

**MCA Part-III (Choice Based Credit System)**  
**(Under Faculty of Science)**  
**To be implemented from the academic year 2018-2019**

Semester – V							
Sr. No.	Subject Code	Subject Title	Internal Marks	External Marks	CP	Workload per Week	
						T	P
1	IT51	Artificial Intelligence and Applications	20	80	4	4	-
2	IT52	Advance Web Technology	20	80	4	4	-
3	IT5E	Elective II IT5E.1 Cryptography & Network security IT5E.2 Distribute Computing IT5E.3 Mobile Computing IT5E.4 Big Data Management	20	80	4	4	-
4	BM5E	Elective II BM5E.1 Management Information System BM5E.2 Knowledge Management BM5E.3 Software Project Management & Quality Assurance BM5E.4 Enterprise Resource Planning	20	80	4	4	
5	MT51	Optimization Techniques	20	80	4	4	
6	CS51	Industrial Seminar	50		2	2	-
7	IT51L	LAB IX (Artificial Intelligence and Applications)		100	4	-	4
8	IT52L	LAB X (Advance Web Technology)		100	4	-	4
<b>Total</b>			<b>150</b>	<b>600</b>	<b>30</b>	<b>22</b>	<b>8</b>

Semester – VI					
Sr. No.	Subject Code	Subject Title	Internal	External	CP
1	IT61	Project Work	200	300	20

**MCA (Choice Based Credit System)**  
**(Under Faculty of Science)**  
**(Introduced from June 2016 and Onwards)**  
To be implemented from the academic year 2018-2019  
Semester-V

**IT51- Artificial Intelligence and Applications**

**Internal Marks -20**

**External Marks-80**

**Theory-04 h/week**

---

**Course Objective:**

1. To endow with various disciplines of Artificial Intelligence and its applications.
2. To explore knowledge representation techniques in AI.
3. To demonstrate Machine Learning through Artificial Neural Networks.
4. To explain handling uncertainty using Fuzzy Logic.

**Course Outcomes:** By the end of the course students shall be able to:

1. Apply problem solving by intelligent search approach.
2. Represent knowledge using AI knowledge representation techniques.
3. Design Machine Learning solution to real life problems.
4. Derive solutions for problems with uncertainty using Fuzzy theory.

**UNIT-I**

**Introduction to Artificial Intelligence and Applications**

**(15)**

Introduction, Disciplines of AI, Applications of AI, Turing Test, General Problem Solving, Nature of AI Problems, Expert Systems – Characteristics, Knowledge Representation, Architecture, Natural Language Processing - NLP Phases, Parser

**UNIT-II**

**Knowledge Representation**

**(15)**

Introduction, Propositional Logic, Syntax and Semantics, Interpretations, Properties, Predicate Calculus, WFF, Free and Bound Variables, Normal Forms, Inference Techniques, Resolution, Unification, Modes Pones, Frames, Frame Representation Language, Conceptual Dependency, CD Theory, Script, Semantic Net, Conceptual Graph, Rule Based Representation, Forward and Backward Reasoning

**UNIT-III**

**Problem Solving by Intelligent Search**

**(15)**

Introduction, State and Space Search, Depth First Search, Breadth First Search, Mean and Ends Analysis, Heuristic Search, Hill Climbing, Best First Search, Branch and Bound Search, A\*and AO\* Algorithm, Game Playing, Min-Max Search Procedure, ALPHA-BETA Pruning

**UNIT-IV**

**Soft Computing**

**(15)**

Introduction, Basic Concepts of Neural Networks, Model of an Artificial Neuron, Activation Functions, Feedforward Network, Recurrent Network, Learning Methods, Fuzzy Set Theory,

Fuzzy Membership, Fuzzy Operations, Fuzzy Logic Systems, Fundamentals of Genetic Algorithms, Evolutionary Process, Life Cycle, Applications

### Reference Books

1. Artificial Intelligence & Expert Systems, Dan W. Patterson, Prentice Hall of India, 2005
2. Artificial Intelligence, Elaine Rich, Kerin Knight, Tata McGraw Hill Publishing Company, New Delhi, 2nd Ed, 2004
3. Artificial Intelligence : A Modern Approach, Stuart Russel, Pearson Education, 3rd. Ed., 2011
4. Neural Networks, Fuzzy Logic, and Genetic Algorithms: Synthesis and Applications, S. Rajasekaran, G. A. Vijayalakshmi Pai, Prentice-Hall of India, 2003
5. S. N. Sivanandam, Principles of Soft Computing, Wiley India, 2007
6. Artificial Intelligence & Soft Computing Behavioral & Cognitive Modeling of the Human Brain, Amit Konar, CRC Press, New York, 2008
7. Introduction to Machine Learning, Ethem Alpaydin, PHI Learning Pvt. Ltd, 3<sup>rd</sup> Ed., 2014

