

# Chhattisgarh Swami Vivekanand Technical University, Bhilai ( C.G.)

## Scheme of teaching and examination

### B.E. VII Semester Information Technology

S. No	Board of Study	Subject Code	Subject Name	Periods per week			Scheme of examination			Total Marks	Credits [L+(T+P)/2]
				L	T	P	ESE	CT	TA		
1	Info. Technology	333711(33)	Software Engineering	3	1	-	80	20	20	120	4
2	Info. Technology	333712(33)	Management Information System	3	1	-	80	20	20	120	4
3	Info. Technology	333713(33)	E- Commerce	3	1	-	80	20	20	120	4
4	Info. Technology	333714(33)	Artificial Intelligence& Expert Systems	3	1	-	80	20	20	120	4
5	<b>Refer Table-2</b>		Professional Elective-2	4	-	-	80	20	20	120	4
6	Info. Technology	333721(33)	Software Engineering - Lab	-	-	4	40	-	20	60	2
7	Info. Technology	333722(33)	Artificial Intelligence& Expert Systems Lab	-	-	4	40	-	20	60	2
8	Info. Technology	333723(33)	Software Technology Lab - 4	-	-	4	40	-	20	60	2
9	Info. Technology	333724(33)	Minor Project	-	-	5	100	-	40	140	3
10	Management	300725(36)	Innovative & Entrepreneurial Skills	-	-	2	-	-	40	40	1
11	Info. Technology	333726(33)	** Practical Training ** Evaluation / Library	-	-	1	-	-	40	40	1
<b>TOTAL</b>				<b>16</b>	<b>4</b>	<b>20</b>	<b>620</b>	<b>100</b>	<b>280</b>	<b>1000</b>	<b>31</b>

**L-Lecture, T- Tutorial, P- Practical, ESE- End Semester Examination, CT- Class Test,TA- Teacher's Assessment**

**\* To be completed after VI Semester and before the commencement of VII Semester**

<b>Table- 2</b>			
<b>Professional Elective ( Table-II)</b>			
<b>S.No.</b>	<b>Board of Studies</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	Comp. Science & Engg.	322751 (22)	Digital Image Processing
2	Comp. Science & Engg.	322752 (22)	Advanced Computer Architecture
3	Information Technology	333753 (33)	Multimedia and Communications
4	Comp. Science & Engg.	322755 (22)	Cryptography & Network Security
5	Comp. Science & Engg.	322756 (22)	Fault Tolerant Systems
6	Comp. Science & Engg.	322757 (22)	Natural Languages Processing
7	Comp. Science & Engg.	322758 (22)	OODBMS

Note-1 : 1/4 of total strength of students subjects to Minimum Strength of twenty students is required to offer an elective in the college in a particular academic session.

Note -2 : Choice of elective course once made for an examination cannot be changed for future examination.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: VII

Subject: **Software Engineering.**

Total Theory Periods: **40**

Total Marks in End Semester Exam: **80**

Minimum number of class tests to be conducted: **02**

Branch: **Information Technology.**

Code: **333711(33)**

Total Tutorial Periods: **12**

## **UNIT-I INTRODUCTION TO SOFTWARE ENGINEERING**

Definition and use of Software Engineering Terms related to Software Engineering activities. Size Factors :- Trivial projects, Small projects, Medium size projects, Large projects , Very large projects, Extremely large projects Quality and Productivity factors during Software Development Managerial Issues:- Ideal or expected activities of Managers in a firm

## **UNIT-II PLANNING AND ANALYSIS PHASE:**

Software Project Planning :- Defining the problem, Developing a solution strategy, Planning the development process, Goals and Requirements. Various types of Software Development Models Waterfall model or Linear Sequential model , Prototyping model , Rapid Application Development (RAD) model , Incremental model , Spiral model & Component Assembly model. Programming Team Structure. Software Configuration Management (SCM) :- Meaning and Components of SCM, SCM terms, SCM tasks, Formal technical reviews (FTR) & Configuration audit.

**SOFTWARE QUALITY ASSURANCE:-** Quality, Quality Control, Quality Assurance, Costs related to maintenance of Quality, Software Quality Assurance (SQA) Activities, Statistical Quality Assurance Risk Management :- Types of Risks and Risk Management Strategies. Software Cost Estimation :- Major factors that influence software cost, Software Cost Estimation Techniques, Expert Judgment, Delphi cost estimation (Recursive Estimation), The COCOMO Model, Work Breakdown Structures (WBS), Function-Oriented Metrics (Function Point Analysis). Analysis Concepts:- Software Requirement Analysis activities, Software Requirement Specification(SRS) or Software Requirement Plan(SRP) , Models used in the Analysis phase (Analysis Model).

## **UNIT-III DESIGN PHASE**

Design Principles. Basic Design sub-Phases:- Data design. Architectural design. Interface design. Procedural design. Fundamental Design Concepts: - Abstraction, Information hiding, Modularity, Concurrency, Verification, Aesthetics. Modularization:- Meaning, Coupling and Cohesion in modules Design Notations. Object Oriented Design: - Introduction to UML. Software Design byproducts: - Test Plans, Test Case Design, Milestones, Walkthroughs and Inspections.

## **UNIT IV CODING PHASE**

Coding :- Coding Techniques, Suggestions on good Coding Style (Do's and Dont's), Internal Documentation, Verification and Validation, Objects, Modules and Reusability.

