IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
	Management Science	4	-	4
	ELECTIVE III Web Services E – Commerce Middleware Technologies Ad hoc and Sensor Networks *Predictive Analytics (Associate Analytics-3)* ** *Information Security Incident Response & Management (Security Analyst-3)* **	4	-	4
	ELECTIVE IV Multimedia & Rich Internet Applications Artificial Intelligence Storage Area Networks Machine Learning	4	-	4
	Industry Oriented Mini Project	-	-	2
	Seminar	-	6	2
	Project Work	-	15	10
	Comprehensive Viva	-	-	2
	Total	12	21	28

Note: All End Examinations (Theory and Practical) are of three hours duration.
T   Tutorial   L – Theory   P – Practical/Drawing   C   Credits

** *For registering for Predictive Analytics the prerequisite is Big Data Analytics.*
** *For registering for Information Security Incident Response & Management the prerequisite is Information Security Assessments & Audits.*

Note:

1) Qualification pack for ASSOCIATE ANALYTICS includes the following three subjects.

    1. Introduction to Analytics

    2. Big Data Analytics

    3. Predictive Analytics

2) Qualification pack for SECURITY ANALYST includes the following three subjects.

    1. Information Security Management,

    2. Information Security Assessments & Audits.

    3. Information Security Incident Response & Management

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(A80014) MANAGEMENT SCIENCE

Objectives:

This course is intended to familiarise the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organisational structure, production operations, marketing, Human resource Management, product management and strategy.

UNIT -I:

Introduction to Management and Organisation: Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory – Fayal's Principles of Management – Maslow's theory of Hierarchy of Human Needs – Douglas McGregor's Theory X and Theory Y – Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management. Designing Organisational Structures: Basic concepts related to Organisation - Departmentation and Decentralisation, Types and Evaluation of mechanistic and organic structures of organisation and suitability.

UNIT -II:

Operations and Marketing Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement – Business Process Reengineering (BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality. Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records – JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT -III:

Human Resources Management (HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating – Capability Maturity Model (CMM) Levels – Performance Management System.

UNIT -IV:

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT -V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXT BOOKS:

1. Stoner, Freeman, Gilbert, *Management*, 6th Ed, Pearson Education, New Delhi, 2004
2. P. Vijaya Kumar, N. Appa Rao and Ashima B. Chhalill, Cengage Learning India Pvt Ltd, 2012.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N.Duening and John M.Ivancevich Management—Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2012.
5. Samuel C.Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage,2012.
8. Lawrence R Jauch, R.Gupta andWilliam F.Glueck: Business Policy and Strategic Management, Frank Bros.2012.
9. Aryasri: Management Science, McGraw Hill, 2012.

Outcomes:

By the end of the course, the student will be in a position to

- Plan an organisational structure for a given context in the organisation
- carry out production operations through Work study
- understand the markets, customers and competition better and price the given products appropriately.
- ensure quality for a given product or service
- plan and control the HR function better
- plan, schedule and control projects through PERT and CPM
- evolve a strategy for a business or service organisation

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(A80551) WEB SERVICES
(Elective – III)

Objectives:

- To understand the details of Web services technologies: SOAP, WSDL, UDDI
- To learn how to implement and deploy web service clients and servers.
- To explore interoperability between different frameworks.
- To learn basic concepts of SOA.

UNIT- I

Evolution and Emergence of Web Services - Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVA RMI, Microsoft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

Web Services Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication models, basic steps of implementing web services.

UNIT- II

Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding, SOAP message exchange models, SOAP communication and messaging, SOAP security.

Developing Web Services using SOAP – Building SOAP Web Services, developing SOAP Web Services using Java and Axis, limitations of SOAP.

UNIT- III

Describing Web Services – WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

Discovering Web Services – Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI Registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, Publishing API, Publishing, searching and deleting information in a UDDI Registry,

limitations of UDDI.