### MCA (Choice Based Credit System) (Under Faculty of Science)

(Introduced from June 2016 and Onwards)

To be implemented from the academic year 2018-2019

Semester-V

### IT52- Advanced Web Technology

**Internal Marks -20**

**External Marks-80**

**Theory-04 h/week**

---

### Course Objective:

1. To familiarize a student with Client-side and Server-side processing
2. To provide a student with the solid foundation of the syntax and semantics of C# as well as architecture of the .NET framework
3. To inculcate skills pertaining to data access technology geared to facilitate the development of disconnected systems using .NET platform.
4. To familiarize the student with the development of N-tier web-based application

### Unit 1: Client Side Scripting with HTML and JavaScript

**15 hrs**

Overview of HTML, Structure of HTML document. Formatting text with HTML, adding local and remote links, adding graphics, creating lists in HTML, creating tables in HTML, Dividing the window with frames, Building interactivity with forms, Formatting site with cascading style sheets. Image maps – creating client-side and server-side image maps. Various HTML Editors.

JavaScript Overview, Data types, variables, scope of variables, casting, data type conversion rules, Expressions and operators. Arrays. Built-in functions, and Built-in objects- String,

Date, Math. Three types of dialog boxes-alert, prompt, confirm. Custom Functions. Working with Frames, Forms and Form elements and the associated events. Form validation. JavaScript Regular Expression. Cookies-Stateful Vs Stateless. Cookie functions. JavaScript's object model. Hierarchy of JavaScript objects. Events in JavaScript, Event-handlers. Browser objects in JavaScript - window, document, history and location. Browser detection.

### **Unit 2: Introduction to .NET**

**15 hrs**

Overview of .NET framework, problems with the earlier languages and .NET solution. Overview of .NET binaries and .NET architecture. The role of Microsoft Intermediate Language and Metadata. Understanding Common Language Runtime, services, Common Type System and Common Language Specification. .NET base classes, overview of .NET assemblies, .NET memory management. System.GC class and concept of generations. Introduction to C#, Visual Studio .NET IDE. C# language fundamentals, object oriented programming with C#, Runtime polymorphism and type casting rules. C# Event Architecture, declarative and dynamic event handling, single cast and multicast delegates, relationship between delegates and events, cross language inheritance. Interfaces and collections – Understanding interface-based programming, building a custom enumerator, building a cloneable object, comparable objects.

### **Unit 3: Data Access with ADO.NET**

**15 hrs**

Comparison between ADO and ADO.NET and benefits offered by ADO.NET. The need for ADO.NET, ADO.NET namespaces, ADO.NET managed providers, SQL managed providers, Accessing XML through ADO.NET , OLEDB managed providers, creating relationships programmatically, executing stored procedures. Building Master-detail relationships. Data navigation using CurrencyManager. Data binding in ADO.NET. Introduction to SQL Server.

### **Unit 4: Web Development using ASP.NET**

**15 hrs**

Architecture of ASP.NET web application. Understanding ASP.NET page structure. Page level events. Using standard controls, validation controls, Rich controls. Designing web sites with master pages and themes. Localization and multiple languages. ASP.NET folder structure. Validation process. Validation controls. Validation Groups and Custom Validation. Comparison between HTML controls and server controls. Performing data access – Using SqlDataSource control, using List controls, GridView control, FormView, Repeater, DataList, ListView and DataPager controls. Developing 3-tier application using ObjectDataSource. Data Access with LINQ to SQL. Site Navigation, state management and Security – Using Navigation controls. Site maps. Using Login controls. Using ASP.NET Membership. ASP.NET configuration. Maintenance of application state, viewstate, Types of state management. Using profiles, Caching application pages and data, Cache dependency. SqlCacheDependency. ASP.NET and AJAX. – Using server-side ASP.NET AJAX. Using the ASP.NET AJAX control Toolkit. Using client-side ASP.NET AJAX. Configuring an ASP.NET application. Structure of web.config Setup and deployment setup wizard. Building and understanding web services, anatomy of a web service, overview of web service namespaces, building a simple web service, Web Service Description Language (WSDL), generating a proxy with C#.