## **UNIT –V      SOFTWARE TESTING, MAINTENANCE PHASE & CASE Tools**

Testing:- Types of Tests, Test Report and Analysis.

Maintenance:- Definition of Software Maintenance, Types of Maintenance, Management of software maintenance.

CASE Tools:- Introduction to CASE tools, Use of CASE tools in various phases of Software Development.

### **Text Books:-**

- 1      Fundamentals of software Engineering, Rajib Mall, Prentice Hall of India
- 2      Software Engineering by Roger Pressman

### **Reference Books:-**

- 1      Software Engineering by Evan Scatch
- 2      Software Engineering by Pankaj Jalote
- 3      Fundamental of Software Engg- Ghezzi, Jazayer's and Mandriolli (PHI).

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester: VII**

**Subject: Management Information System.**

**Total Theory Periods: 40**

**Total Marks in End Semester Exam: 80.**

**Minimum number of class tests to be conducted: 02.**

**Branch: Information Technology.**

**Code: 333712(33)**

**Total Tutorial Periods: 12**

- UNIT - I: MANAGEMENT & ORGANIZATIONAL SUPPORT SYSTEMS FOR DIGITAL FIRM:**  
Definition of MIS; Systems approach to MIS: MIS and Human factor considerations, concept of organizational information sub-system, MIS & problem solving. Information Technology Infrastructure for digital firm. Related Case Studies.
- UNIT -II: INFORMATION SYSTEMS & BUSINESS STRATEGY:**  
Information Management. Who are the users? Managers, Decision making & information System, Evolution of Computer based information system (CBIS), Model of CBIS. Changing role of Information systems in organization: Trend to End-User computing, justifying the CBIS, Achieving the CBIS, Managing the CBIS, Benefits & Challenges of CBIS implementation. Strategic Information System, Business level & Firm level Strategy, Case Studies.
- UNIT-III: INFORMATION SYSTEMS IN THE ENTERPRISE:**  
Systems from Management & Functional perspective & their relationship: Executive Support System, Decision Support System, Sales & Marketing Information System, Manufacturing Information System, Human-Resource Information System. Finance & Account Information System. Case Studies.
- UNIT-IV: INFORMATION TECHNOLOGY FOR COMPETITIVE ADVANTAGE:**  
Firm in its environment, the information resources, who manages the information resources? Strategic planning for information resources. End-User Computing as a strategic issue, Information resource management concept. Knowledge management & their work system, Business value of information system Related Case Studies.
- UNIT-V: INTERNATIONAL INFORMATION SYSTEM:**  
Introduction to E-Commerce, Business Intelligence. E-Commerce strategy, Electronic Data Interchange, E-commerce methodology, E-commerce technology & their success strategies.  
Managing International Information Systems: IIS architecture, Global business drivers, challenges, and strategy: divide, conquer, appease, cooptation, business organization, problems in implementing global information systems,  
Understanding ethical and social issues related to systems, ethics in information society, and Moral dimensions of information systems.

**Text Book:**

1. MIS managing the digital firm, Kenneth C. Laudon & Jane P. Laudon (Pearson Education).
2. MIS, Suresh K. Basandra (Wheelers)

**Reference Books:**

1. Introduction to computer Information System for Business, Mark G. Simkin. S. Chand & Co., 1996.
2. Analysis & Design of Information Systems, James A. Senn. MC Graw-Hill International edition, 1989.
3. Analysis and Design of information system , V.Rajaraman(PHI)

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester: VII**  
**Subject: E-Commerce.**  
**Total Theory Periods: 40**  
**Total Marks in End Semester Exam: 80.**  
**Minimum number of class tests to be conducted: 02**

**Branch: Information Technology.**  
**Code: 333713 (33)**  
**Total Tutorial Periods: 12**

## **Unit 1:**

Introduction to e-Commerce, e-Commerce Framework, e-Commerce and Media Convergence, Anatomy of e-Commerce Applications, e-Commerce Consumer Applications, e-Commerce Organization Applications.

## **Unit 2:**

Components of I-way, Network Access Equipment, National-Independent ISPs, Regional- level ISPs, Local -level ISPs.

## **Unit 3:**

Client-Server Network Security, Emerging Client-Server Security Threats, Firewalls and Network Security, Data and Message Security, Encrypted Documents and Electronic Mail, Challenge Response System.

## **Unit 4:**

Architectural Framework for e-Commerce, WWW as the Architecture, Security and the Web, Consumer Oriented Applications, Mercantile Process Models, Types of E-Payment Systems, Smart Cards, Credit Card -Based e-payment Systems.

## **Unit 5:**

Electronic Data Interchange, EDI Applications in Business, EDI and E-Commerce, Standardization and EDI, EDI Software Implementation, Value Added Networks (VANs), Internal Information Systems.