UNIT- IV

Web Services Interoperability – Means of ensuring Interoperability, Overview of .NET, Creating a .NTE client for an Axis Web Service, Creating java client for a web service, Challenges in Web Services Interoperability.

Web Services Security – XML security frame work, Goals of Cryptography, Hash Cipher, Symmetric Cipher, Asymmetric Cipher, XML encryption, Digital signature, Digital Certificate, XML Encryption, SAML, structure.

UNIT- V

Overview of Service Oriented Architecture – SOA concepts, Key Service Characteristics, Technical Benefits of a SOA.

SOA and Web Services – Web Services Platform, Service-Level Data Models, Discovery, Security and Interaction Patterns, Atomic and Composite services, Service-level communication and alternative transports.

TEXT BOOKS:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India,   rp – 2008.
2. Understanding SOA with Web Services, Eric Newcomer and Greg Lomow, Pearson Edition – 2009
3. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier - 2009

REFERENCE BOOKS:

1. Building Web Services with Java, 2nd Edition, S. Graham and others, Pearson Edn., 2008.
2. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers, 2005.
4. J2EE Web Services, Richard Monson-Haefel, Pearson Education.
5. Web Services, G. Alonso, F. Casati and others, Springer, 2005.
6. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education, 2008.
7. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.

Outcomes:

- Basic details of WSDL, UDDI, SOAP
- Implement WS client and server with interoperable systems

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(A80544) E - COMMERCE
(Elective – III)

Objectives:

- Identify the major categories and trends of e-commerce applications.
- Identify the essential processes of an e-commerce system.
- Identify several factors and web store requirements needed to succeed in e-commerce.
- Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
- Understand the main technologies behind e-commerce systems and how these technologies interact.
- Discuss the various marketing strategies for an online business.
- Define various electronic payment types and associated security risks and the ways to protect against them.

UNIT - I

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT - II

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

UNIT - III

Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT - IV

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.

UNIT - V

Consumer Search and Resource Discovery - Information search and

Retrieval, Commerce Catalogues, Information Filtering.
Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing.

TEXT BOOK :

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

REFERENCES :

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

Outcomes:

- Ability to identify the business relationships between the organizations and their customers
- Ability to perform various transactions like payment, data transfer and etc.

(A80546) MIDDLEWARE TECHNOLOGIES
(Elective – III)

Objectives:

- IT systems are more and more integrated with other software systems.
- The knowledge of integrating these systems by using middleware technologies can be a key competence for IT engineers. Middleware is commonly understood as an intermediary software layer between the application and the operating system, which encapsulates the heterogeneity of the underlying communication network, operating system or hardware platform.
- This course provides details about the modern component platforms. Based on practical examples, details about modern middleware technologies are studied.
- Students get the chance to gain in-depth knowledge popular middleware platforms.

UNIT-I

Introduction to client server computing: Evolution of corporate computing models from centralized to distributed computing, client server models. Benefits of client server computing, pitfalls of client server programming.

UNIT-II

CORBA with Java: Review of Java concept like RMI, RMI API, JDBC. Client/ Server CORBA-style, The object web: CORBA with Java.

Introducing C# and the .NET Platform; Understanding .NET Assemblies; Object –Oriented Programming with C#; Callback Interfaces, Delegates, and Events.

UNIT III

Building c# applications: Type Reflection, Late Binding, and Attribute-Based Programming; Object Serialization and the .NET Remoting Layer; Data Access with ADO.NET; XML Web Services.

Core CORBA / Java: Two types of Client/ Server invocations-static, dynamic. The static CORBA, first CORBA program, ORBlets with Applets, Dynamic CORBA-The portable count, the dynamic count multicount.

UNIT-IV

Existential CORBA : CORBA initialization protocol, CORBA activation services, CORBAIDL mapping CORBA java- to- IDL mapping, The

introspective CORBA/Java object.

Java Bean Component Model : Events, properties, persistency, Introspection of beans, CORBA Beans.

