

**Year:I****Semester:II**

<b>Course Code</b>	<b>CourseTitle</b>	<b>Credits</b>	<b>Lecture (Hrs.)</b>	<b>Tutorial (Hrs.)</b>	<b>Laboratory (Hrs.)</b>	<b>Total (Hrs.)</b>
MCA151	ResearchMethodology	3	3	1	-	4
MCA152	VisualProgrammingLangaugeand.Net	3	3	-	3	6
MCA153	CloudComputing	3	3	1	2	6
MCA154	InformationSecurity andEthics	3	3	1	2	6
MCA1**	Specialization1	3				
MCA1**	Specialization2	3				
	<b>Total</b>	<b>18</b>				

#### **\*\*SpecializationAreas:**

Specialization area courses have been designed in four major areas for in-depth knowledge in thearea. Students develop specialized expertise in the specialization area. Students are required totake four specialization courses from the selected area, two courses each in second and thirdsemesterofthe MCA program.Specializationareas are Information System Management, Networking and Cloud Computing, E-Commerce and Web Application Development, and Artificial Intelligence and Business Analytics.

Courses for specialization should be chosen from one of following four areas of specialization.Same area of specialization should be followed for choosing courses for specialization in thesubsequentsemesters.

#### **A. InformationSystemManagement**

**For Year:I and Semester:II (Specialization 1 and Specialization 2)**

MCA171: IT Entrepreneurship and Supply Chain

ManagementMCA172:Computer based Accounting andFinancial

ManagementMCA173:EnterpriseResourcePlanning

#### **B. NetworkingandCloudComputing**

**For Year:I and Semester:II (Specialization 1 and Specialization 2)**

MCA178:CloudSecurity

MCA179:NetworkSystemAdministration

MCA180:Remote SensingandGIS

## **C:Digital-CommerceandWebApplicationDevelopment**

**Year:IandSemester:II(Specialization1andSpecialization2)**

MCA185: Digital-CommerceMCA186:

Digital-

GovernanceMCA187:MultimediaandAppli  
cation

MCA188:MobileComputingandWAPBasedApplication

## **D:ArtificialIntelligenceandBusinessAnalytics**

**Year:ISemester:II(Specialization 1andSpecialization 2)**

MCA192:Artificial

IntelligenceMCA193:Machine Learning

MCA194:BusinessIntelligence,

AnalyticsandDataScienceMCA195:BigDataManagement

## MCA151 ResearchMethodology

Teaching Schedule			Examination Scheme				
Hours/Week			Internal		Final		Total
Theory	Tutorial	Practical	Theory	Practical	Theory	Practical	100
3	1		20		80	-	

### **Course Objective:**

Provide knowledge to the students about different type of research, their process and applications. Familiarize the students with different types of data collection techniques and their applications. Develop an understanding of ethical issues and required consideration for their research studies. Provide skills for the selection of sampling technique, errors and proper planning different sampling methods.

Enable the research students in developing the most appropriate methodology for their research study.

### **Course Contents:**

#### **Unit 1: Introduction**

[4Hrs]

Meaning and Importance of Research, Classification of Research, Research in Engineering Functions, The Research Process, Research as a scientific Process, Issues governing Research Function, Listing and description of Steps of research.

#### **Unit 2: Research Design**

[4Hrs]

Meaning and Importance of Research Design, Classification of Research Design, The Research Process, Variables, Hypothesis, Errors Affecting Research Design, Measurements and Scaling, Reliability and validity test of research, Pilot test, field study, Issues Governing Research Design

#### **Unit 3: Development of Research**

[9Hrs]

Selection of research topics, Research problem vs research question, Meaning and Importance of Research Proposal, Classification of Research Proposals, Components of a Research Proposal, Manager-Researcher Contribution in Developing a Research Proposal, Evaluation a Research Proposal, The Development of Research Issues Governing Proposal

#### **Unit 4:Sampling Decisions**

[4Hrs]

Sampling Vs.Census, Sampling Techniques, IssuesGoverningSamplingDecisions

#### **Unit 5: Data Collection Methods**

[8Hrs]

Meaning, Importance and Types of Data, Methods of Data Collection, Steps of Data processing and Presentation, Various Methods of Data Collection

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**Unit 6: Data Reduction and Analysis****[5Hrs]**

Meaning and Importance of Data Reduction, Data Reduction Process, Selected Techniques of Data Analysis

**Unit 7: Formatting the report****[4Hrs]**

Formatting a Report, Developing the Final Draft, Preparing for Citation and Referencing Making an Oral Presentation of a Report

**Unit 8: Development of Research Proposal****[3Hrs]**

Meaning and Importance of research proposal; the Development of Research Issues Governing Proposal; Writing a research report-Developing an outline; Key elements of research propos Objective, Introduction, Design or Rationale of work, Experimental Methods, Procedures, Measurements, Results, Discussion, Conclusion, Referencing and various formats for reference writing of books and research papers; Publications in Research journals

**Unit 9:Socio-EthicalIssuesin Research****[4Hrs]**

Issues governing Research Function, Incorporating Socio-Ethical Issues in Research Impact of Social Issues in Research

**ReferenceBooks:**

1. Cooper & Schindler (2004), Business Research Methods, New Delhi, Tata Mc Graw Hill Publishing Co.
2. Best, John W., Research In Education, Prentice Hall of India, New Delhi
3. Wolf Howard K. & P. R Pant, Social Science Research & Thesis Writing, Research Division, Kirtipur
4. Goode William J. & Paul K. Hatt, Methods in Social Research, Mc Graw Hill Kogakusha Ltd.
5. Kothari, C. R., Research Methodology, 2nd Revised Edition, New International Publisher.



## MCA152 Visual Programming Language & .Net

Teaching Schedule			Examination Scheme				
Hours/Week			Internal		Final		Total
Theory	Tutorial	Practical	Theory	Practical	Theory	Practical	100
3	1	2	20	20	60	-	

### Course Objective:

To develop an understanding of how to design an effective graphical user interface (GUI), how to analyze a problem and design a program structure to solve the problem using an event driven programming language, Visual Basic and Visual Basic.Net.