## **Text Books:**

1. Frontiers of Electronic Commerce by Ravi Kalakota & Andrew B. Whinston, Pearson Education.
2. E-Commerce – The Cutting Edge of Business by Bajaj, Tata McGraw-Hill

## **Reference Books:**

3. Electronic Commerce by David Kosiur, Published by Microsoft Press.
4. E-business roadmap for success by Dr. Ravi Kalakota & Marcia Robinson.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester: VII**  
**Subject: Artificial Intelligence and Expert System.**  
**Total Theory Periods: 40**  
**Total Marks in End Semester Exam: 80**  
**Minimum number of class tests to be conducted: 02**

**Branch: Information Technology.**  
**Code: 333714(33)**  
**Total Tutorial Periods: 10**

## **UNIT-1 GENERAL ISSUES AND OVERVIEW OF AI:**

The AI problems; what is an AI technique; Characteristics of AI applications Problem Solving, Search and Control Strategies General Problem solving; Production systems; Control strategies: forward and backward chaining Exhaustive searches: Depth first Breadth first search.

## **UNIT-2 HEURISTIC SEARCH TECHNIQUES:**

Hill climbing; Branch and Bound technique; Best first search and A\* algorithm; AND/OR Graphs; Problem reduction and AO\* algorithm; Constraint Satisfaction problems Game Playing Minmax search procedure; Alpha-Beta cutoffs; Additional Refinements

## **UNIT-3 KNOWLEDGE REPRESENTATION**

First Order Predicate Calculus; Skolemisation; Resolution Principle and Unification; Inference Mechanisms Horn's Clauses; Semantic Networks; Frame Systems and Value Inheritance; Scripts; Conceptual Dependency AI Programming Languages Introduction to LISP, Syntax and Numeric Functions; List manipulation functions; Iteration and Recursion; Property list and Arrays, Introduction to PROLOG.

## **UNIT-4 NATURAL LANGUAGE PROCESSING PARSING TECHNIQUES;**

Context - free Grammar; Recursive Transition Nets (RTN); Augmented Transition Nets (ATN); Semantic Analysis, Case and Logic Grammars; Planning Overview - An Example Domain: The Blocks World; Component of Planning Systems; Goal Stack Planning (linear planning); Non-linear Planning using constraint posting ; Probabilistic Reasoning and Uncertainty; Probability theory; Bayes Theorem and Bayesian networks; Certainty Factor.

## **UNIT-5 EXPERT SYSTEMS:**

Introduction to Expert Systems, Architecture of Expert Systems; Expert System Shells; Knowledge Acquisition; Case Studies: MYCIN, Learning, Rote Learning; Learning by Induction; Explanation based learning.

### **Text Book:**

1. Elaine Rich and Kevin Knight: Artificial Intelligence- Tata McGraw Hill.
2. Dan W.Patterson, Introduction to Artificial Intelligence and Expert Systems- Prentice Hall of India.

### **Reference Books:**

1. Nils J.Nilsson: Principles of Artificial Intelligence- Narosa Publishing house.
2. Artificial Intelligence : A Modern Approach, Stuart Rusell, Peter Norvig, Pearson Education, 2<sup>nd</sup> Edition
3. Artificial Intelligence, Winston, Patrick, Henry, Pearson Education
4. Artificial Intelligenece by Gopal Krishna , Janakiraman

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: **VII**

Subject: **Digital Image Processing.**

Total Theory Periods: **50.**

Total Marks in End Semester Exam: **80**

Minimum number of class tests to be conducted: **02**

Branch: **Information Technology.**

Code: **322751(22)**

Total Tutorial Periods: **Nil**

## **UNIT I: INTRODUCTION:**

Image formation model, Spatial & Gray level resolution, Image enhancement in special domain: Piecewise transformation functions, Histogram equalization, Histogram specification, image averaging, spatial filters- smoothing and sharpening, Laplacian filter, Canny edge detector.

## **UNIT II: IMAGE ENHANCEMENT IN FREQUENCY DOMAIN & IMAGE SEGMENTATION:**

2D discrete fourier transform & its inverse, filtering in frequency domain, Ideal & Gaussian low pass filters, High pass filtering, FFT, Line detection, Edge detection, Edge linking & boundary detection, Thresholding, Region based segmentation.

## **UNIT III: MORPHOLOGICAL IMAGE PROCESSING:**

Logic operations involving binary image, Dialation & Erosion, Opening & Closing, Applications to Boundary extraction, region filling, connected component extraction.

## **UNIT IV: IMAGE COMPRESSION:**

Coding redundancy- Huffman coding, LZW coding, run length coding, Lossy compression- DCT, JPEG, MPEG, video compression.

## **UNIT V: IMAGE REPRESENTATION & 3D:**

Boundary descriptors, Shape numbers, Texture, Projective geometry, Correlation based and feature based stereo correspondence, shape from motion, optical flow.

### **Name of Text Books:-**

1. Ganzalez and Woods, Digital Image Processing, Pearson education.
2. Sonka and Brooks, Image Processing, TSP ltd,

### **Name of Reference Books:-**

1. Jain and Rangachar, Machine Vision, MGH.
2. Schalkoff, Digital Image Processing, John Wiley and sons.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester: VII**

**Subject: Advanced Computer Architecture.**

**Total Theory Periods: 50**

**Total Marks in End Semester Exam: 80**

**Minimum number of class tests to be conducted: 02.**

**Branch: Information Technology.**

**Code: 322752 (22)**

**Total Tutorial Periods: Nil.**

**UNIT I: PIPELINE:**

Linear pipeline processor: Nonlinear pipeline processor, Instruction pipeline design, Mechanisms, Dynamic instruction scheduling, Arithmetic pipeline design, Super-scalar processors, VLIW architecture.

