DEVI AHILYA VISHWAVIDYALAYA, INDORE

FACULTY OF ENGINEERING

SCHEME OF EXAMINATION
&
COURSE OF CONTENTS

BE IV Year Programme
(COMPUTER ENGINEERING)

INSTITUTE OF ENGINEERING & TECHNOLOGY
(www.iet.dauniv.ac.in)

B.E. IV YEAR – COMPUTER ENGINEERING

TH- Theory, CW – Class Work, SW – Sessional Work, PR – Practical

Semester- VII

S. No.	Sub. Code	Subject	L	P	Maximum Marks TH	CW	SW	PR	TOTAL
1.	4CO201	Project -II	-	4	-	-	100	50	150
2.	4CO202	Artificial Intelligence	4	2	100	50	50	50	250
3.	4CO203	Object Oriented Design	4	2	100	50	50	50	250
4.	4CO204	Wireless Protocols & Mobile Computing	4	2	100	50	50	50	250
5.		Elective – I	4	-	100	50	-	-	150
	TOTAL		**16**	**10**	**400**	**200**	**250**	**200**	**1050**

Semester- VIII

S. No.	Sub. Code	Subject	L	P	Maximum Marks TH	CW	SW	PR	TOTAL
1.	4EI251	Control System Theory	4	-	100	50	-	-	150
2.	4CO252	Enterprise Resource Planning	4	2	100	50	50	50	250
3.	4CO253	Network & Information Security	4	2	100	50	50	50	250
4.	4CO254	Internet Computing	4	2	100	50	50	50	250
5.		Elective- II	4	-	100	50	-	-	150
	TOTAL		**20**	**6**	**500**	**250**	**150**	**150**	**1050**

List of Elective Subjects

Semester VII, Elective – I

S. No.	Sub. Code	Name of Subject
1.	4CO205	Machine Learning
2.	4CO206	Parallel Computing
3.	4CO207	Very Large Databases
4.	4CO208	VLSI Design
5.	4CO209	Embedded Systems

Semester VIII, Elective – II

S. No.	Sub. Code	Name of Elective
1.	4CO255	Cloud Computing
2.	4CO256	Compiler Construction
3.	4CO257	Distributed Computing
4.	4CO258	Information Retrieval & Extraction
5.	4CO259	Robotics & Numerical Control

Devi Ahilya University, Indore, India Institute of Engineering & Technology		BE IV Year Computer Engineering					
Subject Code & Name 4CO202 Artificial Intelligence	**Periods Hours/ Week** Lectures- 4 Tutorials-0 Practical- 2	**Marks**	Th	CW	SW	Pr	Total
		Max	100	50	50	50	250
Duration of Theory Paper: 3 Hours		Min	35	25	25	25	110

Objective: To introduce the concepts of making computer systems intelligent through computational methods and techniques.

Course of Contents

Unit-I
AI and AI Techniques; Problems, Problem space and Sate space; Production systems; Search techniques and algorithms.

Unit-II
Knowledge Representation- Issues and Methods; Predicate logic- resolution and unification; Forward and backward Reasoning; Logic programming & Prolog.

Unit-III
Symbolic computation- Uncertainty; Rule based systems; Statistical Reasoning; Fuzzy Logic; Expert systems; Decision support systems.

Unit-IV
Semantic networks; Frames and Scripts; Conceptual Dependency; Game playing; Planning overview; Understating; Learning.

Unit-V
Natural language processing- parsing, semantic analysis, ATN and RTNs; Connectionists models- neural networks; Speech and vision processing; Robotic actions.

Books Recommended:
[1] E Rich, K Knight, Artificial Intelligence, 2/e, McGraw Hill, 1991.
[2] S Russell, P Norvig, Artificial Intelligence: A Modern Approach, 2/e, Pearson Education (PH), 2003.
[3] D W Patterson, Introduction to Artificial Intelligence and Expert Systems, PHI, 2007.
[4] P Winston, Artificial Intelligence, 3/e, Addison Wesley, 1992.

