

**Third Year MCA :****Trimester VIII****Subject Code:** MCA 381**Subject:** Enterprise Applications**Lectures per week (hours)** : 3 Lectures + 1 Tutorial**Practicals per week (hours)** : 0**Internal Assessment** : 50 Marks**External Assessment** : 50 Marks**Total Credits** : 4**Prerequisite:** None**Aim:**

The course is aimed to help the student understand and appreciate the basic concepts of Enterprisewide Applications like Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Customer Relationship Management (CRM), Supplier Relationship Management (SRM), Product Life Cycle Management (PLM) and Enterprise Asset Management (EAM).

**Objectives:**

- (1) To understand the basic concept and importance of Enterprisewide Applications.
- (2) To understand the basic concepts and implementation related details of ERP.
- (3) To understand the basic concepts of SCM,CRM,SRM,PLM and EAM

<b>Unit No.</b>	<b>Topics to be Covered</b>	<b>No. of Lectures</b>	<b>Marks per Unit</b>
Unit I	<b>Introduction to Enterprisewide Applications, Introduction to ERP,</b> What is an Enterprise - Introduction to Enterprisewide Applications – Introduction to ERP – Basic ERP Concepts - Justifying ERP Investments – Risks of ERP – Benefits of ERP.	9	13
Unit II	<b>ERP Implementation I</b> Implementation Challenges - Implementation Strategies – Implementation Life Cycle – Pre-implementation Tasks – Requirements Definition – Package Selection	9	12
Unit III	<b>ERP Implementation II</b> ERP Project Teams – Vendors and Consultants – Dealing with Employee Resistance – Contracts with Vendors, Consultants, Employees – Training and Education – Data Migration – Post Implementation Activities	8	12
Unit IV	<b>Supply Chain Management, Customer Relationship</b>	10	13



# AHMEDABAD UNIVERSITY

## AES INSTITUTE OF COMPUTER STUDIES

### Master of Computer Applications (M.C.A.)

Management, Supplier Relationship Management,  
Product Life Cycle Management and Enterprise  
Asset Management

Introduction to SCM – Introduction to CRM –

Introduction to SRM – Introduction to PLM –

Introduction to EAM.

**Total**

**36**

**50**

#### Outcomes:

Upon the completion of this course, the student will be able to:

- (1) Understand and appreciate the importance of Enterprisewide applications in today's large organizations and .
- (2) Understand and appreciate the important aspects of such applications like ERP, SCM, CRM, SRM, PLM, EAM etc. with detailed knowledge of ERP Implementation.

#### Prescribed Reference Books:

- (1) ERP Demystified, Alexis Leon, Tata McGraw Hill, 2<sup>nd</sup> Edition
- (2) Supply Chain Management, Kulkarni / Sharma, TMH , 1<sup>st</sup> Edition
- (3) Customer Relationship Management, Kulkarni, Everest, 1<sup>st</sup> Edition 2009

#### Additional Reference Books:

- (1) Enterprise Resource Planning Text and Cases, Rajesh Ray, TMH, 1<sup>st</sup> Edition
- (2) Supply Chain Management Text and Cases, Janat Shah, Pearson, 1<sup>st</sup> Edition



#### Third Year MCA :

#### Trimester VIII

**Subject Code:** MCA 382

**Subject Name:** Distributed Computing and Service Oriented Architecture (SOA)

<b>Lectures per week (hours)</b>	: 3 Lectures + 1 Tutorial
<b>Practicals per week (hours)</b>	: 4
<b>Internal Assessment</b>	: 50 Marks
<b>External Assessment</b>	: 50 Theory + 50 Practical Marks
<b>Total Credits</b>	: 8

**Prerequisite:** Advanced Java

#### Aim

To learn the concepts of distributed computing and SOA and apply them in designing and developing distributed applications

#### Objectives

- To learn concepts and design of Distributed Systems and their applications
- To learn distributed object computing concepts and its implementation using Java RMI (Remote Method Invocation) platform.
- To learn basic concepts, theories, and techniques for Service-oriented computing and standards related to web services.
- To understand the Service-Oriented Architecture (SOA) and implement it in designing and developing web services using Java.

#### Course Contents:

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	<b>Introduction to Distributed Computing</b> What is a distributed system, distributed computing, evolution of different paradigms of computing, strengths and weaknesses of distributed computing, examples of distributed systems, N-tier architecture of distributed applications, Middleware, distributed computing paradigms: Message passing, Client server, Peer to peer, Message system, Remote procedure call, Distributed objects using RMI. <b>Introduction to XML</b> Introducing XML, need for XML, structure of XML document, tags, elements and attributes, XML document rules and parsers, Invalid, valid and well formed documents, Document type definitions (DTD),	7	09