**UNIT II: MEMORY HIERARCHY & I/O ORGANIZATION:**

Cache memories, Cache coherence, High bandwidth memories, High bandwidth I/O, Disk I/O, Bus specifications and standards.

**UNIT III: PARALLEL COMPUTER MODELS & PROGRAM PARALLELISM:**

Classification of Machines, SISD, SIMD & MIMD, Condition of parallelism, data and resource dependencies, Program partitioning & scheduling, grain size latency, control flow versus data control, data flow architecture.

**UNIT IV: SYNCHRONOUS PARALLEL PROCESSING:**

Vector instruction types, vector access memory schemes, vector and symbolic processors, SIMD architecture, SIMD parallel algorithms, SIMD computers and performance enhancements.

**UNIT V: SYSTEM INTERCONNECTION:**

Network properties and routing, static interconnection networks, dynamic interconnection networks, Multiprocessor system interconnection, Multistage & combining networks.

**Text Books:-**

1. Flynn, computer Architecture: Pipelined and parallel processor design, JB, Boston.
2. Computer Architecture & Parallel processing - Kai Hwang 7 Briggs.(MGH).

**Reference Books:-**

1. R.W. Hockney, C.R. Jesshope, "Parallel Computer 2 –Arch.& Algo.", Adam Hilger.
2. K. Hwang, "Advanced Computer Architecture with ParallelProgramming", MGH.
3. Parallel computing- Theory and practice - Michael J Quinn- Mc Graw Hill

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester: VII**  
**Subject: Multimedia and Communication.**  
**Total Theory Periods: 50**  
**Total Marks in End Semester Exam: 80.**  
**Minimum number of class tests to be conducted: 02**

**Branch: Information Technology.**  
**Code: 333753(33)**  
**Total Tutorial Periods: Nil.**

## **UNIT-I INTRODUCTION:**

Concept of Non-Temporal and Temporal Media. Basic Characteristics of Non-Temporal Media; Images, Graphics, Text. Basic Characteristics of Temporal Media: Video, Audio, Animation. Hypertext and Hypermedia.

Presentations: Synchronization, Events, Scripts and Interactivity, Introduction to Authoring Systems.

## **UNIT-II COMPRESSION TECHNIQUES:**

Basic concepts of Compression. Still Image Compression.: JPEG Compression., Features of JPEG2000. Video Compression: MPEG- 1&2 Compression Schemes, MPEG-4 Natural Video Compression.

Audio Compression: Introduction to speech and Audio Compression, MP3 Compression Scheme. Compression. Of synthetic. Graphical objects.

## **UNIT-III MULTIMEDIA SYSTEMS ARCHITECTURE:**

General Purpose Architecture for Multimedia Support: Introduction to Multimedia PC/Workstation Architecture, Characteristics of MMX instruction set, I/O systems: Overview of USB port and IEEE 1394 interface, Operating System Support for Multimedia Data: Resource Scheduling with real-time considerations, File System, I/O Device Management.

## **UNIT-IV MULTIMEDIA INFORMATION MANAGEMENT:**

Multimedia Database Design, Content Based Information Retrieval: Image Retrieval, Video Retrieval, Overview of MPEG-7, Design of video-on-Demand Systems.

## **UNIT-V VIRTUAL REALITY:**

Introduction to Virtual Reality and Virtual Reality Systems, Related Technologies: Tele-operation and Augmented Reality Systems Interface to the Virtual World-Input; Head and hand trackers, data globes, haptic input devices. Interface to the Virtual World- Output, Stereo display, head-mounted display, auto-stereoscopic displays, holographic displays, haptic and force feedback.

VRML Programming; Modeling objects and virtual environments Domain Dependent applications: Medical, Visualization, Entertainment, etc.

## **Text Books :-**

1. Multimedia Technology, TAY Vaughan, McGraw-Hill
2. Multimedia Concept & Practice, Hartman & Carey, PHI
3. Virtual Reality Systems, John Vince, Addison Wesley.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester: VII**  
**Subject: Cryptography & Network Security.**  
**Total Theory Periods: 50**  
**Total Marks in End Semester Exam: 80**  
**Minimum number of class tests to be conducted: 02.**

**Branch: Information Technology.**  
**Code: 322755 (22)**  
**Total Tutorial Periods: Nil**

- UNIT-I FOUNDATIONS OF CRYPTOGRAPHY AND SECURITY:-**  
Ciphers and Secret Message, Security Attacks and Services. Mathematical Tools for Cryptography: Substitutions and Permutations, Modular Arithmetic, Euclid's Algorithm, Finite Fields, Polynomial Arithmetic. Design Principle of Block ciphers: Theory of Block Cipher Design. Cipher Network Structures, DES and Triple DES, Modes of Operation (ECB, CBC, OFB, CFB) , Strength ( or Not) Of DES
- UNIT-II BLOCKS CIPHER ALGORITHMS:-**  
IDEA, CAST, Blowfish, Twofish , Rijndael (AES). Pseudo Random Numbers and stream ciphers: Pseudo random sequences, Linear Congruential Generators, Cryptographic Generators, Design of Stream Cipher, RC4, RC5.
- UNIT-III PUBLIC KEY CRYPTOGRAPHY:-**  
Prime Numbers and Testing for Primality, Factoring Large Numbers, Discrete Logarithms RSA, Diffie- Hellman, ElGamal , Introduction of Elliptic curve Cryptosystems Key Management , Key Exchange Algorithms, Public – Key Cryptography Standards. Hashes and Message Digests: Message Authentication, MD5, SHA-1, RIPEMD, HMAC
- UNIT-IV DIGITAL SIGNATURES, CERTIFICATES, AND STANDARDS:-**  
Digital Signature Standard (DSS and DSA), Public key Infrastructure, Digital Certificates and Basics of PKCS Standards. Authentication: Kerberos V 4 and V 5, X.509 Authentication Service. Electronic Mail Security: Pretty Good Privacy (PGP), S /MIME, X.400. IP and Web Security Protocols: IPsec and Virtual Private Networks, Secure Sockets and Transport Layer ( SSL and TLS).
- UNIT-V SYSTEM SECURITY: -**  
Computer Virus, Firewall and Design Principles, Reference: Chapter 18 , 19, & 20 of Cryptography and Network Security. Electronic Commerce Security: Electronic Payment Systems, Secure Electronic Transaction (SET), Protocols (CyberCash, iKey) Ecash ( DigiCash ), Smart Card Based Systems.