Devi Ahilya University, Indore, India **Institute of Engineering & Technology**		BE IV Year Computer Engineering					
Subject Code & Name 4CO203 Object Oriented Design	**Periods Hours/ Week** Lectures- 4 Tutorials-0 Practical- 2	**Marks**	Th	CW	SW	Pr	Total
		Max	100	50	50	50	250
Duration of Theory Paper: 3 Hours		Min	35	25	25	25	110

Objective: To learn object oriented analysis, modelling and design using UML. To learn object oriented approach of software engineering.

Prerequisite: Knowledge of object oriented programming and basics of software engineering.

Course of Contents

Unit-I

Rational Unified Process, Process Notation, Business Modeling Workflow, Review of Object Orientation, definition of OOA, OOD and OOP

Unit -II

Object Oriented Analysis: Requirements Overview, Problem Statement, Glossary, Use-Case Model, Supplementary Specifications, Analysis and Design Overview Architectural Analysis: Analysis Mechanisms, Key Abstractions, Pattern, Frame, Initial Architectural Layers,Use Case Analysis: finding classes from use case behavior, describe responsibility, attribute and association, qualify analysis mechanism

Unit – III

Architectural Design**:** Design &Implementation Mechanisms, Design Classes & Subsystems, Reuse opportunities Use-Case Design**:** Interactions between Design Objects, Persistence-Related Behavior, Refine the Flow of Events Description, Unify Classes and Subsystems

Unit – IV

Subsystem Design**:** Subsystems and Interfaces, Distribute Subsystem Behavior to Subsystem Elements, Document Subsystem Elements, Subsystem Dependencies Class Design**:** Create Initial Design Classes, Identify Persistent Classes, Define Operations, Class Visibility, Methods, States, Attributes, Dependencies, Associations, Generalizations, Resolve Use-Case Collisions

Unit – V

Concurrency and Distribution Overview, UML, case study of OOAD application

Books Recommended:

[1] Grady Booch, Object Oriented Analysis & Design with Application, Pearson Education India 2nd Edition.

[2] Scott W. Ambler, The Object Primer, Cambridge University Press, 2nd Edition.

[3] Philippe Kruchten, The rational Unified Processes & Introduction Pearson Education India 2nd Edition.

[4] Grady Booch, Games Rumbaugh, Ivar Jacobson, The Unified Modeling Language User Guide, Addison Wesley

[5] M. Blaha, J. Rambaugh, Object Oriented Modeling and Design with UML, Pearson Education 2nd Edition,2007.

Devi Ahilya University, Indore, India **Institute of Engineering & Technology**		BE IV Year Computer Engineering					
Subject Code & Name 4CO204 Wireless Protocols & Mobile Computing	**Periods Hours/ Week** Lectures- 4 Tutorials-0 Practical- 2	**Marks**	TH	CW	SW	Pr	Total
		Max	100	50	50	50	250
Duration of Theory Paper: 3 Hour		Min	35	25	25	25	110

Objective: To give exposure to the students on wireless communication with emphasis on protocol design and computing on mobile nodes.

Course of Contents

Unit-I

Introduction, Wireless Networks, Wireless VS Wired Networks, Mobile Devices, Mobile Applications, Mobile Environment and limitations, Wireless transmission, Multiplexing, Modulation, Spread spectrum-DSSS & FHSS

Unit-II

Cellular networks- overview, Cellular Concept, Frequency Reuse, Channel Allocation, Call Setup, Cell Handoffs, Location Management, Medium Access Control-motivation for specialized MAC, SDMA,FDMA,TDMA, Reservation Aloha, PRMA, MACA, DSMA, CDMA, GSM-Basics, GSM-Air Interface, protocols, localization & calling

Unit-III

Wireless LANs**,** 802.11 System & Protocol Architecture, MAC layer-DFWMAC-DCF with CSMA/CA, CTS/RTS extension & polling, MAC management, Mobile IP, TCP over wireless, TCP and mobility