UNIT-V

EJBs and CORBA: Object transaction monitors CORBA OTM's, EJB and CORBA OTM's, EJB container frame work, Session and Entity Beans, The EJB client/server development Process The EJB container protocol, support for transaction EJB packaging EJB design Guidelines.

TEXT BOOKS :

1. Client/Server programming with Java and CORBA Robert Orfali and Dan Harkey, John Wiley & Sons ,SPD 2nd Edition
2. Java programming with CORBA 3rd Edition, G.Brose, A Vogel and K.Duddy, Wiley-dreamtech, India John wiley and sons

REFERENCE BOOKS:

1. Distributed Computing, Principles and applications, M.L.Liu, Pearson Education
2. Client/Server Survival Guide 3rd edition Robert Orfali Dan Harkey & Jeri Edwards, John Wiley & Sons
3. Client/Server Computing D T Dewire, TMH.
4. IBM Webspere Starter Kit Ron Ben Natan Ori Sasson, TMh, New Delhi
5. Programming C#, Jesse Liberty, SPD-O'Reilly.
6. C# Preciesely Peter Sestoft and Henrik I. Hansen, Prentice Hall of India
7. Intoduction to C# Using .NET Pearson Education
8. C# How to program, Pearson Education
9. C# and the .NET Platform Andrew Troelsen, Apress Wiley-dreamtech, India Pvt Ltd

Outcomes:

- Ability to design the integrated system with different software's.
- Ability to create simple interface between the software and hardware.

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(A80542) AD HOC AND SENSOR NETWORKS
(Elective – III)

Objectives:

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for adhoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

UNIT- I

Introduction to Ad Hoc Wireless Networks: Characteristics of MANETs, Applications of MANETs, Challenges.

Routing in MANETs: Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Other Routing Protocols.

UNIT- II

Data Transmission in MANETs: The Broadcast Storm, Multicasting, Geocasting

TCP over Ad Hoc Networks: TCP Protocol overview, TCP and MANETs, Solutions for TCP over Ad Hoc

UNIT- III

Basics of Wireless Sensors and Applications: The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

Data Retrieval in Sensor Networks: Classification of WSNs, MAC layer, Routing layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

UNIT- IV

Security : Security in Ad hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

Sensor Network Platforms and Tools: Sensor Network Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms

UNIT- V

Operating System – TinyOS

Imperative Language: nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

TEXT BOOKS:

1. Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P.Aggarwal,* World Scientific Publications / Cambridge University Press, March 2006

2. Wireless Sensor Networks: An Information Processing Approach, *Feng Zhao, Leonidas Guibas,* Elsevier Science imprint, Morgan Kauffman Publishers, 2005, rp2009.

REFERENCE BOOKS:

1. Adhoc Wireless Networks – Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004

2. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010

3. Wireless Ad hoc Mobile Wireless Networks – Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.

4. Ad hoc Networking, *Charles E.Perkins,* Pearson Education, 2001.

5. Wireless Ad hoc Networking, *Shih-Lin Wu, Yu-Chee Tseng,* Auerbach Publications, Taylor & Francis Group, 2007

6. Wireless Ad hoc and Sensor Networks – Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.

7. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications / Cambridge University Press, 2010

8. Ad hoc Wireless Networks – A communication-theoretic perspective, Ozan K.Tonguz, Gialuigi Ferrari, Wiley India,2006, rp2009.

9. Wireless Sensor Networks – Signal processing and communications perspectives, Ananthram Swami, et al., Wiley India, 2007, rp2009.

Outcomes:

- Ability to understand the concept of ad-hoc and sensor networks, their applications and typical node and network architectures.
- Ability to design a protocol for wireless sensor networks
- Ability to evaluate measurements of protocol performance in wireless sensor networks

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(A80547) MULTIMEDIA & RICH INTERNET APPLICATIONS
(Elective-IV)

Objectives:

This course aims to further develop students' competency in producing dynamic and creative graphic solutions for multimedia productions. It provides students with the basic concepts and techniques of interactive authoring. It also introduces students with the advanced scripting skills necessary for implementing highly interactive, rich internet applications using multimedia technologies and authoring tools. Students will develop aesthetic value and competencies in multimedia authoring. Artistic visual style and layout design are stressed, as well as the editing and integration of graphic images, animation, video and audio files. The course allows students to master industry-wide software and technologies to create highly interactive, rich internet applications.

