of „Engineering Ethics‟ – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg‟s theory – Gilligan‟s theory – Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories.

UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION **9 Hours**

Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study.

UNIT III ENGINEER'S RESPONSIBILITY FOR SAFETY **9 Hours**

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk – The Government Regulator‟s Approach to Risk - Case Studies on Chernobyl, Bhopal MIC and Sterlite copper.

UNIT IV RESPONSIBILITIES AND RIGHTS **9 Hours**

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

UNIT V GLOBAL ISSUES **9 Hours**

Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics - Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty – Moral Leadership – Sample Code of Conduct.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR:

1. Case study on Hiroshima and Nagasaki

COURSE OUTCOMES:

At the end of this course, Students will be able to,

CO1: Articulate engineering ethics theory with sustained lifelong learning to strengthen autonomous engineering decisions.

CO2: Fortify the competency with facts and evidences to responsibly confront moral issues raised by technological activities, and serve in responsible positions of leadership.

CO3: Contribute to shape a better world by taking responsible and ethical actions to improve the environment and the lives of world community.

CO4: Be an example of faith, character and high professional ethics, and cherish the workplace responsibilities, rights of others, public's welfare, health and safety.

CO5: Be Proficient in analytical abilities for moral problem solving in engineering situations through exploration and assessment of ethical problems supported by established experiments.

REFERENCES:

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 1999.
2. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, 2003
3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, 2001.
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics – An Indian Perspective", Biztantra, New Delhi 2004

5. David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press, (2003)
6. Nptel link: https://nptel.ac.in/courses/109/106/109106117/

1702IT701 DATA ANALYTICS L T P C
3 2 0 4

AIM: The main objective of this course is to provide practical foundation level training that enables immediate and effective participation in big data and other Analytic projects

PREREQUISITES: Data warehouse and Data mining

COURSE OBJECTIVES:

1. Deploying the Data Analytics lifecycle to address big data analytics projects.
2. Reframing a business challenge as an analytics challenge
3. Applying appropriate analytic techniques and tools to analyze big data.
4. Selecting appropriate data visualizations to clearly communicate analytic insights to business sponsors and analytic audiences.
5. Using tools such as: R and R-Studio, Map Reduce /Hadoop in database analytics.

UNIT I INTRODUCTION 12 Hours

Introduction to Data Science – Data Classification – Data Analytics - Big data overview – characteristics of Big data – the practice of analytics – the role and required skills of data scientist..

UNIT II DATA ANALYTICS LIFECYCLE 12 Hours

Discovery – Data preparation – model planning and building – communicating results – operation alizing a data analytics project.

UNIT III DATA ANALYTICS METHOD USING R 12 Hours

Introduction to R - Using basic R commands to analyze data – statistical measures and visualization to understand data – Practical: RStudio basic commands.

UNIT IV MAP REDUCE AND ITS FRAMEWORK 12 Hours

Introduction to Map Reduce – Hadoop ecosystems – SQL OLAP extensions, windows functions, user defined functions and aggregates – MADlib.

UNIT V ADVANCED DATA ANALYTICS 12 Hours

Classification and prediction technique using R – Time Series analysis – Text Analytics - clustering and association technique using R – web mining – graph mining

TOTAL: 60 Hours

FURTHER READING Deep Learning, Augmented Learning

COURSE OUTCOMES:

At the end of this course, Students will be able to

CO1: Explain the roles of Big data Analytics
CO2: Illustrate Hadoop Distributed File System and its components
CO3: Use data analytics tools to solve Map and reduce problems
CO4: Construct different format of data model using map reduce split up functions
CO5: Use various Streaming tools in Big Data Analytics problems

REFERENCES:

1. ICTACT "Data science and big data analytics ", EMC2 edition 2016
2. Noreen Burlingame, Little Book of Big Data‖ Kindle Edition.2015
3. Tom White, Hadoop the definitive Guide‖, O'Reilly Media yahoo Press, 2nd Edition,2012
4. Alex Holmas, Hadoop in Practice‖, Manning Publications, 2012.
5. https://www.openstack.org/
6. http://nptel.ac.in

1702IT702	SECURITY IN COMPUTING	L	T	P	C
		3	0	2	4

PREREQUISITE:

Computer Networks, Java Programming

COURSE OBJECTIVES:

1. Understand the concepts of public key encryption and number theory
2. Understand authentication and hash functions.
3. Know the network security tools and applications.
4. Understand the system level security used.