### Course Contents:

#### Unit 1: Introduction

[3Hrs]

Character based system, Graphical User Interface, Visual Programming, Visual Interface components, Event Driven Programming

#### Unit 2: Models of Interface design

[3Hrs]

Conceptual model, Implementation model, the manifest model, modeling from users point of view

#### Unit 3: The Form

[5Hrs]

Interface paradigms (Metaphor, Idioms and branding, Affordances), Child forms (Usage of window space, Windows pollution), Platform dependence (Development platform, Multi-Platform development, Interoperability)

#### Unit 4: User-Computer Interaction

[6Hrs]

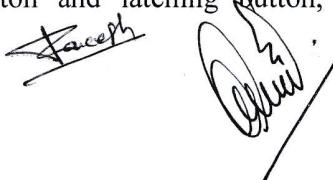
Mouse (Indirect manipulation, Mouse events Focus and cursor hints), Selection (Indicating selection, Insertion and replacement, Additives election, Group selection), Gizmos Manipulation (Repositioning, Resizing, Reshaping, Visual feedback of manipulation), Drag and Drop (Source and target, Problems and solutions, Drag and Drop mechanism)

#### Unit 5: The Cast

[6Hrs]

Menu Design Issue (Drop Down menus, Pop-up menus, Hierarchy of menu), Menus and its types (Standard menus, Optional menus, System menu, Menu item variation), Dialog Boxes (Dialog box basics, Suspension of interaction, Modal and Modeless dialog boxes, Problems in Modeless dialog boxes, Different types of dialog boxes), Dialog box conventions (Caption bar, Attributes, Terminating dialog boxes, Expanding dialog boxes, Cascading dialog boxes), Toolbars (Advantages over menus, Momentary button and latching button, Customizing toolbars)

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**Unit 6: Net Programming****[22 Hrs]**

Language Syntax, Data types, operators, Conditional Statements, Control Structures Concept of OOP (E.g. class, objects, methods, properties, encapsulation, inheritance, overloading)

**ASP. Net Controls and Presentation Techniques**

Working with Forms and Control Validation Controls Web Site Navigation, Menu and View Controls Data Grid and Repeater Emailing Concepts Error Handling, Debugging and Tracing ASP. NET Application Managing State in ASP. NET Application Enhancing Web Sites using Master Pages and Theme Deploying Application.

**Reference Books :**

1. Alan Cooper, The Essential of User Interface Design, Comdex Computer Publishing
2. Evangelos Petroutsos, Mark Ridgeway, Visual Basic .NET Developer's Handbook, BPB Publications
3. Evangelos Petroutsos, Mastering Visual Basic6, BPB Publications
4. Tony Gaddis, Kip Irvine, Bruce Denton, Starting Out With Visual Basic .NET Programming, Dreamtech Press
5. Wiley, Beginning Visual C#2008, Wrox
6. Fergal Grimes, Microsoft .Net for Programmers, (SPI)
7. Balagurusamy, Programming with C#, (TMH)
8. Mark Michaels, Essential C#3.0 For .NET Framework 3.5, 2/e, Pearson Education



## Cloud Computing

### MCA153CO

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
			Theory	Practical	Theory	Practical	
3	1	2	20	20	60	-	100

**Course Objective:**

The course aims at providing knowledge concerning computing service models, service management and security concepts related to cloud computing

**Course Contents:**

**1. Cloud Computing Fundamentals**

[8 Hrs]

Cloud Computing definition: private, public and hybrid cloud; Evolution of Cloud Computing; Characteristics of Cloud, Cloud Types; Cloud Computing Benefits and Limitations, Cloud Architecture; Cloud computing vs. Cluster computing vs. Grid computing; Applications: Technologies and Process required when deploying Web services; Deploying a web service from inside and Outside of a Cloud.

**2. Cloud Computing service models**

[10 Hrs]

**Introduction to Cloud Services:** : SaaS, IaaS, PaaS; Storage As a Service, Communication As a Service; Cloud-based big data/real time analytics, Understanding SOA; Improving Performance through Load Balancing.

**Virtualization Basics:** Objectives, Benefits of Virtualization, Emulation, Virtualization for Enterprise, VMware, Server Virtualization, Data Storage Virtualization.

**3. Service Management**

[9 Hrs]

**Cloud vendors and Service Management:** Amazon cloud, AWS Overview, Installation of AWS, Google app engine, azure cloud, salesforce.

**Service Management in Cloud Computing:** Service Level Agreements(SLAs), Billing & Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting enormously , Managing Data: Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud , Large Scale Data Processing.

**4. Security Concepts**

[9 Hrs]

Cloud security challenges, Cloud security approaches: encryption, tokenization/obfuscation, cloud security alliance standards, cloud security models and related patterns, Cloud security in mainstream vendor solutions, Mainstream Cloud security offerings: security assessment, secure Cloud architecture design, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations.

**5. Case Studies and Presentations**

[9Hrs]

Case study on Open Source & Commercial Clouds: Eucalyptus, Microsoft Azure, Amazon EC2

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## **Laboratory Works:**

Laboratory works include the following experiments:

1. Working of Goggle Drive to make spreadsheet and notes.
2. Installation and Configuration of Just cloud.
3. Working in Cloud9 to demonstrate different language.
4. Working in Codenvy to demonstrate Provisioning and Scaling of a website.
5. Installation and Configuration of Hadoop/Eucalyptus
6. Working and installation of Google App Engine
7. Working and installation of Microsoft Azure
8. Working with Mangra soft Aneka Software

## **Reference Books:**

1. Cloud Computing: A Practical Approach by Anthony T. Velte Toby J. Velte, Robert Elsenpeter, The McGraw-Hill.
2. Cloud Computing: SaaS, PaaS, IaaS, Virtualization and more. by Dr. Kris Jamsa.
3. Tim Mather, SubraKumaraswamy, ShahedLatif, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, O'ReillyMedia Inc.
4. Cloud Computing Bible, Barrie Sosinsky, Wiley-India.
5. Jason Venner, ProHadoop, Apress.
6. Cloud Computing: Principles and Paradigms, Editors: RajkumarBuyya, James Broberg, Andrzej M. Goscinski, Wile.
7. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
8. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India.

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## MCA 154 Information Security & Ethics

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1	2	Theory	Practical	Theory	Practical	100
			20	20	60	-	

**Course Objective:**

The aim of this course is to provide attendees with a thorough understanding of the issues associated with the design, provision and management of security services for modern communication and information systems. Moreover, this course aims to provide the concepts, properties, and functions of computer/information systems security and controls.

**1. Introduction**

[ 3 Hrs ]

The Security Problem in Computing: The meaning of computer Security, Computer Criminals, Methods of Defense, Elements in Computer Security.Threats in Information Technology, difference between Information Security and Network Security.

**2. Cryptography**

[ 10 Hrs ]

Elementary Cryptography: Substitution Ciphers, Transpositions, Making "Good" Encryption algorithms, The Data Encryption Standard, The AES Encryption Algorithms, Public Key Encryptions, Uses of Encryption.

**3. Program Security:**

[10 Hrs ]

Secure Programs, Nonmalicious Program Errors, viruses and other malicious code, Targeted Malicious code, controls Against Program Threats, Protection in General-Purpose operating system protected objects and methods of protection memory and addmens protection, File protection Mechanisms, User Authentication Designing Trusted O.S: Security polices, models of security, trusted O.S design, Assurance in trusted O.S. Implementation examples.

**4. Database Security**

[ 5 Hrs ]

Data base Security: Security requirements, Reliability and integrity, Sensitive data, Inference, multilevel database, proposals for multilevel security.

Security in Network: Threats in Network, Network Security Controls, Firewalls, Intrusion Detection Systems, Secure E-Mail.