	XML schemas, namespaces, XML programming interfaces, Document Object Model (DOM), Simple API for XML (SAX), Java API for XML Parsing (JAXP), XML parser, Parsing an XML Document, Validating XML Documents, Using Namespaces, Streaming Parser, Generating XML Documents, XSL Transformations		
Unit II	<b>Distributed Object Computing using RMI platform</b> Introduction to distributed object computing and RMI, Java RMI Architecture, RMI Architecture layers, parameters in RMI, RMI Garbage collection of remote objects, RMI development process, steps for installing and executing RMI Applications, Locating remote objects (Naming Service), Java RMI Naming Service, RMI Security Manager, RMI's dynamic stub loading classes, RMI scenario, Comparison of RMI and CORBA, RMI interfaces and classes, RMI-IIOP.	8	11
Unit III	<b>Service Oriented Architecture</b> Introduction to SOA, defining SOA, SOA Interaction pattern, SOA Entities, SOA characteristics, SOA standards, key principles of SOA, best practices for SOA. <b>Case Study on Business Value Propositions of SOA</b> <b>Simple Object Access Protocol (SOAP)</b> What is SOAP protocol, SOAP interaction between service request and provider, SOAP Message Structure, SOAP envelope, Structure and contents of SOAP Message, SOAP Process Model, SOAP Encoding, request, response, <b>Introduction to Web Services Description Language (WSDL)</b> Structure of WSDL, Designing and describing a web service and its functional characteristics <b>Introduction to Universal Description, Discovery and Integration (UDDI)</b> What is a registry, goals of UDDI, UDDI data structures, role of UDDI in Web services, UDDI Registry API, Interaction between SOAP, WSDL and UDDI	10	15
Unit IV	<b>Web Services</b> What is web service, need for web services, types of web services: JAX-WS (Big Web services, SOAP based) and JAX-RS (RESTful Web services), deciding which type of web service to use, service transport, service messaging, service description, service registry, service composition, application scenarios, benefits of web services <b>Java EE Web services with JAX-WS</b>	11	15



Service client programming model, service endpoint model, Creating a Simple Web Service and Clients with JAX-WS, Requirements of a JAX-WS Endpoint, coding service endpoint implementation class, building, packaging and deploying service, developing JAX-WS standalone client and web client using servlet, types supported by JAX-WS.

#### **RESTful Web Services**

What are RESTful web services, Representational State Transfer (REST) architectural style, when to use RESTful design, Creating a RESTful Root Resource Class, Developing RESTful Web Services with JAX-RS, JAX-RS Annotations, Java API for RESTful Web Services, creating a RESTful web service, deploying and testing web service using web client

**Total**

**36**

**50**

#### **Outcomes:**

- The student should be able to design and develop distributed computing applications using RMI / Web services.
- Learn standards related to Web services: Web Services Description Language (WSDL), Simple Object Access Protocol (SOAP), and Universal Description, Discovery and Integration (UDDI).
- Understand how to use the SOAP standard to develop and expose Web Services using Java.
- The student should be able to understand basic principles of SOA and apply it in designing and developing distributed applications using web services.

#### **Prescribed Reference Books:**

- Distributed Computing, M. L. Liu, Pearson Education, 1<sup>st</sup> edition (2004).
- Service-Oriented Architecture: Concepts, Technology & Design by Thomas Erl, Pearson Education, 2006.
- Java Server Programming Java EE 6(Black book), Kogent Solutions Inc., Wiley, 2010 Edition.

#### **Additional Reference Books and Resources:**

- Distributed Systems, Concepts and Design, George Coulouris, Pearson Education, 4<sup>th</sup> edition, 2009.
- SOA Using Java Web Services by Mark D. Hansen, Prentice Hall, 1<sup>st</sup> edition, 2007
- J2EE Web Services, Richard Monson, Pearson Education, 1<sup>st</sup> edition, 2004.
- Java Web Services Architecture, James McGovern, Sameer Tyagi et. al., Morgan Kaufmann Publishers, 1<sup>st</sup> Edition.
- Java Platform, Enterprise Edition 6 (Java EE 6) Tutorial, Eric Jendrock, Ian Evans, Devika Gollapudi, Sun Microsystems, 2011 available in pdf and online at <http://download.oracle.com/javaee/6/tutorial/doc>.



- Java Platform, Enterprise Edition 6 (Java EE 6) Technical Specification and API documentation available online at <http://download.oracle.com/javasee>.
- IBM Case studies on SOA available at <http://www.ibm.com/developerworks/webservices/library/ws-soa-in-action/>

**Subject Code: MCA 382**

**Subject Name:** Distributed Computing and Service Oriented Architecture (SOA)

**Practical per week (hours)** : 4

**Total Marks (Practical Exam)** : 50

#### Topics to be covered in Practical Sessions

Sr. No.	Topics to be Covered	No. of Practical (Hours)
1.0	<b>XML Programming</b> structure of XML document, tags, elements and attributes, XML document rules and parsers, Invalid, valid and well formed documents, Document type definitions (DTD), XML schemas, namespaces, XML programming interfaces, Document Object Model (DOM), Simple API for XML (SAX), Java API for XML Parsing (JAXP), XML parser, Parsing an XML Document, Validating XML Documents, Using Namespaces, Streaming Parser, Generating XML Documents, XSL Transformations	08
2.0	<b>Distributed Object Computing using RMI platform</b> Introduction to distributed object computing and RMI, Java RMI Architecture, RMI Architecture layers, parameters in RMI, RMI Garbage collection of remote objects, RMI development process, steps for installing and executing RMI Applications, Locating remote objects (Naming Service), Java RMI Naming Service, RMI Security Manager, RMI's dynamic stub loading classes, RMI scenario, Comparison of RMI and CORBA, RMI interfaces and classes, RMI-IIOP.	10
3.0	<b>Java EE Web services with JAX-WS</b> Service client programming model, service endpoint model, Creating a Simple Web Service and Clients with JAX-WS, Requirements of a JAX-WS Endpoint, coding service endpoint implementation class, building, packaging and deploying service, developing JAX-WS standalone client and web client using servlet, types supported by JAX-WS.	09
4.0	<b>RESTful Web Services</b> What are RESTful web services, Representational State Transfer (REST) architectural style, when to use RESTful design, Creating a RESTful Root Resource Class, Developing RESTful Web Services with JAX-RS, JAX-RS Annotations, Java API for RESTful Web	09