UNIT I INTRODUCTION **9 Hours**

Motivating examples– Basic concepts: confidentiality, integrity, availability, security policies, security mechanisms, assurance –Basic Cryptography: Historical background, –Elementary Ciphers (Substitution, Transposition and their Properties) –Caesar Cipher– Data Encryption Standard – Block Cipher Design Principles and Modes of Operation – Case study: AES.

UNIT II PUBLIC KEY CRYPTOGRAPHY **9 Hours**

Euclidean algorithm –Euler Theorem– Fermat Theorem– Totent functions– multiplicative and additive inverse – Selection of public and private keys–Case Study: Diffie-Hellman key Exchange – Elliptic Curve Architecture and Cryptography - Introduction to Number Theory – Confidentiality using Symmetric Encryption – Public Key Cryptography – Case Study: RSA.

UNIT III AUTHENTICATION AND HASH FUNCTION **9 Hours**

Security Handshake pitfalls–Online vs. offline password guessing–Reflection attacks Per-session keys and authentication tickets–Key distribution centers and certificate authorities Authentication requirements – Authentication functions – Message Authentication Codes– Hash Functions – Case Study: MD5, HMAC.

UNIT IV NETWORK SECURITY AND FIREWALLS **9 Hours**

Public Key infrastructures– IPSec - IKE– SSL/TLS - Authentication Application: X.509 Authentication Service – Electronic Mail Security – PGP – S/MIME - IP Security – Web Security – Kerberos - Packet filters– Application level gateways– Encrypted tunnels.

UNIT V HACKING **9 Hours**

Introduction to Hacking – Hacking Process – Foot printing – System Hacking – Trojan Horses – Ethical Hacking – Attacks and Countermeasures.

LIST OF EXPERIMENTS: **15 Hours**

1. Implement the following Substitution & Transposition Techniques concepts
2. Implement the following algorithms a) DES b) RSA Algorithm c) Diffie-Hellman d) MD5 e) SHA-1
3. 3 Implement the Signature Scheme - Digital Signature Standard
4. Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG).
5. Setup a honey pot and monitor the Honeypot on network (KF Sensor)
6. Installation of Rootkits and study about the variety of options
7. Perform wireless audit on an access point or a router and decrypt WEP and WPA.(Net Stumbler)
8. Demonstrate intrusion detection system (IDS) using any tool (snort or any other s/w)
9. Apply different hacking techniques and counter measures to solve various problems

SOFTWARE REQUIREMENTS: Java Compiler, GnuPG, KF Sensor or Equivalent, Snort, Net Stumbler or Equivalent

TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

1. Cyber Forensics, Security Management issues

COURSE OUTCOMES:

After the end of this course, student will be able to.

CO1: Explain concepts related to applied cryptography, including symmetric cryptography, asymmetric cryptography, and digital signatures

CO2: Understand the theory behind the security of different cryptographic algorithms.

CO3: Understand common network vulnerabilities, defense mechanisms against network attacks, and

cryptographic protection mechanisms.

CO4: Apply the requirements of non-real time security (email security) and ways to provide privacy, source authentication, message integrity, non-repudiation, proof of submission, proof of delivery, message flow confidentiality, and anonymity

REFERENCES:

1. William Stallings, "Cryptography and Network Security – Principles and Practices", Pearson Education, Third Edition, 2016
2. Charlie Kaufman, Radia Perlman, and Mike Speciner, " Network Security: PRIVATE Communication in a PUBLIC World", Prentice Hall, ISBN 0-13-046019-2, 2017
3. Behrouz A. Foruzan, "Cryptography and Network Security", Tata McGraw-Hill, 2013
4. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2013.
5. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education, 2012
6. Wade Trappe and Lawrence C. Washington , " Introduction to Cryptography withcoding theory" , Pearson Education, 2012.
7. Thomas Calabrese, "Information Security Intelligence : Cryptographic Principles andApplications", Thomson Delmar Learning,2012.
8. http://nptel.ac.in//

1703IT703 CLOUD INFRASTRUCTURE AND COMPUTING

L	T	P	C
3	0	2	4

PREREQUISITE:

1. Distributed Computing
2. Data Mining and Data Warehousing

COURSE OBJECTIVES:

1. Introduce the broad perceptive of cloud architecture and model
2. Understand the concept of Virtualization
3. Be familiar with the lead players in cloud.
4. Apply different cloud programming mode as per need
5. Understand the design of cloud Services.