### **Reference Books:**

1. The Complete Reference HTML- Thomas A.Powell

2. The ABC's of JavaScript – Lee Purcell & May Jane Mara
3. Effective C# - Bill Wagner
4. C# 4.0 The Complete Reference - Herbert Schildt
5. Essential C# 4.0 - Mark Michaelis and Eric Lippert
6. C# in a Nutshell, 2nd Edition - Ben Albahari, Peter Drayton, Ted Neward Publisher: O'Reilly Media
7. C#.Net Developer's Guide - Joseph Albahari, Adrian Turtschi, Jason Werry, Greg Hack  
Publisher: Elsevier
8. Programming C# - Jesse Liberty, Publisher: O'Reilly Media
9. ASP.NET Unleashed – Stephen Walther - Sams Publishing
10. The Complete Reference ASP.NET - Matthew Macdonald
11. ASP.NET in a Nutshell, 2nd Edition By G. Andrew Duthie, Matthew MacDonald  
Publisher: O'Reilly Media
12. Designing Microsoft ASP.Net Applications (Microsoft Press) – Jonathan Goodyear, Brian Peek, Brad Fox.
13. Microsoft ASP.Net – Step by Step (Microsoft Press) - G. Andrew Duthie
14. Programming ASP .NET - Jesse Liberty, Dan Hurwitz, Publisher: O'Reilly Media

**MCA (Choice Based Credit System)  
(Under Faculty of Science)**

**(Introduced from June 2016 and Onwards)**

To be implemented from the academic year 2018-2019

Semester-V

<b>Elective–I</b>	<b>IT5E.1- Cryptography and Network Security</b>	
<b>Internal Marks -20</b>	<b>External Marks-80</b>	<b>Theory-04 h/week</b>

---

**Course Outcome:**

1. Understand the fundamental principles of access control models and techniques, authentication and secure system design.
2. Understand the basics of cryptography and encryption systems.
3. Understand principles and practice of different encryption techniques.
4. Identify and mitigate different network security systems.

**Unit 1:** [15hrs]

Network Security: Need for Security; Threats and Vulnerabilities in Networks – Threats in Transit, Protocol Flaws, Impersonation; Virus and Malicious Code; Active and Passive Attacks; Network Security Controls – The OSI Security Architecture, Encryption, Content Integrity, Strong Authentication, Access Controls, Honeypots, Traffic flow security; Firewalls – Types Design and Types of Firewalls, Personal Firewalls, Comparison of Firewall Types, Firewall Configurations; Introduction to Blockchain and Bitcoin.

**Unit 2:** [15hrs]

Basics of Cryptography: Cryptography Terminologies; Classical Encryption Techniques; Substitution Techniques– The Caesar Cipher, One-Time Pads, Playfair Cipher; Transposition Techniques– Rail Fence Cipher, Route Cipher, Columnar Cipher; Steganography- Techniques of Steganography, Detection of Steganography, Applications of Steganography; Encryption and Decryption: Characteristics of Good Encryption Technique; Properties of Encryption Systems; Types of Encryption Systems- Based on Block, Based on Key.

**Unit 3:** [15hrs]

Types of Encryption and Decryption Systems: Block Ciphers - Data Encryption Standard (DES) Algorithm, Security of the DES, Advanced Encryption Standard (AES) Algorithm, Strength of the Algorithm, DES and AES Comparison; Public Key Encryption- Characteristics of Public Key System; RSA Technique – Encryption Method; Key Exchange Techniques- Distribution of Public Keys; Diffie-Hellman Scheme; Hash Functions and Digital Signature - Hash function, SHA, HMAC, Security of hash function, Properties of Digital Signature, Digital Signature Standards, Cryptanalysis.

**Unit 4:** [15hrs]

IP, Web and E-mail Security: IP Security- Overview of IP Security; IP Security Architecture; Authentication Header; Encapsulating Security Payload (ESP); Key Exchange Technique- Internet Key Exchange, Internet Security Association and Key Management Protocol (ISAKMP); Web Security- Web Security Requirements; Secure Socket Layer (SSL) – SSL Architecture, SSL Protocol; Transport Layer Security (TLS); E-mail Security: Threats to E-Mail; Encryption for Secure E-Mail; Secure E-Mail System – PGP (Pretty Good Privacy), S/MIME (Secure Multipurpose Internet Mail Extensions).

**Reference Books**

1. Cryptography And Network Security Principles And Practice Fourth Edition, William Stallings, Pearson Education
2. Modern Cryptography: Theory and Practice, by Wenbo Mao, Prentice Hall PTR
3. Behrouz A. Ferouzan, “Cryptography & Network Security”, Tata Mc Graw Hill, 2007.
4. Man Young Rhee, “Internet Security: Cryptographic Principles”, “Algorithms and Protocols”, Wiley Publications, 2003.
5. Charlie Kaufman and Radia Perlman, Mike Speciner, “Network Security, Second Edition, Private Communication in Public World”, PHI 2002.