UNIT - I

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT- II

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

Multimedia Data Compression: Lossless compression algorithms, Lossy compression algorithms, Image compression standards.

UNIT- III

Basic Video compression techniques, Case study: MPEG Video Coding I, Basic Audio compression techniques, Case study: MPEG Audio compression.

Web 2.0

What is web 2.0, Search, Content Networks, User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

UNIT - IV

Rich Internet Applications(RIAs) with Adobe Flash : Adobe Flash-

Introduction, Flash Movie Development, Learning Flash with Hands-on Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.

Rich Internet Applications(RIAs) with Flex 3 - Introduction, Developing with Flex 3, Working with Components, Advanced Component Development, Visual Effects and Multimedia.

UNIT - V

Ajax- Enabled Rich Internet Application : Introduction, Traditional Web Applications vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using xmlhttprequest object, Using XML, Creating a full scale Ajax Enabled application, Dojo ToolKit.

TEXT BOOKS:

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI Learning, 2004

2. Professional Adobe Flex 3, Joseph Balderson, Peter Ent, et al, Wrox Publications, Wiley India, 2009.

3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson Education.

REFERENCE BOOKS:

1. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Pearson Education, 2001, rp 2005.

2. Multimedia Making it work, Tay Vaughan, 7th edition, TMH, 2008.

3. Introduction to multimedia communications and Applications, Middleware, Networks, K.R.Rao, Zoran, Dragored, Wiley India, 2006, rp. 2009.

4. Multimedia Computing, Communications & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education, 2004

5. Principles of Multimedia, Ranjan Parekh, TMH, 2006.

6. Multimedia in Action, James E.Shuman, Cengage Learning, 198, rp 2008.

7. Multimedia Systems design, Prabhat K. Andleigh, Kiran Thakrar, PHI, 1986.

8. Multimedia and Communications Technology, Steve Heath, Elsevier, 1999, rp 2003.

9. Adobe Flash CS3 Professional, Adobe press, Pearson Education, 2007.

10. Flash CS3 Professional Advanced, Russel Chun, Pearson Education, 2007.

11. Flash CS5, Chris Grover, O'Reilly, SPD, 2010.

12. SAMS Teach yourself Adobe flash CS3, Pearson Education, 2007.

13. Flex 4 Cookbook, Joshua Noble, et.al, O'Reilly,SPD 2010.

14. Flex3 – A beginner's guide, Michele E.Davis, Jon A.Phillips, TMH, 2008.

15. Mastering Dojo,R.Gill,C.Riecke and A.Russell,SPD.

Outcomes:

- Ability to design a short films and teaching material for better understanding.

- Ability to apply different multimedia development tools to produce web based and stand-alone user interfaces.

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PREDICTIVE ANALYTICS (ASSOCIATE ANALYTICS – III)
(Elective-II)

Unit I
Introduction to Predictive Analytics & Linear Regression (NOS 2101):
What and Why Analytics, Introduction to Tools and Environment, Application of Modelling in Business, Databases & Types of data and variables, Data Modelling Techniques, Missing imputations etc.
Need for Business Modelling, Regression -- Concepts, Blue property-assumptions-Least Square Estimation, Variable Rationalization, and Model Building etc.

Unit II
Logistic Regression (NOS 2101):
Model Theory, Model fit Statistics, Model Conclusion, Analytics applications to various Business Domains etc.
Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building -- Regression, Classification, Overfitting, Pruning and complexity, Multiple Decision Trees etc.