Services, creating a RESTful web service, deploying and testing web service using web client

**Total**

**36**

<b>Third Year MCA :</b>	<b>Trimester VIII</b>
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**Subject Code:** MCA 383

**Subject:** Cyber laws

**Lectures per week (hours)** : 3 Lectures + 1 Tutorial

**Practicals per week (hours)** : 0

**Internal Assessment** : 50 Marks

**External Assessment** : 50 Marks

**Total Credits** : 4

**Prerequisite:** None.

**Aim:**

The course is aimed to introduce the cyber space security and related laws.

**Objectives:**

- (1) To enable the student to acquire a critical understanding of secure Electronic Communication and cyber law
- (2) To make student conversant with the social and intellectual property issues of cyber space.
- (3) To give student important concepts of Information Technology Act

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	<b>Cyber Laws for Cyber space</b> <ul style="list-style-type: none"> <li>• Defining Cyber Laws</li> <li>• Rights of netizens and e-governance</li> <li>• A short history of Information Technology Act</li> </ul> <b>Basic Concepts of Technology and Law</b> <ul style="list-style-type: none"> <li>• Understanding the Technology of Internet</li> <li>• Scope of Cyber Laws</li> <li>• Cyber Jurisprudence</li> </ul>	8	10
Unit II	<b>Business on the Net</b> <ul style="list-style-type: none"> <li>• Classification of Internet Business Models</li> <li>• E-Commerce and Security</li> <li>• The World of Electronic Contracts</li> <li>• Important Cyber Contracts</li> </ul> <b>Privacy on the Net</b> <ul style="list-style-type: none"> <li>• Online Ads and Profilers</li> </ul>	10	15



- Protecting your Privacy
- Privacy Tips for E-Shoppers/Surfers
- IT Act and Issue of Privacy
- Digital Content Rights
- Steps to protect the content on WWW
- Software Patents
- IT ACT and Issue of Copyright, Patent and Trademark

Unit III	<b>Information Technology Act 2000</b>	9	12
	<ul style="list-style-type: none"><li>• Information Technology Act-2000-1 (Sec 1 to 13)</li><li>• Information Technology Act-2000-2 (Sec 14 to 42 and Certifying authority Rules)</li><li>• Information Technology Act-2000-3 (Sec 43 to 45 and Sec 65 to 78)</li><li>• Information Technology Act-2000-4(Sec 46 to Sec 64 and CRAT Rules)</li><li>• Information Technology Act-2000-5 (Sec 79 to 90)</li><li>• Information Technology Act-2000-6 ( Sec 91-94)</li></ul>		
	<b>International Scenario in Cyber Laws</b>		
	<ul style="list-style-type: none"><li>• Data Protection Laws in EU and USA</li><li>• Child Abuse Protection Laws in EU and USA</li><li>• Cyber Laws - the Malaysian Approach</li></ul>		
	<b>Cyber Law Issues for Management</b>		
	<ul style="list-style-type: none"><li>• Cyber Law Issues in E-Business Management</li><li>• Major issues in Cyber Evidence Management</li><li>• Cyber Law Compliancy Audit</li></ul>		
Unit IV	<b>Law of Digital Contracts</b>	9	13
	<ul style="list-style-type: none"><li>• The Essence of Digital Contracts</li><li>• The System of Digital Signatures</li><li>• The Role and Function of Certifying Authorities</li><li>• The Science of Cryptography</li></ul>		
	<b>Intellectual Property Issues in Cyber Space</b>		
	<ul style="list-style-type: none"><li>• Domain Names and Related issues</li><li>• Copyright in the Digital Media</li><li>• Patents in the Cyber World</li></ul>		
	<b>Case studies</b>		
	<b>Total</b>	<b>36</b>	<b>50</b>

#### Outcomes:

Upon the completion of this course, the student will be able to:

1. Understand easily the present practices in E-Security.



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### Master of Computer Applications (M.C.A.)

2. Undertake project work on topics related to E-Security.

#### Reference Books:

- (1) Handbook of Cyber Laws; Sharma, V; Macmillan India Limited ,1<sup>st</sup> Edition
- (2) E-Security And You : Electronics Authentication And Information Systems Security; Oberoi, S; Tata Mcgraw-Hill Publishing Company Limited,1<sup>st</sup> Edition

#### Additional Reference Books:

- (1) Information Technology And Cyber Laws : A Mission With Vision; Dudeja, V D; Commonwealth Publishers,1<sup>st</sup> Edition
- (2) Internet Marketing E-Commerce And Cyber Laws; Naranyan, A & Thakur, L K; Authors Press, 1<sup>st</sup> Edition.