**(Under Faculty of Science)**  
**(Introduced from June 2016 and Onwards)**  
To be implemented from the academic year 2018-2019  
Semester-V

<b>Internal Marks -20</b>	<b>Elective-I</b> <b>IT5E.2- Distributed Computing</b> <b>External Marks-80</b>	<b>Theory-04 h/week</b>
---------------------------	---	-------------------------

---

**Unit - 1** **15hrs**  
**Introduction:** Definition, Goals, Characteristics, Evolution of Distributed System, Types of distributed systems, Architecture: Architectural Styles, System Architecture  
**Processes and Communication:** Threads, Virtualization, Clients, Servers, Code Migration, Types of Communication, Software Agents, Remote Procedure Call,

**Unit – 2** **15hrs**  
**Synchronization:** Clock Synchronization, Logical Clock, Mutual exclusion, Election Algorithms  
**Distributed File Systems:** Architecture, Processes, Communication, Naming, Synchronization  
**Distributed Web based System:** Architecture, Processes, Communication, Naming, and Synchronization.

**Unit – 3** **15hrs**  
**Fault Tolerance:** Introduction, Process Resilience, Distributed Commit, Recovery.

**Distributed Multimedia Systems:** Introduction, Characteristics of multimedia data, Quality of service management, Resource management, Stream adaptation, Case study: The Tiger Video file server.

**Unit – 4** **15hrs**  
**Distributed Operating Systems – Case studies.**  
**Amoeba:** Design goals, architecture, process management, file management.  
**Mach:** Design goals, architecture, process management, memory management  
**Designing Distributed System:** Google Case Study

**Reference Books:**

1. Distributed Systems Principles and Paradigms- A. S. Tanenbaum (2nd Edition) ,Pearson Education.
2. Distributed Operating Systems - P. K. Sinha (PHI)
3. Distributed Systems – Concepts & Design(5<sup>th</sup> Edition) by George Coulouris, Jean Dollimore, TimKindberg (Pearson Education)
4. **Distributed Computing** Principles, Algorithms, and Systems, Ajay D. Kshemkalyani,Mukesh Singhal, Cambridge University Press
5. Introduction to Distributed Algorithms, Gerard Tel, Cambridge University Press

**MCA (Choice Based Credit System)**  
**(Under Faculty of Science)**

**(Introduced from June 2016 and Onwards)**  
To be implemented from the academic year 2018-2019  
Semester-V

<b>Internal Marks -20</b>	<b>Elective-I      IT5E.3- Mobile Computing</b>	<b>External Marks-80</b>
		<b>Theory-04 h/week</b>

---

**Unit 1** **15 hrs.**

**Introduction to Android:** Introduction to Mobile Computing, Android platform and the Android Studio IDE, Android Architecture, Setting up development environment, Android Components-Activities, Services, Broadcast Receivers & Content providers, **UI Components-** Views & notifications, Components for communication -Intents & Intent Filters ,

**Unit 2** **15 hrs.**

**Application Structure:** Android Manifest.xml, Resources & R.java, Activities and Activity lifecycle. First sample Application, Deploying sample application on a real device, Emulator-Android Virtual Device **User Interface Design:** Intents, Activity lifecycle, Widgets and Layouts, UI Events, Event Listeners, Background Tasks

**Unit 3** **15 hrs.**

**Data -- Saving, Retrieving, Loading**

Storing Data in your app, Storing Data using SQLite, Sharing Data: Content Resolvers and Content Providers, Loading Data using Loaders.

**Unit 4** **15 hrs.**

**Networking support:** Basics of networking in Android, AsyncTask, HttpURLConnection , publishing app.

**References:**

1. Professional Android 4 Application Development Reto Meier Wrox
2. Android Application Development: Programming with the Google SDK 2009 by Rick Rogers, John Lombardo, Zigurd Mednieks, G. Blake Meike
3. Android Programming for Beginners by John Horton, Published by Packt Publishing Ltd.
4. Programming Android, Book by G. Blake Meike, Laird Dornin, Masumi Nakamura, and Zigurd R. Mednieks, O'Reilly Publishers.

**MCA (Choice Based Credit System)**  
**(Under Faculty of Science)**  
**(Introduced from June 2016 and Onwards)**  
To be implemented from the academic year 2018-2019  
Semester-V

<b>Internal Marks -20</b>	<b>Elective-I      IT5E.4- Big Data Management</b>	<b>External Marks-80</b>
		<b>Theory-04 h/week</b>

---



**Course Objective:**

1. Understanding of Big Data for Business Intelligence
2. Understanding different tools for Big Data Analytics.
3. To study issues relating Big Data Security.
4. Learn end to end skills of Big data Analytics

**Unit-1:****15hrs.**

Introduction to Big Data.