Unit III
Objective Segmentation(NOS 2101):
Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building -- Regression, Classification, Overfitting, Pruning and complexity, Multiple Decision Trees etc.
Develop Knowledge, Skill and Competences (NOS 9005)
Introduction to Knowledge skills & competences, Training & Development, Learning & Development, Policies and Record keeping, etc.

Unit IV
Time Series Methods /Forecasting, Feature Extraction (NOS 2101):
Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average, Energy etc and Analyze for prediction.
Project

Unit V
Working with Documents (NOS 0703):
Standard Operating Procedures for documentation and knowledge sharing, Defining purpose and scope documents, Understanding structure of documents – case studies, articles, white papers, technical reports, minutes of meeting etc., Style and format, Intectual Property and Copyright, Document preparation tools – Visio, PowerPoint, Word, Excel etc., Version Control, Accessing and updating corporate knowledge base, Peer review and feedback.

TEXT BOOK:
1. Student's Handbook for Associate Analytics-III.

REFERENCE BOOK:
1. Gareth James • Daniela Witten • Trevor Hastie Robert Tibshirani. An Introduction to Statistical Learning with Applications in R

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INFORMATION SECURITY INCIDENT RESPONSE & MANAGEMENT (SECURITY ANALYST -- III)
(Elective-II)

Unit I
Managing Information Security Services:
Configuring Network Devices, Identifying Unauthorized Devices, Testing the Traffic Filtering Devices, Configuring Router, Configuring Modes – Router/Global/Interface/Line/Privilege EXEC/ROM/User EXEC, Configuring a banner/Firewall/Bastion Host/VPN server etc.

Unit II
Troubleshooting Network Devices and Services:
Introcution& Methodology of Troubleshooting, Troubleshooting of Network Communication-Connectivity-Network Devices-Network Slowdowns-Systems-Modems etc.

Unit III
Information Security Incident Management & Data Backup:
Information Security Incident Management overview-Handling-Response, Incident Response Roles and Responsibilities, Incident Response Process etc.
Data Back introduction, Types of Data Backup and its techniques, Developing an Effective Data Backup Strategy and Plan, Security Policy for Back Procedures.

Unit IV
Log Correlation:
Computer Security Logs, Configuring& Analyzing Windows Logs, Log Management-Functions & Challenges, Centralized Logging and Architecture, Time Synchronization – NTP/NIST etc.
Develop Knowledge Skill and competences (NOS 9005)

Unit V
Handling Network Security Incidents:
Network Reconnaissance Incidents, Network Scanning Security Incidents, Network Attacks and Security Incidents, Detecting DoS Attack, DoS Response Strategies, Preventing/stopping a DoS Incident etc.
Handling Malicious Code Incidents:
Incident Handling Preparation, Incident Prevention, Detection of Malicious Code, Containment Strategy, Evidence Gathering and Handling, Eradication and Recovery, Recommendations etc.
Project.

TEXT BOOKS:
1. Managing Information Security Risks, The Octave Approach by Christopher Alberts, and Audrey Dorofee
2. "Cryptography and Network Security (4th Edition) by (Author) William Stallings."

REFERENCES:
1. https://www.sans.org/reading-room/whitepapers/incident/security-incident-handling-small-organizations-32979

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(A80526) ARTIFICIAL INTELLIGENCE
(Elective- IV)

Objectives:

- To learn the difference between optimal reasoning vs human like reasoning.
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing.

UNIT-I

Introduction, History, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications Problem Solving - State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A*, Constraint Satisfaction Game Playing, Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning.

UNIT-II

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

UNIT-III

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools.

Uncertainty Measure - Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.

UNIT-IV

Machine-Learning Paradigms: Introduction. Machine Learning Systems.

Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees (Text Book 2), Deductive Learning. Clustering, Support Vector Machines.

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

UNIT-V

Advanced Knowledge Representation Techniques: Case Grammars, Semantic Web.

Natural Language Processing: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking Knowledge.

TEXT BOOKS:

1. Saroj Kaushik. Artificial Intelligence. Cengage Learning. 2011.
2. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004.