#### Third Year MCA :

#### Trimester VIII

**Subject Code:** MCA 383

**Subject:** E-Governance

**Lectures per week (hours)** : 3 Lectures + 1 Tutorial

**Practicals per week (hours)** : 0

**Internal Assessment** : 50 Marks

**External Assessment** : 50 Marks

**Total Credits** : 4

**Prerequisite:** None.

#### **Aim:**

Study relationship and application of information, knowledge, information systems, and information and communication technologies for improving governance.

#### **Objectives:**

- Basic concepts of eGovernment, the range of information, services, and activities that comprise e-government.
- Good practice approaches, tools and techniques widely used for Managing e-Government, such as models eGovernment, theories of evolution of eGovernment, eGovernment assessment models, BPRs and change management, Program management, etc.
- The role of ICT as an enabler for structural and process changes in government and public services organizations.
- The technical implementation, management, and security of e-government.
- The critical analysis and assessment of eGovernment projects.

<b>Unit No.</b>	<b>Topics to be Covered</b>	<b>No. of Lectures</b>	<b>Marks per Unit</b>
Unit I	<b>Introduction to eGovernment</b>  Definitions, Domains, Taxonomy, Current status – Indian and global, conceptual Foundations, Citizen Centric eGovernment, eGovernment Services, Definitions, differentiation of G2C, G2B, G2G, G2E services – a broad outline <b>Managing eGovernment – strategy, and implementation</b> Management Models: centralized, decentralized, hybrid, Implementation models: Back end automation, Front end only services, holistic,	9	12



	Business models: Self financed, PPP, JV, differed Payment, Facilities Management outsourcing, Management of Intellectual Property		
Unit II	<b>Managing eGovernment – BPRs, Change management, and Capacity Building</b> Transformational Government for value creation, Theory and practice of BPR, Managing change, Capacity Building, roles of political leadership, Media, and citizens. <b>Mnaging eGovernment – Technology, Data and Security</b> Technology: components and overview, procurement strategy and challenges, Challenges and strategies for Business Continuity, Data: Building Data Quality and Data culture, Challenges and strategies for data Preparedness and Data sustenance, Additional challenges in implementation of COTS Packages and ERP Packages.	9	13
Unit III	<b>eGovernment Project Life cycle and Program management</b> Differences between general and eGovernment Project Life cycle. Concepts behind and importance of each PLC stage, Overview of theory and practice of Program Management. <b>Security Policy, ISMS, Challenges of protecting citizen privacy, RTI and related challenges and strategies</b>	9	12
Unit IV	<b>Challenges in Implementation of eGovernment Projects</b> Universally identified challenges, Challenges facing eGovernment practitioners in India <b>Case studies on EGovernance</b> Some Global and Indian Case studies of - Successful and - Unsuccessful Projects	9	13
	<b>Total</b>	<b>36</b>	<b>50</b>

#### Outcomes:

- Have acquired knowledge of theories and practice in the area of eGovernment, which contributes to a comprehensive perspective
- Be able to initiate, analyse and participate in the development work carried out with ICTs in the public sector;
- Have acquired knowledge and understanding of the Indian and global issues behind eGovernment, i.e. legal, social, technological, and organisational changes connected with the use of ICTs in public administration; Be able to understand what roles technology can play in these changes;
- Have acquired knowledge and understanding of how information is created and used in



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## AES INSTITUTE OF COMPUTER STUDIES

### Master of Computer Applications (M.C.A.)

order to solve strategic and operational problems in the public authorities' activities, and how these processes can be managed and improved;

- Have acquired a good knowledge of eGovernment and the ability to handle changing situations where several participants with conflicting interests are involved, for example Political leadership, Senior Management, Middle management and Government staff, ICT vendors and other businesses.
- Be able to assess the best way in which to deploy and sustain eGovernment systems
- Be able to critically evaluate and analyse eGovernment implementations.

#### Reference Books:

1. Implementing and managing eGovernment, an International Text; by Richard Heeks, Vistaar Publications, India (2006).
2. Digital government: Technology and Public Sector performance; by West, Darell M., Princeton University Press (2005).
3. Public Information Technology and e-Governance: Managing the Virtual State; by Garson G. David, Jones and Bartlett (2006).
4. E-Government: From vision to Implementation; by Subhash Bhatnagar; Sage Publications India Pvt Ltd. (2004).
5. IT Experience in India: Bridging the Digital Divide; by Kenneth Kenniston, Deepak Kumar, Sage Publications India Pvt Ltd. (2004).
6. eGovernance Case Studies; Ashok Agarwal, University Press India, (2007)
7. Compendium of eGovernance Initiatives in India; Piyush Gupta, R K Bagga, University Press India, (2008).
8. e-Government - The Science of the Possible , J Satyanarayana, Prentice Hall



**Third Year MCA : Trimester VIII**

**Subject Code:** MCA 383

**Subject:** E-Security and Cyber laws

**Lectures per week (hours)** : 3 Lectures + 1 Tutorial

**Practicals per week (hours)** : 0

**Internal Assessment** : 50 Marks

**External Assessment** : 50 Marks

**Total Credits** : 4

**Prerequisite:** None.

**Aim:**

The course is aimed to introduce the cyber space security and related laws.