**5. Security in Networks**

[ 8 Hrs ]

Threats in Network, Network Security Controls, Firewalls, Intrusion Detection Systems, Secure E-Mail.Security Protocols: - TCP/IP Model, OSI model, security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.

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**6. Administered Security [ 5 Hrs ]**

Administering Security: Security Planning, Risk Analysis, Organizational Security policies, Physical Security. Legal Privacy and Ethical Issues in Computer Security: Protecting Programs and data, Information and the law, Rights of Employees and Employers, Software failures, Computer Crime.

**7. Legal and Ethical Issues [ 4 Hrs ]**

7.1. Protection of data and Information Laws

7.2. Types of Ethical Issues: Personal Privacy, Access Right

Harmful Actions, Patents, Copyright, Trade Secrets, Liability, Piracy, Access Costs, Data Gathering

**Lab:**

1. Block Cipher such as Feistel, DES or AES
2. Public Key Cryptography (RSA)
3. Conventional Cryptography
4. Authentication Methods such as password or Kerberos.
5. Software Flaw Fraud tools such as flaw finders, ITS, PScan, RATS
6. Analysis of Network port scanner tool such as NMAP
7. Analysis of Sniffer program such as Ethernet
8. Transport Security using firewall
9. Application level security such as email by using PHP
10. Implementation of IDS

**References:**

1. Mark Stamp, "Information security Principles and Practice" Wiley
2. Charles P. Pfleeger, "Security in Computing", Pearson Education
3. Michael E. Whitman and Herbert J. Mattord, Principles of Information Security, Thomson/Course Technology, ISBN 0-619-21625-5, Fourth Edition, 2012
4. Computer Security: Art and Science, Matt Bishop, Addison- Wesley

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## MCA171 IT Entrepreneurship and Supply Chain Management

Teaching Schedule			Examination Scheme				
Hours/Week			Internal		Final		Total
Theory	Tutorial	Practical	Theory	Practical	Theory	Practical	
3	1		20		80	-	100

### **Course Objective:**

This course is designed to introduce students to the concept of Entrepreneurship and Supply Chain Management in relation to Information Technology. The course believed to enable students to turn IT based product idea into working prototype with the knowledge enriched by basics of Supply Chain Management concepts.

### **Course Contents:**

#### **Unit 1: Entrepreneurship and the Entrepreneurial Mind-set [ 6Hrs]**

Nature and Development of Entrepreneurship, The Entrepreneurial Process (Identify and Evaluate the Opportunity, Develop a Business Plan, Determine and Obtain the Resources Required, Manage the Enterprise), How Entrepreneurs Think (Effectuation, Cognitive Adaptability, Entrepreneurial Heuristics, Learning from Business Failure, Recovery and Learning Process), Ethics and Social Responsibility of Entrepreneurs.

#### **Unit 2: Creativity and the Business Idea [ 11Hrs]**

Ideas from Trend Analysis, Trends (Green Trend, Clean Energy Trend, Organic-Orientation Trend, Economic Trend, Social Trend, Health Trend, Web Trend), Common Sources of New Venture Ideas (Consumers, Existing Products and Services, Distribution Channels, Governments, Research and Development,), Methods of Generating Ideas and Solving Problems (Focus Groups, Brainstorming, Brainwriting, Problem Inventory Analysis, Reverse Brainstorming, Gordon Method, Checklist Method, Free Association, Forced Relationships, Collective Notebook Method, Attribute Listing, Big-Dream Approach, Parameter Analysis, Delphi/Nominal Group Technique, Scenario Analysis, Cause-Effect Analysis, Value Analysis, Morphological Analysis, Synectics), Creativity and Entrepreneurship, Innovation (Types of Innovation, Defining Innovation, Classification of New Products), Entrepreneurial Innovation, Opportunity Recognition, Product Planning and Development Process (Establishing Evaluation Criteria, Idea Stage, Concept Stage, Product Development Stage, Test Marketing Stage), e-Commerce and Business Start-up (Using e-Commerce Creatively, Web Sites, Tracking Customer Information, Doing e-Commerce as an Entrepreneurial Company).

#### **Unit 3: E—Entrepreneurship(Principles of Founding Electronic Ventures) [ 8Hrs]**

Introduction, The Net Economy (Value Chain of the Real Economy vs. Value Chain of the Net Economy), Founding Electronic Ventures (The electronic creation of customer value, Examples for electronic value creation processes), Success Factors of Electronic Ventures, Development Phases of Electronic Ventures, Future Trends. Case Study

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**Unit 4: Building a Strategic Framework to Analyze Supply Chains [ 5Hrs]**

Understanding the Supply Chain (Concept of Supply Chain, Decision Phases in Supply Chain, Process View of a Supply Chain, The Importance of Supply Chain Flows, Examples of Supply Chains. Principles of Just in Time (JIT)

**Unit 5: Supply Chain Drivers and Obstacles [ 4Hrs]**

Drivers of Supply Chain Performance, A Framework for Structuring Drivers, Facilities, Inventory, Transportation, Information, Obstacles to Achieving Strategic Fit.

**Unit 6: Information Technology and the Supply Chain [ 6Hrs]**

The Role of IT in the Supply Chain, The Supply Chain IT Framework, Customer Relationship Management, Internal Supply Chain Management, Supplier Relationship Management, The Transaction Management Foundation, The Future of IT in the Supply Chain, Supply Chain IT in Practice. Case Study

**Unit 7: E-Business and the Supply Chain [ 5Hrs]**

The Role of E-Business in Supply Chain, The E-Business Framework, The B2B Addition to the E-Business Framework, E-Business in Practice.

**Reference Books:**

1. Chopra, Sunil &Meindl, Peter (2004). *Supply Chain Management: Strategy, Planning, and Operation.*(2<sup>nd</sup>ed.).Delhi, Pearson Education, Inc.
2. Hisrich, R. D., Manimala, Mathew J., Peters, Michael P., & Shepherd, Dean A. (2013). *Entrepreneurship.*(8<sup>th</sup>ed.).New Delhi, McGrawHill Education (India) Private Limited.
3. Zhao, Fang (Ed.)(2008). *Information Technology Entrepreneurship and Innovation.*New York, Information Science Reference. DOI: 10.4018/978-1-59904-901-4.
4. Crandall, Richard E., Crandall, William R., & Chen, Charlie C. (2015). *Principles of Supply Chain Management.* (2<sup>nd</sup>ed.). New York, CRC Press.
5. Holt, David H. (2005). *Entrepreneurship: New Venture Creation.*New Delhi, Prentice-Hall of India Private Limited.
6. Kollmann, Tobias, Kuckertz, Andreas, &Stöckmann, Christoph (Eds.) (2010). *E—Entrepreneurship and ICT Ventures: Strategy, Organization and Technology.*New York, Business Science Reference.