UNIT I CLOUD ARCHITECTURE AND GRID SERVICE MODEL 9 Hours

Technologies for Network-Based System – System Models for Distributed and Cloud Computing Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS)– OGSA architecture.

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 - Virtualization for Data-center Automation.

UNIT III CLOUD INFRASTRUCTURE 9 Hours

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

UNIT IV PROGRAMMING MODEL 9 Hours

Globus Toolkit (GT4) Architecture – MapReduce, – Hadoop Library from Apache - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula. OpenStack.

UNIT V SECURITY IN THE CLOUD 9 Hours

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

LIST OF EXPERIMENTS: 15 Hours

1. Introduction to cloud computing.
2. Creating a Warehouse Application in SalesForce.com.
3. Implementation of Para-Virtualization using VM Ware,,s Workstation/ Guest O.S.
4. Installation and Configuration of Hadoop.
5. Create an application (Ex: Word Count) using Hadoop Map/Reduce.
6. Securing Servers in Cloud.
7. Case Study: PAAS(Facebook, Google App Engine), Amazon Web Services.

TOTAL: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

1. Cyber Forensics, Security Management issues

COURSE OUTCOMES:

After the end of this course, student will be able to.

CO1: Develop different Cloud Computing architecture, infrastructure and delivery models using cloud services

CO2: Build different virtual machines using their types, tools and operations at storage, network and compute levels

CO3: Deploy various virtual machines using various cloud platforms

CO4: Deploy various programming model to implement cloud infrastructure and platform

CO5: Design a real time cloud models using cloud security services

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, 2016.
2. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2012.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2013.
4. Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India, 2011.
5. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly, 2015
6. Katarina Stanoevska-Slabeva, Thomas Wozniak, Santi Ristol, "Grid and Cloud Computing – A Business Perspective on Technology and Applications", Springer, 2015
7. Rajkumar Buyya, Christian Vecchiola, S.TamaraiSelvi, „Mastering Cloud Computing", TMGH, 2014.
8. http://nptel.ac.in//

1704IT751	SOFTWARE DEVELOPMENT (MINI PROJECT III)	L	T	P	C
		0	0	2	1

PREREQUISITE :

1. CASE Tools
2. Application Development (Web and Mobile Apps)
3. Software Engineering and Project Management

COURSE OBJECTIVES:

1. To develop knowledge to formulate a real world problem and project's goals.
2. To identify the various tasks of the project to determine standard procedures.
3. To identify and learn new tools, algorithms and techniques.
4. To understand the various procedures for validation of the product and analysis the cost effectiveness.
5. To understand the guideline to Prepare report for oral demonstrations.

TO DEVELOP A MINI-PROJECT USING FOLLOWING PROBLEM STATEMENTS AND PROJECT SELECTION BASED ON REAL TIME AND SOCIAL ISSUES

1. Automation Anywhere
2. Inventory Control
3. Course Registration
4. Online Mentoring
5. Web Crawling and App development
6. Data Centre and Virtualization
7. Cyber Security in Information and Communication Engineering
8. Online Token Passing Systems
9. Course Assessment and Attainment Processing Systems
10. MOOC and Online Learning platforms

Not limited too.

Course Outcomes:

At the end of this course, students will be able to,

CO1: Formulate a real world problem, identify the requirement and develop the design solutions.
CO2: Express the technical ideas, strategies and methodologies.
CO3: Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
CO4: Test and validate through conformance of the developed prototype and analysis the cost effectiveness.
CO5: Prepare report and present the oral demonstrations.

TOTAL:45 HOURS

1704GE751	LIFE SKILLS: COMPETITIVE EXAM PREPARATION	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:

1. Study the concepts of data structures, algorithms and computer architecture.
2. Study the process and implementation of Operating systems and design of compilers.
3. Familiar with the database and network concepts

Data Structures: Recursion. Arrays, Stacks, Queues, Linked lists, Trees, Graphs

Algorithms: Searching – Sorting - Asymptotic worst case time and space complexity – Greedy – Divide & Conquer – Dynamic Programming

Computer Organization: Machine instructions - Addressing modes - Hazards – Pipelining - Memory hierarchy - I/O interface

Operating System: Processes – Threads - Inter-process communication - Concurrency and synchronization – Deadlock - CPU scheduling - Memory management and virtual memory - File systems

Databases: ER-model - Relational model: Relational algebra, Tuple Calculus - SQL - Integrity constraints -Normal forms -Transactions and concurrency control

Computer Networks: Layering – Categories – Topology - Flow and Error control techniques – Switching - IPv4/IPv6 - Routing - TCP – UDP - Application layer protocols – Bluetooth - Wi-Fi - Network security – Firewalls - Digital signatures and certificates.