## **Text Books:**

Cryptography and Network Security, William Stalling, PHI.

## **Reference Books:-**

Applied Cryptography: Protocols & Algorithms, Schneier & Bruce, and MGH International.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: VII  
Subject: Fault Tolerant Systems  
Total Theory Periods: 50  
Total Marks in End Semester Exam: 80  
Minimum number of class tests to be conducted: 02.

Branch: Information Technology.  
Code: 322756(22)  
Total Tutorial Periods: Nil

- UNIT I - INTRODUCTION**  
Definition of fault tolerance, Redundancy, Applications of fault-tolerance, Fundamentals of dependability.
- UNIT II- ATTRIBUTES**  
Reliability, availability, safety, Impairments: faults, errors and failures, Means: fault prevention, removal and forecasting
- UNIT III- DEPENDABILITY EVALUATION**  
Common measures: failures rate, mean time to failure, mean time to repair, etc. Reliability block diagrams ,Markov processes ,
- UNIT IV- REDUNDANCY**  
Hardware redundancy, Redundancy schemes, Evaluation and comparison, Applications ,Information redundancy ,Codes: linear, Hamming, cyclic, unordered, arithmetic, etc. ,Encoding and decoding techniques ,Applications , Time redundancy
- UNIT V- PROGRAMMING**  
Software fault tolerance, Specific features, Software fault tolerance techniques: N-version programming, recovery blocks, self-checking software, etc.

## Text Books

- 1 Anderson, T., and P.A. Lee, Fault-Tolerant Principles and Practices, Prentice-Hall
- 2 Hwang, K., and F.A. Briggs, Computer Architecture and Parallel Processing, McGraw-Hill. Jalote, P.
3. Fault-Tolerance in Distributed Systems, ISBN 0-13-301367-7, Prentice-Hall,

## Reference Book

1. Johnson, B.W., Design and Analysis of Fault-Tolerant Systems, Addison Wesley
2. Leveson, Nancy G., Safeware, system safety and computers, Addison Wesley.
3. Pradhan, D.K., Fault-Tolerant Computing -- Theory and Techniques, (2 Volumes), Prentice-Hall.
4. Pradhan, Dhiraj K., Fault-Tolerant Computer System Design, ISBN 0-13-057887-8, Prentice-Hall PTR

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester: VII**  
**Subject: Natural Language Processing.**  
**Total Theory Periods: 50**  
**Total Marks in End Semester Exam: 80.**  
**Minimum number of class tests to be conducted: 02**

**Branch: Information Technology.**  
**Code: 322757(22)**  
**Total Tutorial Periods: Nil**

## **Unit -I INTRODUCTION & SYNTACTIC PROCESSING**

The study of Language, Linguistic background, Grammars and Parsing, Features and Augmented Grammars, Grammars for Natural Language, Towards Efficient Parsing, Ambiguity Resolution.

## **Unit -II SEMANTIC INTERPRETATION**

Semantics and Logical Form, Linking Syntax and Semantics, Ambiguity Resolution, Strategies for Semantic Interpretation, Scoping and the Interpretation of Noun Phrases.

## **Unit -III PRAGMATICS**

Discourse: Reference Resolution, Syntactic and Semantic Coreference, Text Coherence, An Inference based resolution algorithm. Dialogue and Conversational Agents: What makes dialogue different? Dialogue structure and coherence.

## **Unit -IV NATURAL LANGUAGE GENERATION**

Introduction to language generation, an architecture for generation, surface realization, systemic grammar, functional unification grammar, discourse planning.

## **Unit -V MACHINE TRANSLATION**

Language Similarities and Differences, transfer metaphor, syntactic transformations, lexical transfer, idea of Interlingua, direct translation, using Statistical Techniques

### **Text Books:**

1. Speech and Language Processing, by Jurafsky, D. & Martin, J.H.
2. Natural Language Understanding (2nd ed.), Allen, J

### **Reference Books:**

1. Foundations of General Linguistics (2nd ed.) by Atkinson, M, Kilby, D A & Roca, I
2. An Introduction to Language (5th ed.), Fromkin, V & Rodman, R
3. Natural Language Processing for Prolog Programmers, by Covington, M A
4. Natural language processing in Prolog: an introduction to computational linguistics, By Gazdar, G & Mellish, C

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: VII

Subject: OODBMS.