## **MCA172 Computer Based Accounting and Financial Management**

Teaching Schedule Hours/Week			Examination Scheme				
<b>Theory</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Internal</b>		<b>Final</b>		<b>Total</b>
			<b>Theory</b>	<b>Practical</b>	<b>Theory</b>	<b>Practical</b>	
<b>3</b>	<b>1</b>	<b>1</b>	<b>20</b>	<b>20</b>	<b>60</b>	<b>-</b>	<b>100</b>

### **Objective:**

The objective of the course is to provide the students with an understanding of the concept, principles and techniques of accounting and financial management and their application in real life situations. It specifically aims at imparting the students with necessary knowledge and skills required for understanding accounting and making financial decisions for better future of organization.

### **Course contents:**

#### **Unit 1: Introduction of Accounting and Financial Management [4Hrs]**

Meaning of accounting and finance, accounting concept, classification of accounting, difference between accounting and finance, importance of managerial finance, finance functions, finance in the organizational structure of the firm.

#### **Unit 2: Computer based accounting system [6Hrs]**

Difference between manual and computer based accounting, Computer based accounting- Analysis transaction, enter data in database, Arrange data as journal entries, arrange data as ledger accounts, prepare trial balance, and prepare financial statements, Case study and presentation of case study.

#### **Unit 3: Financial statement and cash flow [4Hrs]**

Understanding financial statements: income statement, balance sheet, analysis of cash flow.

#### **Unit 4: Financial analysis [5Hrs]**

Meaning and objectives of financial statement analysis, ratio analysis: liquidity ratios, profitability ratios, activity ratios and ratios for shareholders.

#### **Unit 5: Time value of money [4Hrs]**

Meaning and importance of time value of money. Future value, present value, find out the discount rate and number of periods, amortization.

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**Unit 6: Working capital management** [3Hrs]

Concept and importance of working capital, working capital, and cash flow cycle, and current assets management

**Unit 7: Valuation of bonds** [4Hrs]

Meaning, nature and feature of bond, financial assets valuation, valuation of bond, yield to maturity, current yield, capitals gain yield, and semiannual bond

**Unit 8. Valuation of stocks** [3Hrs]

Meaning and difference between common and preferred stock, Common stock valuation-normal growth, zero growth and super normal growth and valuation of preferred stock.

**Unit 9: Cost of capital** [4Hrs]

Components of cost of capital, cost of debt, cost of preferred stock and equity and weighted average cost of capital.

**Unit 10: Capital Budgeting** [5Hrs]

Ranking investment proposals: payback, discounted payback, net present value, internal rate of return and modified IRR, profitability index.

**Unit 11: Dividend policy** [3Hrs]

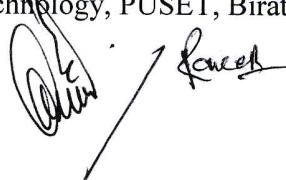
Procedures of dividend payment, factors influencing dividend policy, stock dividends and stock split.

**Use of computer package is emphasized.**

**Reference Books:**

1. RadheShyam Pradhan, Financial Management, Budha Academic Publishers
2. Eugene F. Brigham, Louis C. Gapenski & Michael C. Ehrhardt, Financial Management: theory and practices, Harcourt Asia PTE. Ltd Delhi
3. James C., Van Horne, Financial Management & Policy, PHI India Delhi
4. Balendu Hamal Thakuri, Accounting for Technology, PUSET, Biratnagar

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## MCA173 Enterprise Resource Planning

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1		Theory	Practical	Theory	Practical	100
			20		80	-	

### Course Objective:

The course aims at providing knowledge about ERP and related technologies, modules in an ERP package, its market and its present and future.

### Course Contents:

- Unit1: Introduction to Enterprise Resource Planning (ERP) [7Hrs]**  
 Overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering, Data Warehousing, Data Mining, On-line Analytical Processing, Supply Chain Management
- Unit 2: ERP Implementation [11Hrs]**  
 Implementation Life Cycle, Implementation Methodology, Hidden Costs, Organizing Implementation Vendors, Consultants and Users, Contracts, Project Management and Monitoring
- Unit 3: Business Modules [9Hrs]**  
 Business Modules in an ERP Package, Finance, Manufacturing, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution
- Unit 4: ERP Market [9Hrs]**  
 ERP Market Place, SAP AG, PeopleSoft, Baan Company, JD Edwards World Solutions Company, Oracle Corporation, QAD, System Software Associates
- Unit 5: ERP – Present and Future [9Hrs]**  
 Turbo Charge the ERP System, EIA, ERP and E-Commerce, ERP and Internet, Future Directions in ERP

### Reference Books:

1. Alexis Leon, "ERP Demystified", Tata McGraw Hill, 1999.
2. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, "Concepts in Enterprise Resource Planning", Thomson Learning, 2001.
3. Vinod Kumar Garg and N.K. Venkata Krishnan, "Enterprise Resource Planning concepts and Planning", Prentice Hall, 1998.
4. Jose Antonio Fernandz, "The SAP R /3 Hand book", Tata McGraw Hill

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## **MCA178 Cloud Security**

### **Course Objectives:**

- To introduce the basic concepts of security systems and cryptographic protocols
- To Introduce the multi tenancy operation, virtualized infrastructure security and methods to improve virtualization security

### **Course Contents:**

#### **Unit 1:Security Concepts [9Hrs]**

Confidentiality, privacy, integrity, authentication, non-repudiation, availability, access control, defence in depth, least privilege, their importance in PaaS, IaaS and SaaS, Cryptographic Systems- Symmetric cryptography, stream ciphers, block ciphers, modes of operation, public-key cryptography, hashing, digital signatures, public-key infrastructures, key management, X.509 certificates, OpenSSL.

#### **Unit 2:Multi-Tenancy Issues [9Hrs]**

Virtualization System Security Issues- e.g. ESX and ESXi Security, ESX file system security, storage considerations, backup and recovery; Virtualization System Vulnerabilities- Management console vulnerabilities, management server vulnerabilities, administrative VM vulnerabilities, guest VM vulnerabilities, hypervisor vulnerabilities, hypervisor escape vulnerabilities, configuration issues, malware

#### **Unit 3: Technologies for Virtualization –based Security enhancement [9Hrs]**

Security virtual server protection, virtualization-based sandboxing; Storage Security- HIDPS, log management, Data Loss Prevention.Location of the Perimeter.

#### **Unit 4: Data Center Operations [9Hrs]**

Data Center Operations, Security challenge, Implement Five Principal Characteristics of Cloud Computing, Data center Security Recommendations. Encryption and Key Management: Encryption for Confidentiality and Integrity, Encrypting data at rest, Key Management Lifecycle, Cloud Encryption Standards, Recommendations.

#### **Unit 5: Legal and Compliance issues [9Hrs]**

Responsibility, ownership of data, right to penetration test, local law where data is held, modern Security Standards, cloud services and virtualization security standard , compliance for the cloud provider vs. compliance for the customer.

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### **Laboratory Works:**

Labs consist of at least 8 practical experiments and two assignments covering the topics of the syllabus.