**Objectives:**

- (1) To enable the student to acquire a critical understanding of secure Electronic Communication and cyber law
- (2) To make student conversant with the social and intellectual property issues of cyber space.
- (3) To give student important concepts of Information Technology Act

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	<b>Electronic Communication and IT Act</b> <ul style="list-style-type: none"> <li>• Electronic Communication and Storage</li> <li>• Important concepts introduced in IT act</li> <li>• Electronic Records and Secure Electronic Records</li> <li>• The science of Cryptography</li> </ul>	6	10
Unit II	<b>Authenticating Electronic Records</b> <ul style="list-style-type: none"> <li>• Electronic Signature</li> <li>• Biometric Technology</li> <li>• Digital Signatures</li> <li>• Hash Functions</li> </ul> <b>Public Key Infrastructure</b> <ul style="list-style-type: none"> <li>• Digital Certificates and its Publication</li> <li>• Directories and LDAP</li> <li>• Certificate Revocation Lists</li> <li>• Hierarchical Certificates and Cross Certificates</li> <li>• Technical issues in Long-term archival of Information in Electronic form</li> </ul>	12	15



#### Certification Authorities

Unit III	<b>Cyber Laws for Cyber space</b>	6	10
	<ul style="list-style-type: none"><li>• Defining Cyber Laws</li><li>• Rights of netizens and e-governance</li><li>• A short history of Information Technology Act</li></ul>		
Unit IV	<b>Business on the Net</b>	12	15
	<ul style="list-style-type: none"><li>• Classification of Internet Business Models</li><li>• E-Commerce and Security</li><li>• The World of Electronic Contracts</li><li>• Important Cyber Contracts</li></ul>		
	<b>Privacy on the Net</b>		
	<ul style="list-style-type: none"><li>• Online Ads and Profilers</li><li>• Protecting your Privacy</li><li>• Privacy Tips for E-Shoppers/Surfers</li><li>• IT Act and Issue of Privacy</li><li>• Digital Content Rights</li><li>• Steps to protect the content on WWW</li><li>• Software Patents</li><li>• IT ACT and Issue of Copyright, Patent and Trademark</li></ul>		
	<b>Case studies</b>		
	<b>Total</b>	<b>36</b>	<b>50</b>

#### Outcomes:

Upon the completion of this course, the student will be able to:

1. Understand easily the present practices in E-Security.
2. Undertake project work on topics related to E-Security.

#### Reference Books:

- (1) E-Security And You : Electronics Authentication And Information Systems Security; Oberoi, S; Tata Mcgraw-Hill Publishing Company Limited, 1<sup>st</sup> Edition
- (2) Handbook Of Cyber Laws; Sharma, V; Macmillan India Limited , 1<sup>st</sup> Edition

#### Additional Reference Books:

- (1) Information Technology And Cyber Laws : A Mission With Vision; Dudeja, V D; Commonwealth Publishers, 1<sup>st</sup> Edition
- (2) Internet Marketing E-Commerce And Cyber Laws; Narayanan, A & Thakur, L K; Authors Press, 1<sup>st</sup> Edition.



#### Third Year MCA :

#### Trimester VIII

**Subject Code:** MCA 383

**Subject Name:** Geographic Information Systems

**Lectures per week (hours)** : 3 Lectures + 1 Tutorial

**Practicals per week (hours)** :

**Internal Assessment** : 50 Marks

**External Assessment** : 50 Theory Marks

**Total Credits** : 4

**Prerequisite:** Background in Operating Systems and data management as well as Geography concepts is helpful

#### **Aim:**

The course is aimed to help the students understand fundamentals, concepts and application of GIS

#### **Objectives:**

- (1) To understand the basic GIS data and analysis concepts.
- (2) To understand the practical application and technical language of GIS
- (3) To understand GIS related to Software Development

<b>Unit No.</b>	<b>Topics to be Covered</b>	<b>No. of Lectures</b>	<b>Marks per Unit</b>
Unit I	<b>What is GIS?</b> Introduction, Defining GIS, Components of GIS	9	10
	<b>Spatial data</b> Introduction to spatial data, Maps and their influence on the character of spatial data, Thematic characteristics of spatial data, Other sources of spatial data		
Unit II	<b>Spatial data modeling</b> Introduction, Entity definition, Spatial data models, Spatial data structures, Modelling surfaces and networks, Modeling the third dimension and Modelling the fourth dimension	10	15
	<b>Attribute data management</b> Introduction, Why choose a database approach? Database data models, Creating a database, GIS database applications and Developments in database		



Unit III	<b>Data input and editing</b> Introduction, Methods of data input, Data editing, Towards integrated database <b>Data Analysis</b> Introduction, Measurements in GIS-lengths perimeters and areas, Queries, Reclassification, Buffering and neighborhood functions, Integrating data – map overlay, Spatial interpolation	9	15
Unit IV	<b>Analytical modeling in GIS</b> Introduction, Process models, Modelling physical and environmental process, Modelling human process, Modelling decision making process, Problems with using GIS to model spatial process <b>Output: from new maps to advanced decisions</b> Introduction, Maps as output, Non-cartographic output	8	10
	<b>Total</b>	<b>36</b>	<b>50</b>

#### Outcomes:

Upon the completion of this course, the student will be able to:

1. Gain a basic understanding of GIS concepts, techniques and real world applications
2. Gain understanding of basic principles of map design for effective communication of information and ideas in map form.