Compiler Design: Theory of Computation - Lexical analysis, parsing, syntax directed translation - Runtime environments - Intermediate code generation

Total: 30 Hours

ASSESSMENT PATTERN :

Marks (Continuous Assessment Only)

Test I 25
Test II 25
Final Examination 50

Total Marks 100

COURSE OUTCOMES:

At the end of this course, students will be able to,

CO1: Explore the concepts of data structures, algorithms and computer architecture.
CO2: Elucidate the concepts of operating systems and designing compilers.
CO3: Explain the concepts of networks and manage databases

REFERENCES:

1. M.A.Weiss, Data Structures and Algorithm Analysis in C, Pearson Education Asia, 2015.
2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, McGraw-Hill, Third Reprint 2015.
3. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne,"Operating System Principles", John Wiley & Sons (Asia) Pvt. Ltd, Ninth Edition, 2013.
4. Alfred V. Aho, Ravi Sethi and Jeffrey D. Ullman Compilers: Principles, Techniques and Tools , 2nd Edition, Pearson, 2012.
5. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, Database System Concepts , McGraw -Hill, 2015.
6. Behrouz A.Forouzan, Data Communication and Networking, 5th Edition, Tata McGraw-Hill, 2014.

1704IT754 IN PLANT / INTERNSHIP TRAINING PRESENTATION L T P C

0 0 0 1

In order to provide the experiential learning to the students, the students undergo in-plant training or internship during summer / winter vacation between III and VII semesters. A presentation based on in-plant training / internship shall be made in this semester and suitable credit may be awarded

Internal Assessment Only	
Test	40
Presentation / Quiz / Group Discussion	40
Report	20

1703IT015	**INFORMATION MANAGEMENT**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

PREREQUISITE: Distributed Computing, Cloud Computing

COURSE OBJECTIVES:

1. To expose students with the basics of managing the information
2. To explore the various aspects of database design and modeling.
3. To examine the basic issues in information governance and information integration
4. To understand the overview of information architecture

UNIT I	**DATABASE MODELLING, MANAGEMENT AND DEVELOPMENT**	**9 Hours**

Database design and modeling - Business Rules and Relationship; Java database Connectivity (JDBC), Database connection Manager, Stored Procedures. Trends in Big Data systems including NoSQL - Hadoop HDFS, Map Reduce, Hive, and enhancements.

UNIT II	**DATA SECURITY AND PRIVACY**	**9 Hours**

Program Security, Malicious code and controls against threats; OS level protection; Security – Firewalls, Network Security Intrusion detection systems. Data Privacy principles. Data Privacy Laws and compliance.

UNIT III	**INFORMATION GOVERNANCE**	**9 Hours**

Master Data Management (MDM) – Overview, Need for MDM, Privacy, regulatory requirements and compliance. Data Governance – Synchronization and data quality management

UNIT IV	**INFORMATION ARCHITECTURE**	**9 Hours**

Principles of Information architecture and framework, Organizing information, Navigation systems and Labeling systems, Conceptual design, Granularity of Content.

UNIT V	**INFORMATION LIFECYCLE MANAGEMENT**	**9 Hours**

Data retention policies; Confidential and Sensitive data handling, lifecycle management costs. Archive data using Hadoop; Testing and delivering big data applications for performance and functionality; Challenges with data administration.

TOTAL: 45 Hours

COURSE OUTCOMES

At the end of this course, students will be able to,

CO1: Cover core relational database topics including logical and physical design and modeling

CO2: Design and implement a complex information system that meets regulatory requirements; define and manage an organization's key master data entities

CO3: Design, Create and maintain data warehouses.