### **Reference Books:**

1. Tim Mather, Subra Kumaraswamy, ShahedLatif, "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance" O'Reilly Media; 1 edition [ISBN: 0596802765], 2009.
2. Ronald L. Krutz, Russell Dean Vines, "Cloud Security" [ISBN: 0470589876], 2010.
3. John Rittinghouse, James Ransome, "Cloud Computing" CRC Press; 1 edition [ISBN: 1439806802], 2009.
4. J.R. ("Vic") Winkler, "Securing the Cloud" Syngress [ISBN: 1597495921] 2011. 12 SRM-M.Tech Cloud Computing 2015 – 16
5. Cloud Security Alliance, "Security Guidance for Critical Areas of Focus in Cloud Computing" 2009.
6. Vmware "VMware Security Hardening Guide" White Paper, June 2011 .

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## MCA180RemoteSensing&GIS

Teaching Schedule Hours/Week			Examination Scheme				
<b>Theory</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Internal</b>		<b>Final</b>		<b>Total</b>
			<b>Theory</b>	<b>Practical</b>	<b>Theory</b>	<b>Practical</b>	
<b>3</b>	<b>1</b>	<b>2</b>	<b>20</b>	<b>20</b>	<b>60</b>	<b>-</b>	<b>100</b>

**Course Objective:**

The main objective of this course is to familiarize students with the fundamentals know how of remote sensing and geographical information system.

**Course Contents:**

**Unit 1: Fundamentals & Physics of Remote Sensing**

**1.1 Concept and Scope of Remote Sensing:** Definitions, Process and Characteristics of Remote Sensing System, Advantages and Limitations. [3 H]

**1.2 Concept of Electro magnetic Radiation (EMR) :** Wavelength-frequency-energy relationship of EMR, EMR Spectrum and its properties, EMR wavelength regions and their applications, Atmospheric windows, Interactions of EMR withmatter, Energy Interaction in the atmosphere, Energy Interactions with Earth Surface features, Spectral Signatures. [6Hrs]

**Unit 2: Platforms and Sensors**

**2.1 Types and Characteristics of Sensor:** Sensor materials, Sensor System - Framing and Scanning System (Whiskbroom scanner, Push-broom scanner, Side Looking scanner), Imaging and non-imaging sensors, Active and passive sensors, Resolution of Sensors - Spectral, Spatial, Radiometric &Temporal; Scale, Mapping unit, Multi-band concepts and False Color Composites. [5 Hrs]

**2.2 Remote Sensor Platforms and Satellite Orbits:** Ground, Airborne and Space-borne Platforms; Orbital Characteristics—Coverage, Passes, Pointing Accuracy; Geostationary, Sun synchronous, shuttle orbit, Semi synchronous orbit (Molniya orbit) and Quasi-zenith satellite orbit. [4 Hrs]

**2.3 Space Imaging Satellites:** Early history of space imaging; Multi spectra land Hyper spectral sensors, Radar, Lidar; Specification of some popular satellites – IRS, LANDSAT and SPOT series; High resolution satellites – IKONOS, Cartosat, Quickbird, Orb View, World View; Other latest earth resourcesatellites. [4Hrs]

**Unit-3: Fundamentals of Geographic Information System**

**3.1 Basic Concepts:** Definition of GIS, Components of GIS, Variables-points, lines, polygon; Functionality of GIS, Areas of GIS application, Advantages and Limitations of GIS. [3 Hrs]

**3.2 GIS Data & Database:** Spatial and Attribute Data, Information Organization and Data Structures - RasterandVectordatastructures;Fileorganizationandformats,Geo-database,GISSoftwares. [4 hrs]

**3.3 GIS Data Input:** Nature and Source of data, Method of spatial data capture-Primary and Secondary, Digitization and Scanning method, Techniques and procedure for digitizing, Errors of Digitization, Attribute data capture. [5 Hrs]

**3.4 GIS Mapping:** Defining Map, Categories of Maps, Map Scales, Georeferencing, Projection Systems—Types and As pects; UTM. [4Hrs]

**3.5 Data Editingin GIS:** Detecting and correcting errors, Re-projection, Transformation and Generalization, Edge matching and Rubber sheeting, Conversion from Other Digital Sources.[ 3 Hrs]

*Altharur*



*Kareem*

**3.6 Spatial Analysis:** Types of Spatial Analysis, Measurement in GIS, Query by Attributes, Spatial Queries, Attribute Based Operation, Neighborhood Analysis, Connectivity Analysis, Overlay and Coverage Rebuilding.

[4 Hrs]

**Laboratory Works:**

There shall be lab exercises covering sever all topics of Remote Sensing and GIS.

**References Books:**

1. P.A. Burrough and R.A. Mc Donnell, "Principles of Geographical Information Systems", Oxford University Press.
2. J. Star and J. Estes, "Geographic Information Systems: An Introduction", Prentice Hall, Englewood Cliffs, N. J.
3. J. Lee, D. W. S. Wong, "Statistical Analysis with Arc View GIS", John Wiley and Sons, Inc., New York.
4. George Joseph, "Fundamentals of Remote Sensing".
5. Ravi P. Gupta, "Remote Sensing Geology".
6. Basudeb Bhattacharya, "Remote Sensing and GIS".
7. Noam Levin, "Fundamental of Remote Sensing".
8. Floyd F. Savins, "Remote Sensing, Principal and Interpretation".

Ritwick

Ranjan

## MCA185 Digital Commerce

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1		Theory	Practical	Theory	Practical	100
			20		80	-	

### **Course Objective:**

The main objective of this course is to equip students with the knowledge of electronic commerce, Mobile Commerce, Digital Marketing, web content management system, and uses of Artificial Intelligence required for analyzing and implementing Digital Commerce in a typical business set up.

### **Course Contents:**

#### **Unit 1: E-Commerce** [11 Hrs]

Introduction, Advantages and Disadvantages, Benefits, Features, Business models of E-Commerce, Infrastructure Requirement for E-Commerce, Different types of Networking for E-Commerce ,Internet, Extranet and Intranet, Security for E-Commerce, Security Standards, Firewall, Cryptography, Digital Token based Payments

#### **Unit 2: Electronic Retailing** [2Hrs]

Mercantile Models from the consumer's perspective, Distinctive phases of a consumer Mercantile Model, Pre purchase Preparation, Purchase consummation, Post purchase Interaction

#### **Unit 3: Introduction to Digital Commerce** [3 Hrs]

Need of digital commerce, comparison between Digital Commerce and E-Commerce, Challenges of Digital Commerce, Key Digital Commerce Trends

#### **Unit 4: Mobile Commerce** [8Hrs]

Definition, Types of Mobile Commerce, Applications Comparison between M-Commerce and E-Commerce, Features of M-Commerce, Global System for Mobile Commerce (GSM), GPRS, 3G, 4G, 5G

#### **Unit 5: Digital Marketing** [8 Hrs]

Internet Marketing and Digital Marketing Mix, Search Engine Advertising, Introduction to SEO, Display marketing, Social Media (Facebook, LinkedIn, Twitter, YouTube, Google,

Rethaaur

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Instagram) Marketing, Case studies, Study of any two research articles on Digital Marketing and presentation by individual students

**Unit 6: web Content Management systems [7 Hrs]**

Planning and Developing Dynamic Web Content Sites, Building and Administrating a Wordpress Blog Site, Building an Online Social Network Using SocialGo, Creating Online Courses Using MoodleCloud

**Unit 7: Applications of AI[6Hrs]**

Chatbots, Personalization, Inventory and Supply Chain, Intelligent Image Search, Case s Case studies, Study of any two research articles on the application of AI in digital commercee and and presentation by individual student.