Unit-IV

Designing mobile applications, Mobile agents transcoding and proxy architecture, wireless web and WAP, J2ME basics, Mobile Application development using J2ME, Data broadcasting, and Location based computing,

Unit-V

Information management: data dissemination and broadcast models, mobile database and mobile transaction, location-Independent and location-dependent computing models, Human-computer interactions: reduced user interfaces, wearable and pervasive computing; Use of XML & UML in mobile interfaces

Books Recommended:

[1] J Schiller, Mobile Communications, Pearson Education, 2003
[2] W. Stalling, Wireless Communications & Networks, Pearson Education, 2/e, 2005
[3] A Talukdar, RYavagal, Mobile Computing: Technology, Applications & Service Creation, McGrawHill, 2006
[4] Reza B'Far, Mobile Computing Principles; Designing and Developing Mobile Applications with UML and XML, Cambridge University Press, 2005.
[5] James Keogh, The Complete Reference J2ME, Tata McGraw Hill, 2003

Devi Ahilya University, Indore, India Institute of Engineering & Technology		BE IV Year Computer Engineering					
Subject Code & Name 4CO205 Machine Learning	**Periods Hours/ Week** Lectures- 4 Tutorials-0 Practical- 0	**Marks**	TH	CW	SW	Pr	Total
		Max	100	50	-	-	150
Duration of Theory Paper:3 Hours		Min	35	25	-	-	60

Course Objectives: The field of machine learning is concerned with the question of how to build computer programs able to construct new knowledge or to improve already possessed knowledge by using input information. The goal of this course is to introduce the theoretical foundations of machine learning, to provide practical experience of applying machine learning techniques and to investigate new problems where machine learning techniques can do better.

Prerequisite: Basic knowledge of a programming language is required. Basic knowledge of probabilities and statistics is required

Course of Contents

Unit-I

Introduction: Definition of learning systems. Goals and applications of machine learning. Aspects of developing a learning system: training data, concept representation, function approximation.

Inductive Classification: The concept learning task. Concept learning as search through a hypothesis space. General-to-specific ordering of hypotheses. Finding maximally specific hypotheses. Version spaces and the candidate elimination algorithm.

Unit-II

Decision Tree Learning: Representing concepts as decision trees. Recursive induction of decision trees. Picking the best splitting attribute: entropy and information gain. Searching for simple trees and computational complexity.

Experimental Evaluation of Learning Algorithms: Measuring the accuracy of learned hypotheses. Comparing learning algorithms: cross-validation, learning curves, and statistical hypothesis testing.

Unit-III

Computational Learning Theory: Models of learnability: learning in the limit; probably approximately correct (PAC) learning. Sample complexity: quantifying the number of examples needed to PAC learn. Computational complexity of training. Sample complexity for finite hypothesis spaces. PAC results for learning conjunctions, kDNF, and kCNF. Sample complexity for infinite hypothesis spaces, Vapnik-Chervonenkis dimension.

Unit-IV

Language Learning: Classification problems in language: word-sense disambiguation, sequence labeling. Formal Language learning, introduction to Hidden Markov models (HMM's).

Support Vector Machines: Maximum margin linear separators. Quadratic programming solution to finding maximum margin separators. Kernels for learning non-linear functions.

Unit-V

Genetic Algorithms (GAs): Motivation, Representing Hypotheses, Genetic operators, fitness Function and Selection. How do GAs work? Machine Learning: The Michigan Approach, The Pitt Approach, An evolution program: the GIL system. Evolutionary Programming and Genetic Programming.

Books Recommended:

[1] Tom Mitchell, *Machine Learning*, McGraw-Hill, 1997.

[2] Richard O. Duda, Peter E. Hart & David G. Stork, *Pattern Classification,* Wiley & Sons, 2001.

[3] Ethem Alpaydin, *Introduction to Machine Learning*, MIT Press, 2004.

[4] David E. Goldberg, *Genetic Algorithms in Search, Optimization and Machine Learning,* Kluwer Academic Publishers, Boston, MA, 1989.