Total Theory Periods: 50

Total Marks in End Semester Exam: 80.

Minimum number of class tests to be conducted: 02

Branch: Information Technology.

Code: 322758(22)

Total Tutorial Periods: Nil

## UNIT I THE EXTENDED ENTITY RELATIONSHIP MODEL AND OBJECT MODEL:

The ER model revisited, Motivation for complex data types, User defined abstract data types and structured types, Subclasses, Super classes, Inheritance, Specialization and Generalization, Constraints and characteristics of specialization and Generalization, Relationship types of degree higher than two.

## UNIT II. OBJECT-ORIENTED DATABASES:

Overview of Object-Oriented concepts, Object identity, Object structure, and type constructors, Encapsulation of operations, Methods, and Persistence, Type hierarchies and Inheritance, Type extents and queries, Complex objects; Database schema design for OODBMS; OQL, Persistent programming languages; OODBMS architecture and storage issues; Transactions and Concurrency control, Example of ODBMS

## UNIT III. OBJECT RELATIONAL AND EXTENDED RELATIONAL DATABASES:

Database design for an ORDBMS - Nested relations and collections; Storage and access methods, Query processing and Optimization; An overview of SQL3, Implementation issues for extended type; Systems comparison of RDBMS, OODBMS, ORDBMS

## UNIT IV. PARALLEL AND DISTRIBUTED DATABASES AND CLIENT-SERVER ARCHITECTURE:

Architectures for parallel databases, Parallel query evaluation; Parallelizing individual operations, Sorting, Joins; Distributed database concepts, Data fragmentation, Replication, and allocation techniques for distributed database design; Query processing in distributed databases; Concurrency control and Recovery in distributed databases. An overview of Client-Server architecture

## UNIT V DATABASES ON THE WEB AND SEMI STRUCTURED DATA:

Web interfaces to the Web, Overview of XML; Structure of XML data, Document schema, Querying XML data; Storage of XML data, XML applications; The semi structured data model, Implementation issues, Indexes for text data. **Enhanced Data Models for Advanced Applications:** Active database concepts. Temporal database concepts.; Spatial databases, Concepts and architecture; Deductive databases and Query processing; Mobile databases, Geographic information systems.

### Text Books:

1. Rajesh Narang, Object Oriented Interfaces and Databases, Prentice Hall of India
2. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems [3e], McGraw-Hill

### Reference books:

1. Elmasri and Navathe, Fundamentals of Database Systems [4e], Pearson Education
2. Korth, Silberchatz, Sudarshan, Database System Concepts, McGraw-Hill.
3. Peter Rob and Coronel, Database Systems, Design, Implementation and Management, Thomson Learning.
4. C.J.Date, Longman, Introduction To Database Systems, Pearson Education

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: VII  
Subject: Software Engineering Lab.  
Total Practical Periods: 50  
Total Marks in End Semester Exam: 40.

Branch: Information Technology.  
Practical Code: 333721(33)

## NOTE for Students to Follow strictly :-

- Every **two to three students** should form a group and should develop a software that could be developed within **one month** of time.
- The groups should prepare a **softcopy as well as hardcopy** of the documentation as per phases given below.
- Every student in the group should have a copy of the documentation
- Every student should get his own copy of the documentation properly checked from the **Teacher In-charge**, after every phase of development given below.
- Before the Final Practical examinations, every individual student should submit his own hardcopy of the documentation in a **Punched Cardboard File Only**.
- One **CD** of the project and its documentation (softcopy), from every group should be submitted during **final submissions**.
- During **Final Submissions**, every copy of the documentation should be accompanied by a **Submission Certificate** duly signed by the **Teacher In-charge and Head of Department**.

## Planning Phase

### 1. Problem Statement :-

- a. Description of the present situation.
- b. Problem constraints (Manpower, Software and Hardware).
- c. Statement and brief description of Goals (Process and Product).
- d. Statement and brief description of Requirements (Functions, Hardware, Software and User interface) of the overall product.
- e. List and Description of the users and their role, who will use the software product.

### 2. Solution strategy :-

- a. List and brief description of all possible solutions.
- b. List and brief description of all accepted solutions.
- c. List and brief description of all rejected solutions.

### **3. Development process :-**

- a. Life cycle model for the project.
- b. Team structure for the project (Details of team members also needed).
- c. Software Configuration Management :-
  - i. List and brief description of non-changeable objects that would contribute to the software phase wise.
  - ii. List and brief description of changeable objects that would contribute to the software phase wise.
- d. Software Quality assurance :-
  - i. List and brief description of quality attributed decided for evaluating the software product phase wise.
  - ii. List and brief description of the validations (are we making the product right ?) and verifications (are we making the right product? ) phase wise.
- e. Risk management :-
  - i. List and brief description of any kind of Risks that may occur phase wise.
  - ii. List and brief description of any possible solutions for the above mentioned risks.

### **4. Software metrics :-**

- a. Deciding the complexity category of the product under development.
- b. Estimating Lines of Code needed for the complete development of the product.
- c. Calculating Programmer months for the project.
- d. Calculating the development time for the project.
- e. Calculating the Average staffing level for the project.
- f. Using COCOMO model for performing cost estimation for the product.

### **5. Review of the Planning Phase :-**

- a. Points and brief description of the reviews conducted and report of the results obtained.