**Reference Books:**

1. Electronics Commerce –Technologies and Applications: Bhaskar Bharat, TMH
2. Frontiers of Electronic Commerce: Kalakota ,Whinston, Pearson Education
3. E-Commerce : Strategy Technologies and Applications: Whiteley, David, TMH
4. Digital Marketing: Seema Gupta, Mc\_Graw Hill

Ritavur

## MCA 186 Digital-Governance

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
			Theory	Practical	Theory	Practical	
3	1		20		80	-	100

**Course Objective:**

This course provides the implementation and management of Digital Government from the technicalities of data flows and process mapping to the policies of e-government and Digital Governance.

**Course Contents:**

**Unit 1: Basics of e-Government**

[5Hrs]

e-Government and e-Governance, e-Government as information system, benefits of e-Government, e-Government stages of development, PPP Forms, Issues in PPP for e-Government, citizen-centric approach to e-Government.

**Unit 2: ICT Infrastructure for e-Government**

[2Hrs]

Network infrastructure, computing Infrastructure, data centers, e-Government architecture, interoperability framework.

**Unit 3: e-Government Readiness**

[3Hrs]

e-Readiness framework, steps to e-Government readiness, issues in e-Government readiness.

**Unit 4: Security for e-Government**

[4Hrs]

Challenges of e-government security, an approach to security for e-Government, security management model, e-Government security architecture, security standards.

**Unit 5: Managing e-Government**

[6Hrs]

Approaches to management of e-Government systems, e-Government strategy, managing public data, managing issues for e-Government, emerging management issues for e-Government.

**Unit 6: Implementing e-Government**

[6Hrs]

e-Government system life cycle and project assessment, analysis of current reality, design of new e-Government system, e-Government risk assessment and mitigation, e-Government system construction, implementation and beyond, developing e-Government hybrids.

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**Unit 7: Basics of Digital Governance****[2Hrs]**

Definition of Digital Governance, Digital Strategy, Digital Policy, Digital Standards, The Power of Framework

**Unit 8: Digital Team, Digital Strategy, Digital Policy and Digital Standards****[5hrs]**

Core Tream, Distributed Digital Team, Committees, Councils, Worker Groups, Extended Team, Definition of Digital Strategy and Digital Policy, Policy attributes, Writing Digital policy, Raising awareness about Digital Policy, Standards definition and Documentation, Identifying Standards authors

**Unit 9: Digital Governance Design Factors and Implementation****[2Hrs]**

Corporate Governance Dynamics, External Demands, Internet and WWW Governance, Organization Culture, The nature of Digital Presence, Identification of a Sponsor and Advocate, Populating the design Team, Implementing the framework

**Unit 10: Case Studies and Applications of e-government system and Digital Governance****[10Hrs]**

- Nepal: Cyber Laws, ICT development project, Government Integrated Data Center (GIDC), e-Government master plan, Human resource management software.
- India: Community information centers, e-Procurement in the government of Andhra Pradesh, e-Suvida.
- Other Countries: E-Government development in South Korea, e-Government in China, e-Government in Brazil, Sri Lanka, Singapore, USA.
- Government case study, Higher Education Framework

**Reference Books:**

1. "Implementing & Managing e-Government", Richard Heeks
2. "e-Governance: Concepts & Case Studies", C. S. R. Prabhu, Prentice Hall of India
3. "e-Government", J. Satyanarayana, Prentice Hall of India
4. "Managing Chaos, Digital Governance by Design" Lisa Welchman, Rosenfeld

## Multimedia and Application

### BCA437CO

**Year:** .....

**Semester:** .....

Teaching Schedule Hours/Week			Examination Scheme				
<b>Theory</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Internal</b>		<b>Final</b>		<b>Total</b>
			<b>Theory</b>	<b>Practical</b>	<b>Theory</b>	<b>Practical</b>	
3	1	2	20	20	60	-	100

#### Course Objective/s:

**The main objective is introduce the technologies, concept and techniques associated with the development of multimedia system.**

#### **Unit 1: Multimedia System**

**[3 Hrs]**

- 1.1 Introduction, aspect, element, and structure
- 1.2 Medium, properties and notation
- 1.3 Data stream characteristics for traditional, and continuous media

#### **Unit 2: Sound and Audio**

**[4 Hrs]**

- 2.1 Basic sound concept, Computer representation and file formats
- 2.1 Basic music (MIDI) concepts, MIDI devices, messages, and software
- 2.2 Basic speech concept, generation, analysis (recognition and understanding), and Transmission

#### **Unit 3: Image and Graphics**

**[4 Hrs ]**

- 3.1 Basic concept: representation, image format, graphics format
- 3.2 Image processing fundamentals, Synthesis, analysis and Transmission

#### **Unit 4: Video and Animation**

**[4 Hrs]**

- 4.1 Basic video concepts: signal representation, format, and transmission
- 4.2 Basic animation concept, languages, control and transmission

#### **Unit 5: Data compression**

**[6 Hrs]**

- 5.1 Basic concepts, Coding requirement
- 5.2 Categories (Source, Entropy, and Hybrid Coding)
- 5.3 Basic compression techniques (Run-Length coding, Hoffman coding, Prediction coding, and Adaptive compression techniques)
- 5.4 Coding standard JPEG, H.261 (px64), MPEG and DVI.

#### **Unit 6: Multimedia communication system**

**[4 Hrs]**

- 6.1 Introduction to Multimedia communication
- 6.2 Application subsystem
- 6.3 Transport subsystem
- 6.4 Quality of service and resource management

#### **Unit 7: Documentation Hypertext and MHEG**

**[4 Hrs]**

- 7.1 Documents: architecture and Manipulation of multimedia data
- 7.2 Hypertext, hypermedia and multimedia
- 7.3 Hypermedia Systems: Architecture, nodes and pointers
- 7.4 Document Architecture: SGML, ODA and MHEG.