CO4: Learn recent advances in NoSQL , Big Data and related tools

REFERENCES:

1. Alex Berson, Larry Dubov Master Data Management and Data Governance, 2/E, Tata McGraw Hill, 2015
2. Security in Computing, 4/E, Charles P. Pfleeger, Shari Lawrence Pfleeger, Prentice Hall; 2013
3. Information Architecture for the World Wide Web; Peter Morville, Louis Rosenfeld ; O'Reilly

Media;2011
4. Jeffrey A. Hoffer, Heikki Topi, V Ramesh - Modern Database Management, 10 Edition, Pearson, 2012
5. http://nosql-database.org/ Next Gen databases that are distributed, open source and scalable.
6. http://ibm.com/big-data - Four dimensions of big data and other ebooks on Big Data Analytics
7. Inside Cyber Warfare: Mapping the Cyber Underworld- Jeffrey Carr, O'Reilly Media; Second Edition 2011
1.http://nptel.ac.in

1703MG001	TOTAL QUALITY MANAGEMENT	L	T	P	C
		3	0	0	3

AIM: The aim of this course is to address the need for skilled professionals who can contribute effectively towards Quality Management to engage the participants on contemporary issues pertaining to the management of quality in both services and manufacturing industries

COURSE OBJECTIVES:

1. To learn concepts, dimension quality and philosophies of TQM.
2. To study the TQM principles and its strategies.
3. To impart knowledge on TQM tools for continuous improvement

UNIT I	INTRODUCTION	9 Hours

Definition of Quality - Dimensions of Quality - Quality Planning - Quality costs - Analysis Techniques for Quality Costs - Basic concepts of Total Quality Management - Historical Review - Quality Statements - Strategic Planning, Deming Philosophy - Crosby philosophy - Continuous Process Improvement - Juran Trilogy, PDSA Cycle, 5S, Kaizen - Obstacles to TQM Implementation

UNIT II	TQM PRINCIPLES	9 Hours

Principles of TQM, Leadership - Concepts - Role of Senior Management - Quality Council, Customer satisfaction - Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement - Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits - Supplier Partnership - Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures - Basic Concepts, Strategy, Performance Measure.

UNIT III	STATISTICAL PROCESS CONTROL (SPC)	9 Hours

The seven tools of quality - Statistical Fundamentals - Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables X bar and R chart and attributes P, NP, C, and u charts, Industrial Examples, Process capability, Concept of six sigma - New seven Management tools

UNIT IV	TQM TOOLS	9 Hours

Benchmarking - Reasons to Benchmark - Benchmarking Process, Quality Function Deployment (QFD)- House of Quality, QFD Process, and Benefits - Taguchi Quality Loss Function - Total Productive Maintenance (TPM) - Concept, Improvement Needs, and FMEA - Stages of FMEA

UNIT V	QUALITY SYSTEMS	9 Hours

Concept, Requirements of ISO 9000 and Other Quality Systems - ISO 9000:2000 Quality System - Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO 9000:2005 and 9001:2015, ISO 14000.

TOTAL: 45 Hours

FURTHER READING: Case Study: TQM Quality and Environmental Concepts in real World Applications, Environment Management system

COURSE OUTCOMES

At the end of this course, students will be able to,

CO1: Understand the concepts, dimension quality and philosophies of TQM.

CO2: Understand the principles of TQM and its strategies.

CO3: Apply seven statistical quality and management tools

CO4: Understand TQM tools for continuous improvement.

CO5: Understand the Quality Management system

REFERENCES:

1. Dale H.Bester filed, Total Quality Management, Pearson Education Inc., New Delhi, 2003.
2. N. Gupta and B. Valarmathi, Total Quality Management, Tata McGraw-Hill Publishing Company Pvt. Ltd., New Delhi, 2009.
3. P.N. Muherjee, Total Quality Management, Prentice Hall of India, New Delhi, 2006.
4. James R. Evans and William M. Lidsay, The Management and Control of Quality, South-Western 2002.
5. S. Kumar, Total Quality Management, Laxmi Publications Ltd. New Delhi, 2006

1703IT016	DATA CENTRE AND VIRTUALIZATION	L	T	P	C
		3	0	0	3

AIM:

The main objective of this course is designed to gauge your level of skill designing, installing, and managing VMware vSphere environments in a real world environment.

