

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES  
DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech. (IT) 5½ Years**

**X SEMESTER**



**Jan. 2018 – May 2018**

<b>Sub. Code</b>	<b>Sub. Name</b>	<b>Credit</b>
IT-1002B	Design Patterns	4
IT-1001C	Data mining and Warehousing	4
IT-1007A	Research in Computing	4
IT-1003B	Wireless & Mobile Communications	4
IT-1004A	Information Technology & Project Management	4
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**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**

**M. Tech. (5 ½ Years) X Semester**

**IT-1002B : Design Pattern**

**Learning Objectives:** To strengthen the knowledge of Object Oriented Design and development by understanding various design patterns for object oriented reusable Software.

**Pre requisites:** Knowledge of object oriented system concepts, object oriented analysis and Modeling and object oriented programming using Java.

**Course Contents:**

**I Review of Object Orientation**

Introduction to Software Patterns, Overview of UML, Class Diagrams, Collaboration Diagrams, State chart Diagram, Deployment Diagram,

**II Introduction**

Introduction to design pattern, describing design pattern, design Pattern for solving problem, selection of design pattern, use of design pattern. Fundamental Design Patterns: Delegation, Interface, Abstract Super-class, Interface and Abstract class, Marker Interface.

**II Creational Pattern**

Simple Factory pattern, Factory Method, Abstract Factory, Builder, Prototype, Singleton

**III Structural Pattern**

Adaptor, Bridge, Composite, Façade, Flyweight, Decorator, Proxy Pattern

**IV Behavioral Pattern I**

Chain of Responsibility, Command, Interpreter, Mediator, Memento Pattern

**V Behavioral Pattern II**

Observer, State, Strategy, Template Method, Visitor, Iterator Pattern

**Text Book**

1. Gamma, Helm, Johnson, Vlissides, Design Patterns. Elements of Reusable Software., Pearson Education 2006

**Reference Book**

1. Cooper, J. W., Java Design Patterns, A Tutorial, Pearson Education, 2000.
2. Freeman, Freeman, Head First Design Patterns, O'Reilly Pub. 2007
3. Mark Grand, Patterns in Java Vol. 1, Wiley 2002
4. Mark Grand, Patterns in Java Vol. 2, Wiley 2002
5. Mark Grand, Patterns in Java Vol. 3, Wiley 2002

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**IT-1001C : Data Mining & Data Warehousing**

**Aim of Course:** To understand data warehouses and data Mining with recent trends and development and trends in the field.

**Objectives:**

The course is designed to make students:

- Understand basic concepts of data warehousing and data mining.
- To make students understand On Line Analytical Processing (OLAP)
- To learn data mining techniques and understand various algorithms.
- To get familiarize with data mining tools and ETL tools.

**Course Contents:**

**UNIT I**

Data Warehouse, Evolution, Definition, Very large database, Application, Multidimensional Data Model, OLTP V/s Data Warehouse, Warehouse Schema, Data Warehouse Architecture. Data Warehouse Server, Data Warehouse Implementation, Metadata, Data Warehouse Backend Process: Data Extraction, Data Cleaning, Data Transformation, Data Reduction, Data loading and refreshing. ETL and Data warehouse, Metadata.

**UNIT II**

Structuring/Modeling Issues, Derived Data, Schema Design, Dimension Tables, Fact Table, Star Schema, Snowflake schema, Fact Constellation, De-normalization, Data Partitioning, Data Warehouse and Data Marts. OLAP, Strengths of OLAP, OLTP V/s OLAP, Multidimensional Data, Slicing and Dicing, Roll-up and Drill Down, OLAP queries, Successful Warehouse, Data Warehouse Pitfalls, DW and OLAP Research Issues, Tools.

**UNIT III**

Fundamentals of data mining, Data Mining definitions, KDD V/s Data Mining, Data Mining Functionalities, From Data Warehousing to Data Mining, DBMS V/s DM, Issues and challenges in Data Mining. Data Mining Primitives, Data Mining Query Languages. Data Mining applications-Case studies.

**UNIT IV**

Association rules: Methods to discover association rules. Various algorithms to discover association rules like A Priori, partition, Pincer search, Dynamic Itemset Counting Algorithm and more.

**UNIT V**

Classification Technique: Decision Trees, Web Mining, Web content mining, Web Structure mining, Text mining, Temporal Mining and Spatial Data Mining.