*Rithika*

*S. Suresh*

*Arun*

<b>Unit 8: Synchronization</b>	[3 Hrs]
8.1 Introduction	
8.2 Notion of synchronization	
8.3 Presentation requirements	
8.4 Reference model for multimedia synchronization	
8.5 Synchronization specification	
<b>Unit 9: Abstraction of programming</b>	[2 Hrs]
9.1 Introduction	
9.2 Abstraction levels	
9.3 Libraries, system software, Toolkits Higher programming language, Object-oriented approaches	
<b>Unit 10: Multimedia Application</b>	[2 Hrs]
10.1 Video-On demand	
10.2 Video Conferencing	
10.3 Educational Application, Industrial Application	
10.4 Information System, Multimedia archives & digital libraries, Media entertainment, Media editors, trends	
<b>Unit 11: Content analysis</b>	[4 Hrs]
11.1 Simple Vs. Complex Features	
11.2 Analysis of Individual Images	
11.3 Analysis of Image Sequences	
11.4 Audio Analysis; Applications	
<b>Unit 12: Multimedia Application Design</b>	[5 Hrs]
12.1 Multimedia Application Classes	
12.2 Types of Multimedia Systems	
12.3 Virtual Reality Design	
12.4 Components of Multimedia Systems	
12.5 Organizing Multimedia Databases	
12.6 Application Workflow Design Issues	
12.7 Distributed Application Design Issues	

### Laboratory Exercises

1. Integration of multimedia (Audio, Speech, and Music Video, Static and, Movie, Animation Programming etc.)
2. Image Enhancement in Photoshop, flash.
3. 2D & 3D animation in OpenGL/Maya/Flash/C++
4. Image Compression Algorithm :JPEG
5. Real Time Scheduling Algorithm

**Note: Lab on any two topics.**

### References

1. Ralf Steinmet and Klara Nahrstedt, Multimedia Computing Communications and applications, Pearson Education asia 2001, ISBN 81-7808-319-1
2. Andleigh P. Thakrar, Multimedia System Design Prentice Hall, NJ 1996
3. Gibbs S.J. Tsichritzis, D.C. Multimedia Programming objects, Environment and frameworks Addison-wesley-1995
4. Koegel-Buford J.F. Multimedia System Addison-Wesley, 1994
5. J.Jeffcoate, Multimedia in Practise: Technology & Application, PHI

R. Bhattacharya

J. Jeffcoate

A. Guha

## MCA192 Artificial Intelligence

Teaching Schedule Hours/Week			Examination Scheme					
Theory	Tutorial	Practical	Internal		Final		Total	
3	1	2	Theory	Practical	Theory	Practical	100	
			20	20	60	-		

### Course Objective:

The main objective of this course is to familiarize students with the sound conceptual understanding of AI technologies and a practical grounding in AI and its applications.

### Course Contents:

#### Unit 1: Introduction

[4 Hrs]

- 1.1 Definitions
- 1.2 Brief history of AI, Turing Test
- 1.3 AI and related fields
- 1.4 Goals and Challenges of AI
- 1.5 Applications of AI

#### Unit 2: Agents and Problem Solving

[7 Hrs]

- 2.1 Introduction to agent and agent environment
- 2.2 Agent architecture
- 2.3 Types and Examples of Agent
- 2.4 PEAS
- 2.5 Defining Problem as a State Space Search
- 2.6 Problem types
- 2.7 Problem formulation, Problem solving agent, Learning agent
- 2.8 Constraint Satisfaction Problem, Cryptarithmetic problems
- 2.9 Game Playing, Production-rule systems

#### Unit 3: Search Strategies

[7 Hrs]

- 3.1 Searching and its importance
- 3.2 Uninformed Search: Breadth-first search, Depth-first search, Depth-limited search, iterative-deepening search, Uniform-cost search, Bidirectional search, Comparative study of uninformed search techniques
- 3.3 Informed Search: Best-first search, Greedy search, A\* search, Hill climbing, Comparative study of informed search techniques
- 3.4 Adversarial Search: Games and Perfect Games, Min Max problem, Alpha-Beta Pruning

#### Unit 4: Knowledge Representation, Inference and Reasoning

[11 Hrs]

- 4.1 Knowledge and its types
- 4.2 Logic, Formal-logic connectives
- 4.3 Propositional Logic, Truth tables, , Well-formed formula, Tautology
- 4.4 Predicate Logic, FOPL
- 4.5 Inference Rules, Resolution in FOPL, Forward and backward reasoning
- 4.6 Semantic Nets and Frames
- 4.7 Reasoning and Uncertainty, Monotonicity
- 4.8 Statistical Reasoning, Bayesian Network
- 4.9 Case-based reasoning

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Xerox



**Unit 5: Expert System** [4 Hrs]

- 5.1 Architecture and characteristics of an expert system
- 5.2 Categories of knowledge, Knowledge acquisition, Knowledge elicitation techniques
- 5.3 Development of an expert system
- 5.4 Case Study

**Unit 6: Machine Learning** [4 Hrs]

- 6.1 Winston's learning concept
- 6.2 Rote learning, Learning by Analogy, Explanation-based learning, Inductive learning
- 6.3 Supervised and Unsupervised learning
- 6.4 Reinforcement learning
- 6.5 Genetic algorithm
- 6.6 Case Study

**Unit 7: Neural Networks** [5 Hrs]

- 7.1 Basic concepts, Network structure
- 7.2 Perceptron, Multilayer Perceptron, Adaline, Madaline
- 7.3 Back propagation, Hopfield network, Boltzmann Machines, Deep learning
- 7.4 Applications of Neural Network
- 7.5 Case Study

**Unit 8: Natural Language Processing** [3 Hrs]

- 8.1 Levels of analysis: Morphological, Syntactic, Semantic, Discourse integration, Pragmatic analysis
- 8.2 Parsing and Parse-tree generation

**Laboratories:**

There shall be lab exercises on PROLOG/LISP covering the following topics.

1. Simple question-answering
2. Solving family relation problems
3. Numerical problems such as Prime number, factors, GCD
4. Logic-gate programs
5. Fundamental search techniques
6. Menu-driven programs
7. Inference and reasoning problems
8. Tower of Hanoi

**Reference Books:**

1. Stuart Russel & Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson
2. E. Rich & K. Knight, "Artificial Intelligence", McGraw-Hill
3. D. W. Patterson, "Artificial Intelligence and Expert Systems", Prentice Hall
4. P. H. Winston, "Artificial Intelligence", Addison-Wesley
5. R. Shingal, "Formal Concepts in Artificial Intelligence", Chapman & Hall
6. E. Turban, "Decision Support and Expert System", Macmillan
7. D. Crookes, "Introduction to Programming in Prolog", Prentice Hall
8. G. Gazadar & C. Mellish, "Natural Language Processing in Prolog and Introduction to Computational Linguistics", Addison-Wesley
9. Haykin, "Neural Networks: A Comprehensive Fundamentals", Macmillan
10. G. F. Lugar & W. A. Stubblefield, "Artificial Intelligence", Benjamin Cummings

*Rattinapuram*

*Dinesh*

*Suresh*

## MCA 193 Machine Learning

Teaching Schedule			Examination Scheme				
Hours/Week			Internal		Final		Total
Theory	Tutorial	Practical	Theory	Practical	Theory	Practical	100
3	1	2	20	20	60	-	

### Course Objective:

The main objective of the course is to provide an understanding of the theoretical concepts of machine learning and uses of machine learning tools towards a variety of applications.