[5] Zbigniew Michalewicz, *Genetic Algorithms + Data Structures = Evolution Programs*, Springer, 1999.

Devi Ahilya University, Indore, India Institute of Engineering & Technology			B.E. IV Year Computer Engineering				
Subject Code & Name 4EI251 –Control System Theory	Periods Hours/ Week **Lectures- 4** **Tutorials-0** **Practical-0**	**Marks**	**TH**	**CW**	**SW**	**PR**	**Total**
		Max	**100**	**50**	**-**	**-**	**150**
Duration of Theory Paper: 3Hr.		**Min**	**35**	**25**	**-**	**-**	**60**

Objective: Is to provide fundamentals of control engineering & clears the mathematical modeling of the physical system. The subject gives various classical analysis tools for design & stability the systems in time domain & frequency domain.

Prerequisites: Knowledge of Laplace Transform, Basics of Matlab & Simulink.

Course of Contents

Unit-I

Laplace Transforms of commonly used function, Various theorems: initial & final value theorem, Inverse laplace transform, Block diagram of control system, open loop & close loop system, Feed back control, Digital Control, Multivariable Control System, Non-Linear Control System. Mathematical Modeling of Physical Systems, Liquid level system, Linear Approximations of Physical Systems, The transfer function, Block Diagram algebra, Signal Flow graphs, Mason's Gain Formula

Unit-II

Effect of using feedback, Sensitivity of control systems, Test signals, Time response of prototype First & second order system, Performance specifications of the prototype I & II order system, Effects of additions of poles and zeros to open loop & close loop transfer functions, concept of dominant pole, Steady-state error & error constants, Types of controllers & their control action, Stability : Absolute & relative, Routh Hurwitz criterion.

Unit III

Concept of complex frequency, Performance specification in frequency domain, Co-relation between frequency domain & time domain, Principal of argument, Polar plots, Bode plots, Nicholas Charts, Stability Analysis in Frequency Domain, Nyquist Criteria, stability margins, Relative stability , Systems with dead time.

Unit IV

State variable representation for an LTI system, Different Canonical forms, Co- relation between state models & Transfer function, Solution of State Equations, Concepts of controllability & observability.

Unit V

The Root-locus concept, Guidelines for sketching Root-locus, Root contours, Root-locus of systems with Dead time, Approaches to system design, Cascade compensation networks, Design of Compensators in time & frequency domain.

Books Recommended:

[1] Modern Control Engineering, 3rd Edition-K. Ogata, PHI.
[2] Control System Engineering, 4th Edition - Nagrath& Gopal, Newage Publishers.
[3] Control Systems (Principles & Design) - M.Gopal, TataMcGraw Hill.
[4] Automatic Control system, 7th Edition-B.C. Kuo, PHI.

Devi Ahilya University, Indore, India **Institute of Engineering & Technology**		BE IV Year Computer Engineering					
Subject Code & Name 4CO252 Enterprise Resource Planning	**Periods Hours/ Week** Lectures- 4 Tutorials-0 Practical- 2	**Marks**	TH	CW	SW	Pr	Total
		Max	100	50	50	50	250
Duration of Theory Paper: 3 Hour		Min	35	25	25	25	110

Objective: The major objective of this course is to facilitate students in understanding the concepts of system, business processes and business organization. Further to know the basics of ERP, standard components of ERP, key implementation issues and some popular ERP products for competitive advantage. Also the objective is to understand integration of enterprise wised business processes through Information Technology.

Prerequisites: Basic concept of Business Data Processing, Information System, Data Base and Data Mining.

Course of Contents

Unit–I - ERP-An Introduction

Overview of ERP; Enterprise –An Overview; Scope, Benefits of ERP and it evolution; Integrated Information Management; Resource Management; Integrated Data Model; ERP and Modern Enterprise, MRP and MRP-II.

Unit–II - Business Engineering and Related Technologies

Business Engineering; Significance of Business Engineering; Principles of Business Engineering; Business Engineering with Information Technology; ERP and Management Concerns; BPR, Data Warehousing; Data Mining, On-line Analytical Processing etc, Supply Chain Management; ERP and Related Technologies.