#### Prescribed Reference Books:

- (1) An Introduction to Geographical Information Systems (3rd edition) – Ian Heywood, Sarah Cornelius and Steve Carver – Pearson

#### Additional Reference Books:

- (1) Concepts and Techniques of Geographic Information Systems – C. P. Lo and Albert K. W. Yeung – Prentice Hall of India  
GIS Book – Korte G B - 5<sup>th</sup> Edition – Thomson Ltd



**Third Year MCA :**

**Trimester VIII**

**Subject Code:** MCA 383

**Subject Name:** Grid and Cloud Computing

**Lectures per week (hours)** : 3 Lectures + 1 Tutorial

**Practicals per week (hours)** : 0

**Internal Assessment** : 50 Marks

**External Assessment** : 50 Theory Marks

**Total Credits** : 4

**Prerequisite:** Operating System and Computer Networks

#### **Aim**

To provide exposure to current and emerging trends in distributed computing infrastructure for building large network-based computational systems

#### **Objectives**

- To understand the need and applications of grid and cloud computing.
- To understand the architecture, service models and technology to facilitated the grid and cloud computing.
- Identify problems and understand methods and general approaches to design, implement, and evaluate distributed systems.

#### **Course Contents:**

<b>Unit No.</b>	<b>Topics to be Covered</b>	<b>No. of Lectures</b>	<b>Marks per Unit</b>
Unit I	<b>Introduction to Distributed Computing</b> What is a distributed system, distributed computing, evolution of different paradigms of computing, strengths and weaknesses of distributed computing, examples of distributed systems, N-tier architecture of distributed applications, Types of distributed computing, Message Passing, client server, peer to peer, remote procedure call (RPC), Distributed object computing, cluster computing, grid computing and cloud computing. <b>Introduction to Cluster Computing</b> What is cluster computing, advantages, system architecture, Parallel programming models and paradigms, Resource management and scheduling	9	09



	(RMS) in cluster, RMS architecture, services provided by RMS, Load sharing and balancing, Case study and exposure to cluster systems like Portable Batch System (PBS)/Condor/Bewolf		
Unit II	<b>Introduction to Grid Computing</b> History, definition, grid computing architecture and model, Types of grid, advantages of grid computing, Grid infrastructure components, Types of grid applications, application flow and their characteristics, batch jobs v/s interactive jobs, Grid resource management and scheduling, Resource brokers and Meta scheduling, Grid information and monitoring, Grid resource allocation management, Open Grid Services Architecture (OGSA), Open Grid Services Infrastructure (OGSI), Web Service Resource Framework (WSRF) and Grid Services	9	11
Unit III	<b>Grid Computing Toolkits , Middleware, Simulation and Grid Services</b> Globus toolkit, Globus toolkit basics, Globus architecture, components and services, Meta schedulers, Grid security infrastructure using public key cryptography, Grid resource allocation and management (GRAM) protocol, Grid services, GRAM clients, Resource specification language (RSL), GridFTP, Reliable file transfer (RFT), Monitoring and discovery system, Grid Simulation environment: GridSim, Grid enabling a software application, Java CoG kit, Globus toolkit Grid services and clients using GRAM 4 and Globus Web Service(WS) API <b>Introduction to Cloud Computing</b> Cloud computing models, techniques, and architectures, pros and cons of cloud computing, cloud computing web based applications.	9	15
Unit IV	<b>Cloud Computing Technologies and Services</b> cloud computing technologies (Hadoop and MapReduce), Infrastructure-as-a-Service (IaaS), Software as a Service (SaaS), Platform-as-a-Service (PaaS), Virtualization, Parallelization, Security/privacy, issues in cloud computing, Application programming framework for cloud computing, Amazon Elastic Compute Cloud (Amazon EC2), Google App Engine.	9	15
	<b>Total</b>	<b>36</b>	<b>50</b>

#### Outcomes:

- Understand the difference between cluster computing, grid computing and cloud computing



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## AES INSTITUTE OF COMPUTER STUDIES

### Master of Computer Applications (M.C.A.)

- The student should be able to understand, design and implement solutions based on cluster, grid and cloud computing.

#### Prescribed Reference Books:

- Grid Computing, Joshy Joseph & Craig Fellenstein, Pearson, 2003.
- High Performance Cluster Computing: Architectures and Systems, Vol-1, Rajkumar Buyya, Prentice Hall, 1<sup>st</sup> edition.
- Cloud Computing: A practical Approach, Anthony T. Velte, Tata McGraw-Hill, 1<sup>st</sup> edition, 2009.