REFERENCE BOOK:

1. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.

Outcomes:

- Possess the ability to formulate an efficient problem space for a problem expressed in English.
- Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique.
- Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing.

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(A80550) STORAGE AREA NETWORKS

(Elective – IV)

Objectives:

- To understand Storage Area Networks characteristics and components.
- To become familiar with the SAN vendors and their products
- To learn Fibre Channel protocols and how SAN components use them to communicate with each other
- To become familiar with Cisco MDS 9000 Multilayer Directors and Fabric Switches Thoroughly learn Cisco SAN-OS features.
- To understand the use of all SAN-OS commands. Practice variations of SANOS features

UNIT- I

Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data centre infrastructure, role of each element in supporting business activities

Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

UNIT-II:

Concept of RAID and its components , Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems ,High-level architecture and working of an intelligent storage system

Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, understand the need for long-term archiving solutions and describe how CAS fulfills the need, understand the appropriateness of the different networked storage options for different application environments

UNIT- III

List reasons for planned/unplanned outages and the impact of downtime, Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR) ,RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures.

UNIT- IV

Architecture of backup/recovery and the different backup/recovery topologies , replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities

UNIT- V

Identify key areas to monitor in a data centre, Industry standards for data centre monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data centre. Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain Virtualization technologies, block-level and file-level virtualization technologies and processes.

Case Studies:

The technologies described in the course are reinforced with EMC examples of actual solutions.

Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

TEXT BOOK:

1.	EMC Corporation, Information Storage and Management, Wiley.

REFERENCE BOOKS:

1.	Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill , Osborne, 2003.

2.	Marc Farley, "Building Storage Networks", Tata McGraw Hill,Osborne, 2001.

3.	Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

Outcomes:

- Ability to demonstrate the storage area networks and their products
- Ability to provide the mechanisms for the backup/recovery

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IV Year B.Tech. IT/CST-II Sem

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4	-/-/-	4

(A80534) MACHINE LEARNING
(Elective – IV)

Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.

UNIT – I

Introduction: An illustrative learning task, and a few approaches to it. What is known from algorithms? Theory, Experiment. Biology. Psychology.

Concept Learning: Version spaces. Inductive Bias. Active queries. Mistake bound/ PAC model. basic results. Overview of issues regarding data sources, success criteria.

UNIT –II

Decision Tree Learning: - Minimum Description Length Principle. Occam's razor. Learning with active queries

Neural Network Learning: Perceptions and gradient descent back propagation.

UNIT –III

Sample Complexity and Over fitting: Errors in estimating means. Cross Validation and jackknifing VC dimension. Irrelevant features: Multiplicative rules for weight tuning.

Bayesian Approaches: The basics Expectation Maximization. Hidden Markov Models

UNIT—IV

Instance-based Techniques: Lazy vs. eager generalization. K nearest neighbor, case- based reasoning.

UNIT—V

Genetic Algorithms: Different search methods for induction - Explanation-based Learning: using prior knowledge to reduce sample complexity.

TEXT BOOKS:

1. Tom Michel, Machine Learning, McGraw Hill, 1997
2. Trevor Has tie, Robert Tibshirani & Jerome Friedman. The Elements of Statically Learning, Springer Verlag, 2001.

REFERENCE BOOKS:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001.
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.

Outcomes:

- Student should be able to understand the basic concepts such as decision trees and neural networks.
- Ability to formulate machine learning techniques to respective problems.
- Apply machine learning algorithms to solve problems of moderate complexity.

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(A80087) INDUSTRY ORIENTED MINI PROJECT

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IV Year B.Tech. IT/CST-II Sem	L	T/P/D	C
	-	-/6/-	2

(A80089) SEMINAR

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(A80088) PROJECT WORK

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IV Year B.Tech. IT/CST-II Sem	L	T/P/D	C
	-	-/-/-	2

(A80090) COMPREHENSIVE VIVA