## **Analysis and Design Phase**

### **1. Analysis document for the product :-**

- a. Data Dictionary :- List and brief description of all the components to be used in ERD, DFD and STD.
- b. Data Object Description document :- Entity Relationship Diagram (ERD)
- c. Process Specification document :- Data Flow Diagram (DFD)
- d. Control Specification document:- State Transition Diagrams (STD)

### **2. Creating Designs document :-**

- a. Data Design :- Description of the data objects and suggested algorithm.
- b. Architectural Design :- Description of how to encapsulate the data with data structures and modules.
- c. Interface Design :- Description of Interfaces to be created between various modules and between user and program.

d. Procedural Design :- Using flow charts and decision tables the entire system is explained.

**3. Preliminary design review :-**

a. Statements of Reviews done on the initial designs and comments for improvement, if necessary.

**4. Test Plan document :-**

a. List and brief description of Functional Tests (Black-Box testing) to be conducted and results expected.

b. List and brief description of Structural Tests (White-Box or Glass-Box testing) to be conducted and results expected.

c. List and brief description of Performance Tests to be conducted and results expected.

d. List and brief description of Stress Tests to be conducted and results expected.

**5. Critical Design review :-**

a. Statements of reviews done on the final designs, listing out important points, if necessary, to be remembered during the implementation phase.

**6. Milestones, Walkthroughs and Inspection document :-**

a. Setting up Milestones for the implementation and testing phases.

b. Setting up Walkthrough schedules for the implementation phase.

c. Setting up Inspection schedules for the implementation phase.

**Implementation Phase**

1. **Coding** :- Here the actual coding is done according to the designs created and standards decided.

2. **Coding standards** :- Standards need to be followed related to the variable declarations and use.

3. **Internal documentation**:- Here small descriptions in the form of comments in the program code is used, describing the meaning of the code, modules or operations performed.

4. **Error documentation** :- List and brief description of errors displayed with their meanings and causes.

5. **Unit testing** :- Testing of individual modules and required code areas are done by using coding that would display temporary results. Those results are evaluated for correctness of code. A table is created stating the test criteria and results.

6. **Validation and Verification** :- A table is created stating the validation and verification activities performed on the code and results found.

7. **Review document** :- According to the milestones set, the reviews, walkthroughs and inspections are done and a document describing the above process and results found, is created.

**Testing Phase**

1. **Testing table** :- The tests decided in Test plan document are conducted and a table is created showing the details of the test performed, expected results and actual found results.

2. **Test report** :- A summary of the Test report is created and suggestions for the steps to be taken further are listed with brief description.

## **User Manual**

1. A document is created describing from the user point of view, how to use and trouble shoot the software product.
2. Different documents should be created for different category of users of the product.
3. A document describing the installation procedures.
4. Frequently Asked Questions and answers document is created from the user point of view.
5. Do's and Don'ts for the user.
6. List and brief description of Errors displayed and their meanings.
7. Contact details for further assistance.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester: VII**  
**Subject: Artificial Intelligence & Expert System Lab.**  
**Total Practical Periods: 50**  
**Total Marks in End Semester Exam: 40.**

**Branch: Information Technology.**  
**Practical Code: 333722 (33)**

## **Suggested List of Experiments (but should not be limited to):**

- (i) Write a prolog program to find the rules for parent, child, male, female, son, daughter, brother, sister, uncle, aunt, ancestor given the facts about father and wife only.
- (ii) Write a program to find the length of a given list
- (iii) Write a program to find the last element of a given list
- (iv) Write a program to delete the first occurrence and also all occurrences of a particular element in a given list.
- (v) Write a program to find union and intersection of two given sets represented as lists.
- (vi) Write a program to read a list at a time and write a list at a time using the well defined read & write functions.
- (vii) Write a program given the knowledge base,  
If x is on the top of y, y supports x.  
If x is above y and they are touching each other, x is on top of y.  
A cup is above a book. The cup is touching that book. Convert the following into wff's, clausal form; Is it possible to deduce that 'The book supports the cup'.
- (viii) Write a program given the knowledge base,  
If Town x is connected to Town y by highway z and bikes are allowed on z, you can get to y from x by bike.  
If Town x is connected to y by z then y is also connected to x by z.  
If you can get to town q from p and also to town r from town q, you can get to town r from town p.  
Town A is connected to Town B by Road 1. Town B is connected to Town C by Road 2.  
Town A is connected to Town C by Road 3. Town D is connected to Town E by Road 4.  
Town D is connected to Town B by Road 5. Bikes are allowed on roads 3, 4, 5.  
Bikes are only either allowed on Road 1 or on Road 2 every day. Convert the following into wff's, clausal form and deduce that 'One can get to town B from townD'.
- (ix) Solve the classical Water Jug problem of AI.
- (x) Solve the classical Monkey Banana problem of AI.
- (xi) Solve the classical Crypt arithmetic problems such as DONALD + GERALD = ROBERT of AI.
- (xii) Solve the classical Missionary Cannibals problem of AI.
- (xiii) Solve the classical Travelling Salesman Problem of AI.
- (xiv) Solve the classical Blocks World Problem of AI.
- (xv) Write a program to search any goal given an input graph using AO\* algorithm.

## **List of Equipments/Machine required :**

- (i) PC with Windows xp
- (ii) Visual prolog compiler

## **Recommended Books :**

- (i) Ivan Bratko : Logic & prolog programming.