#### Additional Reference Books and Resources:

- "Cloud Application Architectures", by George Reese, O'Reilly, 2009.
- Cloud Computing Bible by Barrie Sosinsky, Wiley, 2011.
- "Grid Computing: A Practical Guide to technology and Applications", Ahmar Abbas, Firewall media, 2004.
- Grid and Cluster Computing, CSR Prabhu, Prentice Hall, 1<sup>st</sup> edition.
- Enabling Applications for Grid Computing with Globus, Bart Jacob et. al., IBM Redbooks publication available online at <http://www.redbooks.ibm.com/abstracts/sg246936.html>
- The Grid 2: Blueprint for a New Computing Infrastructure, Ian Foster and Carl Kesselman, Morgan Kaufmann Publishers, 2003.  
Twelfth International Conference On "Advances in Computing and Communications: Theme-Grid Computing", ADCOM - 2004, Dr. Haresh Bhatt, A R Dasgupta, S S Iyengar, Allied Publishers Limited, 2004 (Available in library).



**Third Year MCA :**

**Trimester VIII**

**Subject Code: MCA 383**

**Subject: Information Security**

**Lecturer per week** : 3 Lectures + 1 Tutorial  
**Internal Assessment** : 50 Marks  
**External Assessment** : 50 Marks  
**Total Credit** : 4

**Prerequisite:** Basic knowledge of computer networks and TCP/IP protocol suite.

**Aim:**

This course is aimed to introduce security problems, cryptography and network security

**Objectives:**

- (1) To acquire an understanding of various security problem.
- (2) To make the students learn the principles and practices of cryptography and network security.
- (3) To understand various malicious code.

<b>Unit No.</b>	<b>Topics to be Covered</b>	<b>No. of Lectures</b>	<b>Marks per Unit</b>
Unit I	<b>Introduction to Information Theory</b> Data to information, Information systems, Information management <b>Security Problem in Computing</b> What is Security?, Attacks, Security Goals, Computer Criminals, Method of Defense. <b>Securing the information System</b> Physical security, Application and File Protection, System Security, Network Security, Intrusion Detection	8	10
Unit II	<b>Symmetric Ciphers</b> <b>Classical Encryption Techniques</b> Symmetric Cipher Model, Substitution Techniques, Transposition Techniques <b>Block Ciphers</b> Block Cipher design principles and Modes of operation, Data Encryption Standard, Advance Encryption Standard <b>Public Key Encryption and Hash Function</b>	10	14



	Principles of Public Key Cryptosystems, RSA algorithm, Authentication Requirements and functions, Hash functions, Digital Signatures		
Unit III	<b>Network Security Applications</b> Authentication Applications, Electronic mail security, Web security, IP security	10	14
Unit IV	<b>System Security</b> <b>Intruders</b> Introduction to intruders, intrusion detection , password management <b>Malicious Software</b> Viruses and related threats, virus countermeasures <b>Firewalls</b> Firewall Design principles, trusted systems	8	12
	<b>Total</b>	<b>36</b>	<b>50</b>

#### Outcomes:

Upon the completion of this course, the student will be able to:

- (1) Understand attacks and security goals.
- (2) Understand easily the present practices in network security.

#### Prescribed Reference Books:

- (1) Security in Computing- Pfleeger & Pfleeger-4<sup>th</sup> Edition- Pearson Education.
- (2) Information Security Intelligence: cryptographic principles & applications-Thomas Calabrese-1<sup>st</sup> Edition- Thomsan learning
- (3) Cryptography & Network Security - Principles & Practice, William Stallings, Prentice Hall, 3<sup>rd</sup> Edition.

#### Additional Reference Books:

- (1) Information Security – Dhiren Patel- 1<sup>st</sup> Edition- PHI.
- (2) Applied Cryptography, Bruce, Schneier, Toha Wiley & Sons, 2<sup>nd</sup> Edition.
- (3) Internet Security, Man Young Rhee, Wiley.
- (4) Network Security Essentials, William Stallings, Pearson Education, 3<sup>rd</sup> Edition.



#### Third Year MCA :

#### Trimester VIII

**Subject Code:** MCA 383

**Subject Name:** IT Infrastructure Management

**Lectures per week (hours)** : 4 Lectures

**Practical per week (hours)** : 0

**Internal Assessment** : 50 Marks

**External Assessment** : 50 Marks

**Total Credits** : 4

**Prerequisite:** None.

#### **Aim:**

The course is aimed to give knowledge of Designing & Planning IT Infrastructure.

#### **Objectives:**

- (1) To understand IT Infrastructure & its concepts.
- (2) To make students familiar with organizing and staffing for systems management.
- (3) To learn to manage process, network and technology.

<b>Unit No.</b>	<b>Topics to be Covered</b>	<b>No. of Lectures</b>	<b>Marks per Unit</b>
Unit I	<b>Introduction to IT Infrastructure</b> Infrastructure, IT Infrastructure Assessment, CIO & its roles, educating executives. Introduction to <b>ITIL</b> (Information Technology Infrastructure Library) and ISO 20000. <b>Organizing &amp; Staffing for Systems Management</b> Introduction, Factors to consider in Designing IT Organizations, Infrastructures, Determining & Assessing Skill sets & levels, Alternative sources of staffing, Recruiting staff, Retaining key personnel, Consultants and Contractors.	9	12
Unit II	<b>Customer Service</b> Key elements of good customer service, its Integration & its sins. <b>Processes I</b> Availability- Definition, Differentiating: Availability from uptime/ slow response from downtime/ availability from high availability, traits of an availability process owner, Methods for measuring availability, Seven R's of high availability. Performance and Tuning – Definition, Characteristics	9	13



of owner, Difference between different process, Performance & tuning applied to five resource environments.