Unit–III - ERP Implementation

Business Modelling for ERP; Building the Business Model; ERP Implementation Life Cycle; Implementation Methodology; Role of Consultants, Vendors and Users; Customization; Precautions; ERP: Post implementation Options; ERP Implementation Methodology; Guidelines for ERP Implementation; Project Management and Monitoring.

Unit–IV - Business Modules in an ERP Package

Business Modules in an ERP Package, Finance, Manufacturing, Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution; Market Dynamics and Competitive Strategy.

Unit–V- ERP Products and Future Trends

Various popular ERP Products like SAP, ORACLE, PEOPLE SOFT etc; ERP and E-Commerce; ERP and Internet; Future Directions in ERP; Case Studies.

Books Recommended:

[1] Alexis Leon, ERP- Demystified, Tata McGraw-Hill Publishing Company Limited, 2000.

[2] Vinod Kumar Garg& N.K. Venkitakrishnan, Enterprise Resource Planning-Concepts and Practice, Prentice Hall of India Private Limited, 1998.

[3] Devan Parag, ERP,Excell PublishersNew Delhi,1999.

[4] Kalkota Ravi & B. Whinston, Frontiers of E-Commerce,AddisonWesley,2000.

Devi Ahilya University, Indore, India **Institute of Engineering & Technology**		BE IV Year Computer Engineering					
Subject Code & Name 4CO253 Network & Information Security	**Periods Hours/ Week** Lectures- 4 Tutorials-0 Practical- 2	**Marks**	Th	CW	SW	Pr	Total
		Max	100	50	50	50	250
Duration of Theory Paper: 3 Hours		Min	35	25	25	25	110

Objective: To impart the knowledge of encryption and decryption techniques and their applications in managing the security of data.

Pre-requisite: NIL

Course of Contents

UNIT-I
The need for security, security approaches, principles of security, services, mechanisms & attacks, model for network security. Plain & Cipher text , substitution & transposition techniques, play fair cipher, hill cipher, stenography, key range & key size,

UNIT-II
Deffie-Hellman key exchange. An overview of symmetric key cryptography, Algorithm types & modes, possible types of attacks, Symmetric & asymmetric cipher model, Data Encryption Standard (DES), Advanced Encryption Standard (AES).

UNIT-III
Brief history & overview of asymmetric key cryptography, RSA algorithm, asymmetric & symmetric key cryptography together, digital envelopes, digital signatures & digital certificates & Public key infrastructure (PKI).

UNIT-IV
Secure Socket Layer, Secure Hyper Text Transfer Protocol (SHTTP), Time Stamping Protocol (TSP), 3-D Secure Protocol, Email Security, Kerberos.

UNIT-V
Introduction, brief introduction to TCP/IP, Firewalls, IP Security, Virtual Private Networks, Intrusion detection system, IP spoofing, DNS spoofing.

Books Recommended:
[1] Douglas R. Stinson; *Cryptography Theory and Practice*; 2nd Edition, Chapman & Hall/CRC.
[2] Williams Stallings; *Cryptography & Network Security*; 3rd Edition, Pearson Education.

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<tr><td colspan="2">Devi Ahilya University, Indore, India
Institute of Engineering & Technology</td><td colspan="6">BE IV Year Computer Engineering</td></tr>
<tr><td rowspan="2">Subject Code & Name
4CO254 Internet Computing</td><td rowspan="3">Periods Hours/ Week
Lectures- 4
Tutorials-0
Practical- 2</td><td>Marks</td><td>Th</td><td>CW</td><td>SW</td><td>Pr</td><td>Total</td></tr>
<tr><td>Max</td><td>100</td><td>50</td><td>50</td><td>50</td><td>250</td></tr>
<tr><td>Duration of Theory Paper:
3 Hours</td><td>Min</td><td>35</td><td>25</td><td>25</td><td>25</td><td>110</td></tr>
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Objective:-To learn XML fundamentals, how it works, what technologies surround it , and how it can best be used in a variety of situations, from simple data transfer to using XML in your web pages.