### Course Contents:

#### Unit 1: Introduction to Machine Learning

[5 Hrs]

Introduction, Components of Learning, Learning Models , Geometric Models, Probabilistic Models, Logic Models, Grouping and Grading, Designing a Learning System, Supervised Learning, Unsupervised Learning, Reinforcement Learning, Frameworks for building Machine Learning System

#### Unit 2: Supervised Learning:

[12Hrs]

**Regression:** Linear Regression, Non-Linear Regression, and Model Evaluation Method

**Classification:** Logistic Regression, Support Vector Machine, K-Nearest Neighbors Methods

**Decision Tree Technique-** Decision tree representation, Appropriate problems for decision tree learning, Basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning

#### Unit 3: Unsupervised Learning:

[4Hrs]

Introduction to clustering, K-means clustering, K-mode clustering

#### Unit 4: Model Diagnosis and Tuning:

[7 Hrs]

Bias and Variance, K-Fold Cross-Validation, Random Forests, Boosting, Hyperparameter tuning- GridSearch, RandomSearch.

#### Unit 5: Text mining:

[6 Hrs]

Text mining process overview, Text assemble, Text Preprocessing, Text Assemble, Text Exploration, Model building, Text exploration, Text Similarity, Text Clustering

#### Unit 6: Deep Learning

[11Hrs]

Artificial Neural Network, Feed Forward Neural Network with backpropagation, Convolution Neural Network, Recurrent neural network, Bayesian Learning and its applications

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### **Laboratory Works:**

Laboratory work consists of the following laboratory exercises using Python

1. Introduction to Python, Python Libraries- Numpy, Pandas, Matplotlib, Scikit
2. Perform Data exploration and preprocessing in Python
3. Implement Linear regression
4. Implement Naive Bayes classifier for dataset stored as CSVfile.
5. Implement logistic regression
6. Build models using Decision trees
7. Build model using SVM with different kernels
8. Implement K-NN algorithm to classify a dataset
9. Implement a sklearn multilayer perceptron classifier
10. Using WEKA for classification, clustering and regression

### **Reference Books:**

1. Tom M. Mitchell, Machine Learning, India Edition 2013, McGraw Hill Education
2. Mastering Machine Learning with Python in six steps. A practical Implementation Guide to Predictive Data Analytics Using Python. Authors: Swamynathan Manohar
3. Muller Andreas and Sarah Guidos, Introduction to Machine Learning with Python: A guide for data scientists,
4. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, 2nd edition, springer series in statistics.
5. EthemAlpaydin, Introduction to machine learning, second edition, MITpress.

Ratnawali

Amrit

Ramya

## **MCA194 Business Intelligence, Analytics and Data Science**

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal		Final		Total
3	1	2	Theory	Practical	Theory	Practical	100
			20	20	60	-	

### **Course Objective:**

The main objective of this course is to provide to students foundation in Business Intelligence, analytics techniques and their applications, and an introduction to emerging technologies that are likely to impact on the development and use of BI applications. The course will also provide skills in using specific software tools for developing BI applications.

### **Course Contents:**

#### **Unit 1: An Overview of Business intelligence, Analytics and Decision Support [6 Hrs]**

Changing Business Environments and Computerized Decision Support; Framework for Business intelligence (BI); Intelligence Creation, Use, and BI Governance; Transaction Processing versus Analytic Processing; Successful BI Implementation; Analytics Overview

#### **Unit 2: Data Ware Housing**

**[6 Hrs]**

Data Ware Housing(DW) Definitions and Concepts;DW Process Overview, Architectures; Data Integration, and the Extraction, Transformation and Load (ETL) Processes;DW Development;DW Implementation Issues; Real Time DW; and DW Administration, Security Issues and Future Trends.

#### **Unit 3: Business Reporting, Visual Analytics and Business Performance Management**

**[6 Hrs]**

Business Reporting Definitions and Concepts; Data and Information Visualization;Different Types of Charts and Graphs; Emergence of Data Visualization and Visual Analytics; Performance Dash Boards; Business Performance Management; Performance Measurement; Balanced Score Boards; and Six Sigma as a Performance Measurement System; Using Tableau and Power BI for data visualization

#### **Unit 4: Data Mining**

**[9 Hrs]**

Data Mining (DM) Concepts and Applications; DM Processed Methods Software Tools; and DM Privacy Issues; Using WEKA tools for data mining

#### **Unit 5: Text and Web Analytics:**

**[6 Hrs]**

Text Analytics (TA) and Text Mining (TM) Overview; Natural Language Processing; TM Applications' Process; Sentiment Analysis; Web Mining (WM) Overview; Search Engines; Web Usage Mining (Web Analytics); and Social Analytics

*Rathna*

*Chinni*

*Reet*

**Unit 6: Big Data Analytics:****[5 Hrs]**

Definition of Big Data; Fundamentals of Big Data Analytics; Big Data Technologies; Data Scientist; Big Data and Warehousing; Big Data Vendors; Big Data and Stream Analytics; and Applications of Stream Analytics.

**Unit 7: Business Analytics (BA) – Emerging trends and Future Impacts: [7 Hrs]**

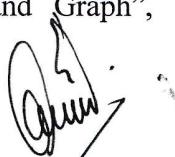
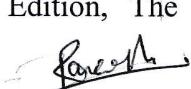
Location-Based Analytics for Organizations; Analytics Applications for Consumers; Recommendation Engines; Web 2.0 Revolution and Online Social Networking; Cloud Computing and BI; Impacts of Analytics in Organizations –An Overview; Issues of Legality, Privacy and Ethics; and an overview of Analytics Ecosystem

**Text Book:**

1. Ramesh Sharda, DursunDelen, Efraim Turban, et al, "Business Intelligence: A Managerial Perspective on Analytics", 3<sup>rd</sup> Ed, Pearson India EducationInc, Indian Subcontinent Reprint 2018 (ISBN 978-93-528-6271-9)

**Reference Books:**

1. Jiawei Han and Michelinekambe, Jian Pei, "Data Mining: Concepts and Techniques ", 3<sup>rd</sup> ed. The Morgan Kaufmann Publishers.
2. Michael Steinbach, Pang-Ning Tan, and Vipin Kumar, "Introduction To Data Mining", Pearson International Edition, 2006.
3. James Allen," Natural Language Understanding", 2<sup>nd</sup> Ed., The Benjamin/Cummings Publishing Company Inc.
4. Daniel Jurafsky, James. H. Martin, " Speech and Language Processing" , 2<sup>nd</sup> Edition, Pearson Education Inc.
5. Gabe Ignatow, Rada F. Mihalcea, "An Introduction to Text Mining: Research Design, Data Collection, and Analysis",1st Edition,
6. ChengXiangZhai, Sean Massung, "Text Data Management and Analysis: A Practical Introduction to Information Retrieval and Text Mining"1<sup>st</sup> Edition, ACM Book Series.
7. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", 1<sup>st</sup> Edition, The Morgan Kaufmann Publishers.

  
Rathaur  
Panell