Text Books:

1. ARUN K PUJARI, Data Mining Techniques, University Press
2. JIAWEI HAN & MICHELINE KAMBER, Data Mining – Concepts and Techniques, Harcourt India

**Reference Books:**

1. W. H. Inmon, Building the Data Warehouse, Wiley Dreamtech India Pvt. Ltd
2. RALPH KIMBALL, The Data Warehouse Life cycle Tool kit, WILEY STUDENT EDITION

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (5 ½ Years) X Semester**  
**IT-1007A : Research in Computing**

**Unit-1:**

The Information Systems and Computing disciplines, Evidence-based practice, The Internet, and Research.

Definition and characteristics of Research, Evaluating research, Rigour, and relevance in research, The 6 P of Research, The purpose and products of research: Reasons for doing research, possible products/outcomes of the research, Finding and choosing research topics, Evaluating the purpose and products of research.

**Unit-2:**

Overview of the Research: A model of the research process, alternatives models of the research process, Evaluating the Research process. Need, types and applications of simulators for researching in CS.

**UNIT-3:**

Reviewing the literature: Purpose and resources of literature review, The internet, and literature reviews conducting a literature review Evaluating literature review Evaluating literature review. Surveys: Defining surveys, Planning and designing surveys, Grounded theory, and surveys, The internet and surveys, Examples of surveys in IS and computing research, Evaluating survey-based research. Interview, Observations, Questionnaire.

**UNIT-4:**

Design and Creation: Defining design and creation: planning and conducting design and creation research. Creative computing and digital art. the internet and design and creation research. Examples of designing and creation research in IS and computing, Evaluating design and creation research. Experiments, Case studies, Action Research, Ethnography, Documents.

**UNIT-5:**

Internet Research: Background to the internet and WWW, Internet Research topics, The internet and literature review The internet and research strategies and methods, Internet research, law and ethics. Participants and Research Ethics: The law and research, Rights of people directly involved, Responsibilities of an ethical researcher, Design, and creation of Project and ethics, Evaluating research ethics.

**Text Book:**

Briony J Oates, Researching information systems and computing, SAGE South Asia Edition, 2007 ISBN: 978-81-7829-759-0

**Reference Materials:**

1. Research Design. Qualitative, Quantitative, and Mixed Methods Approaches. By John W. Creswell, Fourth Edition. SAGE Publication, 2014
2. The Craft of Research, By Wayne C. Booth, Gregory G. Colomb, Joseph M. Williams, Joseph Bizup, William T. FitzGerald, Third Edition, The University of Chicago Press, 2008
3. The Elements of Style. William Strunk Jr. and E. B. White, Fourth Edition, Pearson, 1999

4. Research Methodology By Panneerselvam R, 2nd Edition, PHI, 2014
5. Selecting Empirical Methods for Software Engineering Research, Steve Easterbrook, Janice Singer, Margaret-Anne Storey, D. Damian, Book Chapter in Guide to Advanced Empirical Software Engineering, Forrest Shull, Janice Singer, and Dag I.K. Sjøberg, Springer 2008
6. Statistical Design and Analysis of Experiments With Applications to Engineering and Science, Robert L. Mason, Second Edition, Wiley InterScience.[Good for Data Analysis and Hypothesis Testing]
7. THE DESIGN OF DESIGN: ESSAYS FROM A COMPUTER SCIENTIST, Frederick P. Brooks Jr., Addison-Wesley Professional, 2010.
8. Serge Demeyer. Research Methods in Computer Science
9. Aaron Sloman. TYPES OF RESEARCH IN COMPUTING SCIENCE, SOFTWARE ENGINEERING, AND ARTIFICIAL INTELLIGENCE

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (5 ½ Years) X Semester**  
**IT-1003B : Wireless and Mobile Communications**

**Objective:**

To learn and understand basic concepts of cellular system, wireless propagation and the techniques used to maximize the capacity of cellular network.

To learn and understand architecture of GSM and CDMA system. To understand mobile management, voice signal processing and coding in GSM and CDMA system.

To understand mobile devices connectivity to Internet.

**Prerequisites:** Computer Networks

**Unit I**

Introduction: Overview of the emerging field of mobile computing; Historical perspectives (mainly from the perspective of radio), Land mobile vs. Satellite vs. In-building communications systems, RF vs. IR.

Characteristic of Cellular Systems, Mobility support in cellular telephone networks, Mobile applications, Limitations, Health Concerns.