Definition of Big Data, Sources of Big Data, Characteristics of Big Data, Harnessing Big Data, Real time data processing, Structure of Big Data, Need of Big Data Management, Big Data life Cycle and processing, Concepts in Data Warehousing and its Relevance for Big Data. Applications of Big Data, Benefits of Big Data Management.

**Unit-2:****15hrs.**

NoSQL Databases for Big Data: Introduction to NoSQL, aggregate data models, aggregates, key-value and document data models, relationships, graph databases, schema less databases, materialized views, distribution models, sharing, master-slave replication , peer-peer replication , sharding and replication . Introduction to HBase, MongoDB, Executing queries with MongoDB.

**Unit-3:****15hrs.**

Big Data Analytics Tools. Introduction to HDFS, HDFS operations. Features, Architecture, Components of Hadoop, Hadoop daemons. Cluster capacity planning, Hadoop cluster setup and administration. Map-Reduce - Map-Reduce Architecture, Writing Map-Reduce program, Examples of Map-Reduce. Pig - architecture, Pig data types, Defining schema, Reading and storing data through Pig ,Hive-Introduction, Hive Vs RDBMS, Data Base Operations in Hive.

**Unit-4:****15hrs.**

Big Data Security, Security concerns with Hadoop, Hadoop Security Challenges and threats, Hadoop security best practices, Hadoop Kerberos Security Implementation & Configuration, Securing Sensitive Data in Hadoop Setting up audit logging in Hadoop cluster, Data encryption in Hadoop Ranger- Provide authentication, authorization and data protection.

**Reference Books:**

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN: 9788126551071, 2015.
2. Tom White, Hadoop: The Definitive Guide, O’Reilly, 3rd edition  
Dirk Deroos, Hadoop for Dummies, wiley
3. Alex Holmes, Hadoop in Practice, manning 1 st edition.
4. Alan Gates, Programming Pig, O’Reilly
5. Edward Capriolo, Dean Wampler, Jason Rutherglen, - Programming Hive, O’Reilly

6. Chris Eaton, Dirk deRoos et al. , “Understanding Big data ”, McGraw Hill, 2012.
7. Tom White, “HADOOP: The definitive Guide” , O Reilly 2012. 6 IT2015 SRM(E&T)
8. VigneshPrajapati, “Big Data Analytics with R and Hadoop”, Packet Publishing 2013.
9. Tom Plunkett, Brian Macdonald et al, “Oracle Big Data Handbook”, Oracle Press, 2014.
10. <http://www.bigdatauniversity.com/> 7. JyLiebowitz, “Big Data and Business analytics”,CRC press, 2013.
11. GazzangforHadoop  
<http://www.cloudera.com/content/cloudera/en/solutions/enterprisesolutions/security-for-hadoop.html>
12. Eric Sammer, "Hadoop Operations", O'Reilly, 2012.
13. HADOOP SECURITY :TODAY AND TOMORROW  
<http://www.cloudera.com/content/cloudera/en/solutions/enterprisesolutions/security-for-hadoop.html>

**MCA (Choice Based Credit System)**

(Under Faculty of Science)

(Introduced from June 2016 and Onwards)

To be implemented from the academic year 2018-2019

Semester-V

**Elective–II      BM5E.1- Management Information System**

**Internal Marks -20**

**External Marks-80**

**Theory-04 h/week**

**Course objectives-**

1. To learn computer based IS for capturing, storing, analyzing, processing and supporting for decision making at various level in organization.
2. To study various information system security issues and policies.
3. To learn various applications of information system in organization.

**Unit 1: Introduction to Information System –**

**15**

Use of computers for managerial applications, Concept of Data and Information, Introduction and characteristics of System. Concept of Information System, need and scope of information system, Simon’s Model of decision Making, Structured Vs. Un-structured decisions, formal Vs Informal systems, Technology issues and data and information processing in organizations.

**Unit 2: Computer Based Information Systems–**

**15**

Organization structure, Information needs at different organization levels. Major types of information systems in organization- TPS- Introduction, need and significance, KWS & OAS- Introduction, need and significance. MIS –Introduction, need, characteristics and significance. Decision support systems (DSS) – characteristics, components and significance,

Group decision support systems (GDSS), - Introduction, need elements, characteristics and significance, Executive support systems (ESS) – Introduction, need and significance of ESS.

**Unit 3: Information System Audit & Security- 15**  
Need for Auditing of IS, Security of IS . Types of assessments for Information Security-VAPT of Networks, Web Application Audits, IT assessments or audits, Assessment of Network Equipment's, Assessment of Security Devices (Web Filtering, Firewalls, IDS / IPS, Routers, Data Center Assessment, Security of Application Software, SAP Security, Desktop Security.