Unit III	<b>Customer Services, Processes II</b> Change Management – Definition, Drawbacks, and Key steps in development. Problem Management – Definition & Scope, Distinguishing between problem, change & request management, key steps for development, opening & closing problems, Segregating and Integrating help desks, Client Issues with Problem Management. Storage Management – Definition, Desired traits of Process Owner, Capacity, Performance, Reliability, Recoverability.	9	13
Unit IV	<b>Storage, Network &amp; Technology Management</b> Storage (Data Recovery) Management – Primacy of data, Planning for data recovery (Traditional, electronic, mirroring) Designing a storage recovery plan. Network Management - Definition, Key decisions. Developing Robust Processes – Introduction, Characteristics, World class and mediocre infrastructure, Formal and Informal processes. UTM – Definition, Components of UTM (Virus, IDP, Spamming, Spyware, Malware, firewall) Special considerations client server environments – Introduction, issues, Performance tuning challenges	9	12
	<b>Total</b>	<b>36</b>	<b>50</b>

#### Outcomes:

Upon the completion of this course, the student will be able to:

1. Recruit and retain the key personnel
2. Identify the key customers to provide better services.
3. Identify availability, change & improve the performance by fine tuning different processes.
4. Manage different Network and Technology related issues.

#### Reference Books:

- a. IT Systems Management – Designing, Implementing and Managing World-Class Infrastructures, Rich Schiesser, PHI, First Edition.
- b. Disaster Recovery Planning, Toigo, PHI, 3<sup>rd</sup> Edition.

#### Additional Reference Books:



#### Third Year MCA :

#### Trimester VII

**Subject Code:** MCA 383

**Subject:** Network Security

**Lectures per week (hours)** : 3 Lectures + 1 Tutorial

**Practicals per week (hours)** : 0

**Internal Assessment** : 50 Marks

**External Assessment** : 50 Marks

**Total Credits** : 4

**Prerequisite:** Computer networks and TCP/IP protocol suite.

#### Aim:

The course is aimed to introduce the cryptography and network security.

#### Objectives:

- (1) To make the students learn the principles and practices of cryptography and network security.
- (2) To enable the students develop network security application programs.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	Attacks, Services, Mechanisms, Conventional Encryption: Classical and Modern Techniques, Conventional Encryption Algorithms, Confidentiality using Conventional Encryption, RSA, Elliptic Curve Cryptography, Number Theory Concepts	9	15
Unit II	Hash Functions, Digest Functions, Digital Signatures, Authentication protocols	9	10
Unit III	Authentication Applications, Electronic Mail Security, IP Security, Web Security	9	15
Unit IV	Intruders, Viruses and worms, Firewall design principles, Trusted system	9	10
<b>Total</b>		<b>36</b>	<b>50</b>



# AHMEDABAD UNIVERSITY

## AES INSTITUTE OF COMPUTER STUDIES

### Master of Computer Applications (M.C.A.)

#### **Outcomes:**

Upon the completion of this course, the student will be able to:

1. Understand easily the present practices in network security.
2. Undertake project work on topics related to network security.

#### **Reference Books:**

- (1) Network Security Essentials, William Stallings, Pearson Education, 3<sup>rd</sup> Edition.
- (2) Cryptography & Network Security - Principles & Practice, William Stallings, Prentice Hall, 3<sup>rd</sup> Edition.

#### **Additional Reference Books:**

- (1) Applied Cryptography, Bruce, Schneier, Toha Wiley & Sons, 2<sup>nd</sup> Edition.
- (2) Internet Security, Man Young Rhee, Wiley.
- (3) Security in Computing, Pfleeger & Pfleeger, Pearson Education, 3<sup>rd</sup> Edition.



#### Third Year MCA :

#### Trimester VIII

**Subject Code:** MCA 384    **Subject:** System Development Project (Minor)

<b>Lectures per week (hours)</b>	: 4 Tutorial
<b>Practicals per week (hours)</b>	: 8
<b>Internal Assessment</b>	: 100 Marks
<b>External Assessment</b>	: 100 Marks
<b>Total Credits</b>	: 12

#### **Aim:**

To provide experience to students in system analysis and design of real-life software systems.

#### **Objectives:**

- (1) To apply the system analysis and design skills in developing a real-life software systems.
- (2) To apply the enterprise development technologies learned in previous trimesters (NET platform or Java EE) in creating the solution.
- (3) To understand and apply the software development life-cycle phases in developing the project
- (4) Encourage students to develop innovative projects.

#### **Guidelines**

- Students have to work in the project in teams (maximum 2 or 3 students).
- The Student project teams will be assigned to internal project guides.
- Students have to give periodic project reviews about the status and progress of their project to their internal guides.
- The projects may involve part or all the system development life-cycle phases.
- Student has to prepare a project report in which all the details about the project have to be documented.

#### **Evaluation**

- The internal evaluation will be on the basis of periodic reviews and internal presentation of the analysis and design documentation of the project.
- External evaluation will be on the basis of final project presentation and the project report prepared by the students.  
Evaluation of innovative projects will be on the basis of efforts applied, literature study, methodology, results obtained, conclusion and due weightage will be given to literature survey, analysis, model, design, architecture or algorithm developed. In such projects,