PREREQUISITES: cloud computing

COURSE OBJECTIVES:

1. To understand the Compute virtualization
2. To know about the Software-defined storage in the management pod
3. Implement the Network virtualization

UNIT I	INTRODUCTION TO VIRTUALIZATION TECHNOLOGIES	9 Hours

Introduction to Virtualization – Virtual Box – Concepts and Applications - VMware workstation - VMware player

UNIT II	INTRODUCTION TO VMWARE VIRTUALIZATION	9 Hours

Introduce Virtualization - Introduce Virtual machines - Introduce vSphere components - VMware Vision Virtualization Overview - Virtualization: The Foundation of Cloud Computing - Data Center Virtualization – Introduction to Virtual Machines -Virtual Machine Capabilities

UNIT III	VMWARE ESX AND ESXI (ESX/ESXI 4.1)	9 Hours

Introduce the architecture of ESX and ESXi - Manually configure ESX/ESXi Install and configure vCenter Server components - Manage vCenter Server inventory objects - Hypervisor - ESXi Hypervisor - vSphere 6.0 - Capabilities and Benefits of vSphere 6.0

UNIT IV	COMPONENTS OF VMWARE VSPHERE	9 Hours

vSphere 6.0: Overview and Architecture - Topology of vSphere 6.0 Data Center - vSphere 6.0 Configuration Maximums - vCenter Server - vCenter Server Features - Storage Features in vSphere

UNIT V	VSPHERE SOLUTIONS TO DATA CENTER CHALLENGES	9 Hours

Availability Challenges - Scalability Challenges - Management Challenges - Optimization Challenges Application Upgrade Challenges - Cloud Challenges

	TOTAL:	45 Hours

COURSE OUTCOMES

At the end of this course, students will be able to,

CO1: Identify the need for Data Center Virtualization.

CO2: Describe the components and features of vSphere 6.0.

CO3: Explain various VMware vSphere

CO4: Describe how VMware's products help solve business and technical challenges with regard to Data Center Virtualization.

REFERENCES:

1. Brian Atkinson, "VCP5–DCV VMware Certified Professional–Data Center Virtualization on vSphere Study Guide: Exam VCP–550", Wiley; Study Guide edition, 2014
2. Nick Marshall, Grant Orchard, Josh Atwell, Scott Lowe, "Mastering VMware vSphere 6 (SYBEX)", Wiley-2015
3. **Cloud Infrastructure and Services: Virtualization and Cloud Infrastructure Technology Concepts and Principles by EMC Education Services, Emc Education Services, 2014**
4. VMware Data Centre Virtualization Foundations, VMware Education Services, VMware, Inc.2012
5. www.vmware.com/education
6. http://nptel.ac.in/

1703IT017	SOFTWARE CONFIGURATION MANAGEMENT	L	T	P	C
		3	0	0	3

AIM:

The main objective of this course is to understand the importance and the benefits of software configuration and change management.

PREREQUISITES: Software Engineering and Project Management

COURSE OBJECTIVES:

1. To learn the changing nature of software and need for change management
2. To study the different phases involved in software configuration management
3. To learn about the SCM plans, audits and reviews
4. To study the various SCM tools and implementation techniques
5. To study the SCM different scenarios and future directions

UNIT I	OVERVIEW TO SOFTWARE CONFIGURATION MANAGEMENT	9 Hours

SCM: Concepts and definitions – SCM Plan – Software development life cycle models – SDLC Phases – Need and