**Unit 4: Information Systems Functional Areas 15**  
Information for- Finance, Marketing, Inventory control, Production function. Case studies related to information requirement for above areas.

**Reference Books:**

1. Management Information Systems, Kenneth C. Laudon, Prentice Hall
2. Management Information System, Kelkar, PHI
3. Management of Information systems – Jawadekar W.S.
4. Information systems management in practice – Ralph H. Sprague Jr. & Barbara C. McNurlin
5. Management of information systems – James A. O'Brien
6. Information system concepts for management – 4th edition Lucas
7. Management of information systems – 2nd edition – Kroenke David.
8. Enterprise Resource Planning, Alex Leon

**MCA (Choice Based Credit System)**  
**(Under Faculty of Science)**  
**(Introduced from June 2016 and Onwards)**  
To be implemented from the academic year 2018-2019  
Semester-V  
**Elective-II BM5E.2- Knowledge Management**

**Internal Marks -20**

**External Marks-80**

**Theory-04 h/week**

---

**UNIT: 1 Introduction [15]**

Definitions of data, information, knowledge & knowledge wisdom. Knowledge acquisition tools, global knowledge economy. KM & KMS - Definitions and Perspectives – KM Evolution – Limitations of existing initiatives – KM's Value proposition, Market Value and Prosperity – Drivers of KM - Knowledge-centric drivers, Technology drivers, Structural drivers, Process-focused drivers, Economic drivers – Creating Knowledge Edge. KM Strategy-Meaning, need and significance. Factors influencing Knowledge Management.

**UNIT -2 Fundamentals of Knowledge management [15]**

The origins of knowledge, from data to knowledge, the 5C Process- basic types of knowledge- Knowledge conversion, Fundamental steps-Taming the Tiger's Tail - Business and Knowledge. KMS Life Cycle, Challenges in building KMS, Phases in KM Life Cycle, KM Applications

**Unit: - 3 Organizational KM & KM system development [15]**

Organizational knowledge management- Need, benefits types, components, functions, Knowledge mapping techniques. Knowledge creation – Nonaka’s model of knowledge creation and transformation – Knowledge Architecture – The people core, Identifying Knowledge Centers – The Technical core, Build In-home, buy or outsource model – Capturing Tacit knowledge – Evaluating the Experts – Developing relationship with Experts – The Interview as a tool – Guide to a successful Interview with the Expert, Knowledge indexing, Component architecture of KM system.

**UNIT -4 Knowledge Management, System testing and deployment [15]**

Knowledge measurement Techniques, K-Careers, Knowledge testing, approaches to logical testing, approaches to user acceptance testing, KM system deployment, Issues related to deployment, user training and deployment, post implementation review, Implications for knowledge management. Case studies on KM applications.

**References:**

1. Knowledge Management – Sudhir Warier Vikas Publications
2. “The knowledge Management Toolkit - Orchestrating IT, Strategy, and Knowledge
3. Platforms”, Amrit Tiwana, Pearson, Fifth Impression 2009, Education.
4. Knowledge Management Systems – Stuart Barncs, Thomson Learning
5. Key Issues in the New Knowledge Management – J.M.Firestone, M.W. Mcelroy.
6. Developing Expert system for Business – Chandier / Liang
7. Knowledge Management – Pankaj Sharma APH Pub.
8. Knowledge Management-Elias M. Awad & Hassan M. Ghaziri Pearson publication

**MCA (Choice Based Credit System)**

**(Under Faculty of Science)**

**(Introduced from June 2016 and Onwards)**

To be implemented from the academic year 2018-2019

Semester-V

**Elective–II BM5E.3- Software Project Management and Quality Assurance**

**Internal Marks -20**

**External Marks-80**

**Theory-04 h/week**

---

## **Unit 1: Software Projects, Planning and Quality Metrics [15hrs]**

**Software Projects:** Understanding Software Projects, Software Project management, Software Development Life cycle, Typical Software roles and responsibilities, Components, Review of Models for Software Development

**Project Planning:** Planning process, definition, estimation, testing strategy, team members, organization structure, database, capability baseline, quality objectives, Project Management Plan

**Software Quality & Metrics:** Understanding quality, definitions, attributes of measures, Metrics for different types of projects

## **Unit 2: Project Monitoring, Control & Audit [15hrs]**

**Project Monitoring & Control:** Project Control, effort data, Monitoring and Control, Quantitative techniques, Monitoring Process, Tools and techniques, Example of Monitoring, Data collection, Piloting