**Unit II**

Mobile communication: Fiber or wire based transmission, Wireless Transmission: Frequencies, Antennas and Signal Propagation – path loss of radio signals, Additional signal propagation effect, Multipath propagation, Spread Spectrum- DSSS and FHSS.

Modulation Techniques, Multiplexing techniques, Coding techniques, CDMA, Multiple Radio Access – Introduction Contention based protocols, Channel Allocation

**Unit III**

The Cellular Concept : Introduction, Cell Area, signal strength and cell parameters, capacity of a cell, Frequency reuse, Co-channel Interference, Cell splitting, Cell Sectoring.

Mobile Communication System : Introduction, Cellular System Infrastructure, Registration, Handoff support, Multicasting, Authentication & security, frequency hopping.

Introduction Contention based protocols, Channel Allocation.

GSM- System architecture of GSM, protocols, localization and calling, handover, security.

**Unit IV**

IEEE802.11: Protocol architecture, layers, Information bases and networking, Case Study on Wireless LAN infrastructure and Bluetooth.

Mobile IP, goals, assumptions requirements, entities & terminology, IP packet delivery, tunnelling and encapsulation, Feature & format IPv6, DHCP, TCP over Wireless.

**Unit V**

Characteristic of Ad Hoc networks, Applications, need for routing, routing classification, Wireless sensor networks, classification & Fundamental of MAC protocol for wireless sensor networks, Introduction to IOT

**Text Books:-**

1. Mobile Communications author Jochen Schiller, publication John Willy & Sons, Ltd.
2. Wireless And Mobile Systems author D P Agrawal & Qing-An zeng, publication Thomson.

**Reference Books:-**

1. Wireless Networks author P Nicopotidis, publication Addison –Wesley-An zeng publication
- 2: Mobile Computing author Dr. Rajkamal, publication Oxford University Press.

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**IT-1004A: Information Technology & Project Management**

**Aim of Course:** To make the students familiar with design of a good quality project to industries and academia.

**Objectives:**

The course is designed to make students:

- To present basic concepts of ITPM
- Understand the concepts of project management, project integration, project quality management etc.

**UNIT I**

Project, Project Management, Role of the Project Manager, Project Management and Information Technology Context, A system view of Project Management, Understanding the Organization, Stakeholder Management, Project Phases and the Project Life Cycle, Context of Information Technology Projects, Project Management Process Groups, Mapping Process Groups to Knowledge Areas.

**UNIT II**

Project Integration Management, Strategic Planning and Project Selection, Preliminary Scope statements, Project Scope Management, Scope Planning and Scope Management Plan, Scope Definition and the Project Scope Statement.

**UNIT III**

Project Time Management, Activity Definition and Sequencing, Activity Resource and Duration Estimating, Schedule Development and Control, Project Cost Management, Cost Estimating, Cost Budgeting, Cost Control.

**UNIT IV**

Project Quality Management, Quality Planning, Quality Assurance, Quality Control, Project Human Resource Management, Keys to Managing People, Human Resource Planning, Acquiring the Project Team, Developing the Project Team, Managing the Project Team.

**UNIT V**

Project Communication Management, Communication Planning, Information Distribution, Performance Reporting, Managing Stakeholders, Project Risk Management, Risk Management Planning, Risk Response Planning, Risk Monitoring and Control, Project Procurement Management, Planning Purchasing and Acquisitions, Planning Contracting, Requesting Seller Responses, Selecting Sellers, Administering the Contract, Closing the Contract

**Text Book:**

1. Information Technology Project Management, Kathy Schwalbe, 6<sup>th</sup> Edition, Thomson Course technology.



## Wireless and Mobile Communications lab. Assignment

- Software Installation, hosting on local server
- Concept of global server & hosting of a sample file on global server.
- HTML form, creating signup and login form and database connectivity.
- Member page design with GUI , display data on a simple page for IOT devices.
- Intro to embedded system, simple LED blink with Aurdino UNO.
- Intro to ESP8266 WIFI MODULE communication using UART protocol, intro to USB\_TTL.
- Controlling H/W devices using webpage.
- Uploading data on server, eg. upload temperature on server.
- Data Analysis using MATLAB server.
- Intro to GPRS module ,GSm architecture & AT commands
- Step 7 n 8 using GPRS(SIM 800L) +Aurdino UNO
- Same
- Intro to Ethernet ENC28J16 module + IP address allotment DHCP & static using ARPANET protocol.
- Creating server in UDP protocol.
- Creating client in UDP protocol.
- Creating server & client in TCP/IP protocol.