Prerequisite: HTML, Knowledge of Java Programming language (core)

Course of Contents

Unit-I XML Basics

Introduction to Markup languages, What is XML?, Elements & Attributes, Character data, Character & entity references, CDATA sections, Comments, Processing instructions, Document structure, Well formed XML, Valid XML,XML parsers.

Unit-II Document Type Definition and XML Schema

Document Type declaration, Element Type declaration, Attribute type declaration, Attribute Types, Attribute defaults, Entities, Notation Declarations, Limitations of DTD, Namespaces in XML. Why do we need an XML Schema? XML Schema v/s DTD, Schema Structure, Simple Types & Complex Types, Element Declaration, Attribute declaration, Local v/s global Declarations, Deriving new types & using facets.

Unit-III Transforming XML and XPATH

What is Transformation? Executing Transformations, XSLT for presentation: XML to HTML Example, XSLT for Data conversion: XML to XML example. Introduction to XPATH, XPATH Axes, XPATH Expressions and Location Paths, XPATH Syntax, XPATH Functions.

Unit-IV Document Object Model and Simple API for XML

DOM Implementation, DOM Components, Creating Nodes, Traversing the Nodes. DOM v/s SAX,SAX based parsers, Events, Using SAX.

Unit-V Web Services:

Distributed Computing Architecture: DCOM ,IIOP, Java RMI, Web Services, The Web services stack: SOAP, WSDL and UDDI, Service Oriented Architecture, The Three revolutions: Data, Architecture and Software.

Books Recommended:

[1] David Hunter “Beginning XML”,Wiley Dreamtech,2005,Third Edition
[2] Kal Ahmed, Sudhir Ancha “Professional Java XML”,SPD 2004.
[3] Frank P. Coyle “XML,Web Services,and the Data Revolution “, Pearson Education 2002

Devi Ahilya University, Indore, India Institute of Engineering & Technology		BE IV Year Computer Engineering					
Subject Code & Name 4CO255 Cloud Computing	**Periods Hours/ Week** Lectures- 4 Tutorials-0 Practical- 0	**Marks**	TH	CW	SW	Pr	Total
		Max	100	50	-	-	150
Duration of Theory Paper:3 Hours		Min	35	25	-	-	60

Objective: To Introduce the cutting edge technology in Internet Computing Technology.
Prerequisite: Fundamentals of Network Technology, Fundamentals of Internet Technology.

Course of Content

Unit-I Introduction to Cloud Computing
Cloud introduction and overview, Cloud Computing Technology, Hardware & software Infrastructure, Different clouds, Risks, Cloud Services, Applications, Regulatory Issues, and Limitations.

Unit-II Cloud Computing Architecture
Requirements, Introduction Cloud computing architecture, various kind of Cloud computing architecture, Grid Computing, Transactional Computing ,On Demand Computing, Distributed Computing.

Unit-III Virtualization
Virtualization at the infrastructure level, CPU Virtualization, Storage Virtualization, Network Virtualization, A discussion on Hypervisors, SAN, ISCSI, VLAN. Scaling a Cloud Infrastructure.

Unit-IV Security
Security issues in cloud computing, Data Security: Data Control, Encryption, Regulatory and Standard Compliance, Network security: Firewall Rules, Network Intrusion Detection, Host Security aspects:

Unit-V Disaster Management
Disaster Recovery Planning: Recovery Point Objectives, Recovery Time Objectives, Disaster management in cloud: Backup management Geographic redundancy, Disaster Management: Monitoring, Load Balancing, Database Recovery.

Books and References:
[1] Cloud Application Architectures. George Reese. Publication O'Reilly,2009
[2] Cloud Computing: A Practical Approach. Anthony T.Velte, Tobe J.Velte, Robert Elsenpeter. Publication Pearson Education.,2009
[3] White Papers on cloud Computing