**Configuration Management:** Introduction, Process, Audit

**Software Project Audit:** Introduction, Quality, Quality Principles, Quality Attributes IT, Quality Assurance, Process Definition Life Cycle, Quality Audits, Quality Assurance vs Quality Control

## **Unit 3: Risk management and Benchmarking [15hrs]**

**Risk Management:** Introduction, Risk management Process, Enterprise Risk database

**Acquiring Software Projects:** Outsourcing a project, processes involved in award of a project contract, best practices in writing a proposal, RFP, RFI, SOW

**Benchmarking:** Introduction, Types of benchmarking,

**CMMI and SPM:** Introduction, CMMI framework, Process area, levels of CMMI, Standard CMMI method for appraisal, CMMI adoption, CMMI vs CMM

## **Unit 4: Software Testing and Maintenance [15hrs]**

**Project Management in Maintenance Projects:** Introduction, Software Project Maintenance Life Cycle, Process, estimation, Configuration management, Metrics, Defect prevention, Issues

**Software Testing and Maintenance :** Foundations of Testing, Test Planning, Test Design and Implementation, Testing Network Management Systems, Web Based Testing, Testing Object-Oriented systems, Test Execution and Measurement, Management Issues for Software Quality, Software Testing Types: Unit, Integration, & System, Benchmarking and Certification, Control flow & loop testing, Data-flow testing, Transactionflow testing, Domain testing, Coverage vs. usage based testing, Software Reuse, Software Aging, Product Enhancement, Reverse Engineering, Reengineering Method, Architectural Simplification

**Software Testing Tools :** Test case Generation Methodology, Study of various Testing Tools (Win Runner, Load Runner), Automatic Testing Tool

### **Reference Books:**

1. Software Project Management, Sanjay Mohapatra, Cengage Learning
2. Software Project Management in Practice, Pankaj Jalote, Pearson
3. Project Management – Core text Book, Mantel “et al” ., Wiley

4. Software Engineering: A practical Approach, Roger S. Pressman, McGraw-Hill
5. Software Testing Concepts and Tools, Nageswara Rao Pusuluri, DreamTech

**MCA (Choice Based Credit System)**  
**(Under Faculty of Science)**  
**(Introduced from June 2016 and Onwards)**  
 To be implemented from the academic year 2018-2019  
 Semester-V

**Elective–II    BM5E.4- Enterprise Resource Planning**

**Internal Marks -20**

**External Marks-80**

**Theory-04 h/week**

---

**Course Objective:**

1. To know e concepts of BPR and its need for industry.
2. To understand concept of ERP, evolution, need and significance.
3. To study the ERP implementation life cycle and ERP market.

**Unit-I: Introduction (15)**

Enterprise—An Overview, Business Processes, introduction to ERP, Introduction to ERP, Basic Concepts of ERP, Justifying ERP Investments, Risks of ERP , Benefits of ERP

**Unit-II: ERP Implementation (15)**

ERP Implementation Challenges, ERP Implementation (Transition) Strategies, ERP Implementation Life Cycle, Pre-implementation Tasks, Requirements Definition , Implementation Methodologies, Package Selection, ERP Project Teams, Process Definition, Vendors and Consultants, Dealing with Employee Resistance, Contracts with Vendors, Consultants and Employees, Training & Education, Data Migration, Project Management & Monitoring, Post Implementation Activities, Success & Failure Factors of an ERP Implementation, Operation and Maintenance of the ERP System, Measuring the Performance of the ERP System. Maximizing the ERP System

**Unit-III: ERP and Related Technologies (15)**

Introduction, Business Process Reengineering (BPR), Data Warehousing and Data Mining, On-line Analytical Processing (OLAP), Product Life Cycle Management (PLM), Supply Chain Management (SCM), Customer Relationship Management (CRM), Geographical Information Systems (GIS), Intranets and Extranets, Advanced Technology and ERP Security.

**Unit-IV: Business Modules (15)**

Finance Module of an ERP Package, Manufacturing Module of an ERP Package, Human Resources Module of an ERP Package , Materials Management Module of an ERP Package, Quality Management Module of an ERP Package, Marketing Module of an ERP Package Sales, Distribution & Service Module of an ERP Package

**ERP Markets** – ERP Marketplace and Marketplace Dynamics. ERP Vendors ERP Case Studies

### Reference Books

1. ERP Demystified: Alexis Leon, TMH New Delhi ,3rd Ed.
2. ERP Ware: ERP Implementation Framework : V.K. Garg &N.K. Venkita Krishnan, PHI.
3. ERP Concepts & Planning : V.K. Garg &N.K. Venkita Krishna, PHI, 2nd Ed..
4. ERP a managerial perspective- . Sadagopan , TMH.
5. ERP by- Zaveri and Jyotindra, Himalaya pub

### MCA (Choice Based Credit System)

(Under Faculty of Science)

(Introduced from June 2016 and Onwards)

To be implemented from the academic year 2018-2019

Semester-V

### MT51- Optimization Techniques

Internal Marks -20

External Marks-80

Theory-04 h/week

---

### Course Objectives:

1. To formulate a real-world problem as a mathematical programming model.
2. To solve specialized linear programming problems like the transportation, assignment, game problems.