importance of Software configuration management – Increased complexity and demand – Changing nature of software and need for change management – Lower maintenance costs and better quality assurance – Faster problem identification and bug fixes - SCM: Basic concepts – Baselines – Check-in and Check-out- Versions and Variants – System Building – Releases		
UNIT II	**DIFFERENT PHASES OF SOFTWARE CONFIGURATION MANAGEMENT**	**9 Hours**
Different Phases Of SCM – SCM System design - SCM Plan preparation – SCM Team organization – SCM Infrastructure organization – SCM Team training – Project team training – Configuration identification – Configuration Control – Configuration status accounting – Configuration audits		
UNIT III	**CONFIGURATION AUDITS AND MANAGEMENT PLANS**	**9 Hours**
When, what and who of auditing - Functional Configuration audit – Physical Configuration audit – Auditing the SCM System – Role of SCM Team in configuration audits – SCM plan and the incremental approach – SCM Plan and SCM Tools – SCM Organization		
UNIT IV	**SOFTWARE CONFIGURATION MANAGEMENT TOOLS AND IMPLEMENTATION**	**9 Hours**
Advantages of SCM tools – Reasons for the increasing popularity of SCM tools – SCM Tools and SCM Functions – SCM tool selection – Role of Technology – Selection criteria – Tool implementation – SCM implementation plan – implementation strategy – SCM Implementation team		
UNIT V	**TRENDS IN SCM: FUTURE DIRECTIONS**	**9 Hours**
SCM in different scenarios – SCM and project size – SCM in integrated development environments – SCM In distributed environments – SCM and CASE Tools - Trends in SCM - Hardware and Software Management – Better integration with IDE'S and CASE environments – Customization – Better decision making capabilities – Reduction in SCM Team size – Market snapshot		
	TOTAL:	**45 Hours**
COURSE OUTCOMES		
At the end of this course, students will be able to, CO1: Understand the basic concepts of Software Configuration and its life cycle models CO2: Understand the different phases of Software Configuration management CO3: Explain the importance of software configuration plan and management CO4: Demonstrate the various tools for change management CO5: Analyze various trends in Software Configuration management		
REFERENCES:		
1. Jessica Keyes, Software Configuration Management, Auerbach Publications, 2015. 2. Alexis Leon, Software Configuration Management Handbook, Artech Print on Demand; 2 edition , 2016. 3. Robert Aiello and Leslie Sachs Configuration Management Best Practices: Practical Methods that work in Real World, Addison-Wesley Professional; 1 edition, 2010. 4. Stephen P. Berczuk, Brad Appleton and Kyle Brown , "Software Configuration Management Patterns: Effective Teamwork and Practical Integration", Addison-Wesley , 2013 5. http://nptel.ac.in		

1703IT018	**ENTERPRISE RESOURCE PLANNING**	**L**	**T**	**P**	**C**
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AIM: To study various ERP models, technologies and implementation strategies					
COURSE OBJECTIVES:					
1. Understand the concepts of ERP 2. Understand Business Process Reengineering and ERP related technologies. 3. Know the ERP functional modules. 4. Understand the implementation of ERP and ERP market					
UNIT I	**INTRODUCTION**				**9 Hours**
Basics of ERP – Enterprise: An overview – Paybacks & challenges – Evolution and Structure: Conceptual Model of ERP – The Evolution of ERP – The Structure of ERP.					
UNIT II	**ERP & RELATED TECHNOLOGIES**				**9 Hours**
Business Process Reengineering (BPR) – Data Warehousing and Data Mining – OLAP, Product Life Cycle Management – Supply Chain management – CRM.					
UNIT III	**ERP FUNCTIONAL MODULE**				**9 Hours**
Introduction–Finance – Manufacturing – Human Resource – Plant maintenance – Material Management – Integration of ERP – Supply Chain and Customer Relationship Application.					
UNIT IV	**ERP IMPLEMENTATION**				**9 Hours**
Implementation Challenges – ERP Implementation Strategies – ERP Implementation Life Cycle – Implementation Methodologies – ERP Projects Teams, Vendors and Consultants – Dealing with employee resistance – Training and Education – data migration – Project Management and monitoring– Post Implementation Activities					
UNIT V	**THE ERP MARKET**				**9 Hours**

ERP market place and market place dynamics – Market overview –The changing ERP market – SAP AG – Oracle – PeopleSoft – JD Edwards – Future directives in ERP
TOTAL: 45 Hours

COURSE OUTCOMES

At the end of this course, students will be able to,

CO1: Business processes including order processing, inventory management, procurement, etc.

CO2: Modeling the Process and creating diagrams to depict the sequence of tasks completed in a business process.

CO3: How a business process often spans different functional areas of the business: accounting, marketing, material management, etc.

CO4: How enterprise systems, such as SAP, integrate business functional areas into one enterprise-wide information system.

REFERENCES:

1. S. Sadagopan, " ERP managerial prospective", TMH, 2015
2. Alex Leon, " ERP Demystified", TMH, 2012
3. Rahul V. Altekar, " Enterprise wide Resource Planning", TMH, 2012
4. Vinod Kumar Garg and VenkitakrishnanN.K, " Enterprise Resource Planning Concepts and practice", PHI, 2012
5. Joseph A Brady, Ellen monk, Bret Wagner, "Concepts in Enterprise Resource Planning ", Thomson Course Technology, 2012
6. http://nptel.ac.in/