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

**Semester: VII**

**Subject: Software Technology Lab -4**

**Total Practical Periods: 50**

**Total Marks in End Semester Exam: 40.**

**Branch: Information Technology.**

**Practical Code: 333723 (33)**

**Experiments can be done either with J2EE or .NET Technologies.**

**Suggested List of Experiments (but should not be limited to):**

1. To Study various features of IDE : VISUAL STUDIO .NET or J2EE IDE( e.g. NetBeans, JDeveloper, JBuilder, JAVaStudioCreator)
2. Design simple web based calculator to implement Addition, Subtraction and Multiplication and Division.
3. Create a login form which performs validations at the client and check for the correct password at the server with the help of a database.
4. create an application which performs database handling( add, delete, update ) operations from the client browser.
5. Demonstrate use of Data Environment, add tables and queries, place field on form, report etc.
6. Create simple Notepad application, which contains menus, Rich Text Box, Common Dialogs Box, formatted text, using toolbar and Replace text, window, status bar and scroll bar.
7. Design a complete application using all the .net or J2EE Technologies.

**Text Books :-**

1. Black Book (VB .NET)
2. Complete Reference (VB .NET)
3. VB .NET Microsoft Press
4. Java Server Programming – Wrox Publications
5. Java How To Program – Dietel & Dietel ( Pearson Education )
6. JSP by Hans Berbsten (O'Reilly )

# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C.G.)

Semester: VII  
Subject: MINOR PROJECT.  
Total Practical Periods: 60  
Total Marks in End Semester Exam: 100.

Branch: Information Technology.  
Code: 333724 (33)

Guideline for Minor Project

## Allocation of project:

1. Information regarding broad area must be made available to the students well in advance (may be during previous semester).
2. Information must cover following parameters.
  - i. **Broad area:** Subject or expertise/application area.
  - ii. **Required skills:** Knowledge of subject(s), software, tools & other characteristics.
  - iii. **Type of project:** Hardware, software, design, survey, study based etc.
  - iv. **Guides available:** Name of Guide (S) from Department & Institute.
  - v. **Other related information** depending upon specific branch & institute.
3. It is also recommended to give proper counseling to pick up suitable project.
4. Students must get chance to select projects as per their choice or decided mutually between students and department faculty (HoD) concern.
5. One project group must contain maximum three students.

## Monitoring of project:

1. It is recommended to give projects as per the specializations of existing faculty of the department instead of outside person/agency.
2. Project must be allocated, developed and monitored by department / institution itself, but not by outside agencies.
3. Regular review by guide is recommended to ensure development & contribution of students.

## Internal Evaluation & Submission of project:

1. Evaluation of project would be as per the examination scheme of the University, which is based on internal as well as external evaluation.
2. Internal assessment requires submission of project report for getting approved by the concern authority. However printing and binding would be as per the conventional format.
3. Evaluation will be based on Live demonstration / presentation and Viva.
4. Final submission of project is expected as,
  - ✓ One copy to the Institution central library,
  - ✓ One copy to the department.

## External Evaluation:

External assessment of project would be like conduction of practical exams of University, and must be executed as per the norms of practical exams.

*NOTE: Completion of Project outside the department/Institution should not be encouraged.*

# Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: VII  
Subject: Innovative & Entrepreneurial Skill  
Total Practical Periods: 28  
Total Marks in End Semester Exam: ---  
Minimum number of class test to be conducted: 2

Branch: Common to all Branches  
Code: 300725 (36)  
Total Tut Periods: NIL

## Unit I

Innovation: innovation- an abstract concept; creativity, innovation and imagination; types of innovation - classified according to products, processes or business organizations.

## Unit II

Entrepreneurship: who is an entrepreneur? Entrepreneurship- A state of Mind, Emergence of entrepreneur; Role of Entrepreneur; A Doer not a Dreamer- Characteristics of an entrepreneur; Factors affecting entrepreneurial growth – Social, cultural, personality factors, psychological and Social Factors. Impact of Entrepreneurship for sustainable development.

## Unit III

Difference between entrepreneur and entrepreneurship, Difference between entrepreneur and intrapreneur, Common Entrepreneurial competencies/Traits; Entrepreneurship stimulants, Obstacles inhibiting Entrepreneurship; Types of entrepreneurs, Functions of an entrepreneur.

## Unit IV

Identification of Business Opportunities: Introduction, Sources of Business of Product Ideas, Steps in Identification of Business opportunity and its SWOT Analysis.

## UNIT-V

Techno-Economic Feasibility of the project: Introduction, Techno- Economic feasibility of the Project, Feasibility Report, Considerations while preparing a Feasibility Report, Proforma of Feasibility Report, Role of Institutions and entrepreneurship.

## Text and Reference Books:

1. Competing through Innovation-Bellon & Whittington, Prentice Hall of India
2. A Guide to Entrepreneurship – David Oates- JAICO Publishing House.
3. Entrepreneurship- Rober D Hisrich, Peters, Shepherd- TMH
4. Entrepreneurship in Action- Coulter, Prentice Hall of India
5. Entrepreneurship Management and Development – Ajith Kumar, HPH
6. Fundamentals of entrepreneurship- Mohanty, PHI
7. Patterns of Entrepreneurship- Jack M Kaplan, Wiley, student Edition.