### UNIT-I Operation Research

(15)

- 1.1: Overview of Operation Research: Introduction
- 1.2: Origin and Development of Operation Research
- 1.3: Operation Research and Decision Making
- 1.4: Methodology of Operation Research
- 1.5: Applications Operation Research

### UNIT-II Linear Programming Problems (LPP)

(15)

- 2.1: Introduction to LPP: Concept and Definitions of some terms
- 2.2: Mathematical Formulation of LPP and Duality in LPP
- 2.3: Graphical Solution to LPP
- 2.4: Simplex Method and Big-M method
- 2.5: Illustrative Examples

### UNIT-III Transportation Problem

(15)

- 3.1: Transportation Problem (TP) – Introduction

- 3.2: Mathematical Formulation of TP
- 3.3: Solution of TP: North-west corner rule, Least cost method, Vogel's Approximation Method (VAM)
- 3.4: Transportation Algorithm (MODI – Method)
- 3.5: Illustrative Examples

**UNIT-IV Assignment Problem and Game Theory (15)**

- 4.1: Assignment Problem (AP) – Introduction
- 4.2: Mathematical Formulation of AP
- 4.3: Solution of AP: Hungarian Assignment Method
- 4.4: Game Theory: Introduction, Two-Person zero-sum Games and Minimax-Maximin Principle
- 4.5: Illustrative Examples

**Reference Books:**

- 1. Hadley G.(1969): Linear Programming, Addison Wesley
- 2. Taha H. A. (1971): Operation Research: An Introduction, Macmillan N.Y.
- 3. Kanti Swaroop & Gupta M. M.(1985): Operations Research, Sultan Chand & Co. ltd.
- 4. P.Gupta & D.S.Hira(2010): Operation Research, Sultan Chand & Co. ltd.
- 5. J. K. Sharma. (2003): Operation Research: Theory and Applications. Macmillan.

**MCA (Choice Based Credit System)**  
**(Under Faculty of Science)**  
**(Introduced from June 2016 and Onwards)**  
To be implemented from the academic year 2018-2019  
Semester-V  
**IT51L- LAB IX (Artificial Intelligence and Applications)**

---

Practical's based on Unit-IV of Artificial Intelligence and Applications paper to be conducted.

**MCA (Choice Based Credit System)**  
**(Under Faculty of Science)**  
**(Introduced from June 2016 and Onwards)**  
To be implemented from the academic year 2018-2019  
Semester-V  
**IT52L- LAB X (Advanced Web Technology)**

---

Practical's will be based on Advanced Web Technology paper.



**MCA (Choice Based Credit System)**  
**(Under Faculty of Science)**  
**(Introduced from June 2016 and Onwards)**  
To be implemented from the academic year 2018-2019  
Semester-VI  
**IT61- Project Work**

---

**Project Work:** At the end of the sixth semester of study, a student will be examined in the course "Project Work".

- 1.** Project work may be done individually or in groups in case of bigger projects. However if project is done in groups, each student must be given a responsibility for a distinct module and care should be taken to see the progress of individual modules is independent of others.
- 2.** Students should take guidance from an internal guide and prepare a Project Report on "Project Work" in **2 copies** to be submitted to the Director of the Institute.
- 3.** The Project Report should contain an Introduction to Project, which should clearly explain the project scope in detail. Also, Data Dictionary, DFDs, ERDs, File designs and a list of output reports should be included.(Refer annexure 1)
- 4.** The project Work should be of such a nature that it could prove useful or should be relevant from the commercial/management angle.
- 5.** The project report will be duly accessed by the internal guide of the subject and internal marks will be communicated by the Director of the Institute to the University.
- 6.** The project report should be prepared in a format prescribed by the University, which also specifies the contents and methods of presentation.
- 7.** The major project work carry 200 marks for internal assessment and 300 marks for external viva. The external viva shall be conducted by a panel of minimum of three external examiners out of which one will be the Chairman of the panel.
- 8.** Project work can be carried out in the Institute or outside with prior permission of the Institute.
- 9.** Project viva-voce by the University panel will be conducted in the month of June after completion of 5 months training.