

# VELTECH MULTI TECH

Dr RANGARAJAN Dr. SAKUNTHALA ENGINEERING  
COLLEGE

(Owned by Vel Trust 1997)

*(An ISO 9001: 2008 Certified Institution)*

Accredited By NAAC with 'A' Grade and NBA Accredited  
Institution

(Approved by AICTE New Delhi and Govt. of Tamil Nadu, Affiliated to  
Anna University Chennai)



## SYLLABUS

### WEEKLY SCHEDULE

VII SEMESTER 2017 - 2018

DEPARTMENT OF INFORMATION TECHNOLOGY

IV YEAR DEGREE COURSE

#42, Avadi – Vel Tech Road,  
Avadi

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## **Institution vision and mission**

### **The vision**

- Elevating well being of humanity by augmenting human resource potential through quality technical education and training.

### **The mission**

- To Effectuate supremacy in technical education through articulation of research and industry practices for social relevance.
- To inculcate the habit of lifelong learning.
- To exhibit professional ethics, commitment and leadership qualities

## **Department of Information Technology**

### **Vision**

- To emerge as centre for academic eminence in the field of information technology through innovative learning practices.

### **Mission**

- **M1** - To provide good teaching and learning environment for quality education in the field of information technology.
- **M2** - To propagate lifelong learning.
- **M3** - To impart the right proportion of knowledge, attitudes and ethics in students to enable them take up positions of responsibility in the society and make significant contributions.

## **PROGRAM EDUCATIVE OBJECTIVES**

1. The graduates of Information Technology Engineering Program should be able to Excel in professional carrier and or higher education by acquiring knowledge in mathematical, computing and engineering principles.
2. The Graduates of Information Technology Engineering Program should have an exposure to emerging cutting edge technologies, adequate training and opportunities to work as teams on multidisciplinary projects with effective communication skills.
3. The Graduates of Information Technology Engineering Program should be able to establish an understanding of professionalism, ethics, public policy and aesthetics that allows them to become good professional Engineers
4. The graduates should be able to advance professionally through organized training or self-learning in areas related to computer science and information technology.
5. The graduates of Information Technology Engineering Program should be able to develop an ability to analyze the requirements, understand the technical specifications, design and provide novel engineering solutions and produce efficient product designs.

### **Programme Outcomes (POs)**

Graduates of the 4-year B.Tech. Information Technology (IT) Programme will:

1. Apply knowledge of **mathematics, natural science, engineering** fundamentals, software development, Database management, computer networking, data communication, and information security to the solution of complex engineering problems in Information Technology.
2. Ability to **identify, formulate** and **analyze complex** technical problems in the recent cutting edge areas of hardware and software applications to reach significant conclusions by applying Mathematics, Natural sciences.
3. Ability to analysis, **design**, test and documentation of computer programs, maintenance of networks, databases, security and computer systems (both hardware and software) and providing optimum **design solutions** to meet specified needs of the recent trends.
4. Ability to use **research based knowledge** and **research methods** to perform literature survey, design experiments for complex problems in designing, developing

- and maintaining a computing system, collect data from the experimental outcome, analyze and interpret valid / interesting patterns and conclusions from the data points.
5. Ability to create, select and apply **state of the art tools** and techniques in designing, developing and testing a computing system with the help of latest application software, operating systems, simulation and databases tools.
  6. Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to **professional engineering practice** in system development and solutions to **complex engineering problems** related to Information technologies
  7. Understand and evaluate the sustainability and **impact of professional engineering** work in the solution of complex engineering problems related to societal and environmental contexts with full responsibilities.
  8. An understanding of **professional** and **ethical responsibility** and commitment to them.
  9. Ability to function effectively to strive towards **achieving a common goal** as an individual in a group and with the capacity to be a team leader.
  10. **Communicate effectively** on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
  11. Ability to function on **multi-disciplinary** teams, apply engineering and **management knowledge** and techniques to estimate time and resources needed to complete a computer **engineering projects**
  12. Recognize the need for, and have the preparation and ability to **engage in independent** and **lifelong learning** in the broadest context of technological change.

**WEEK DETAILS**

<b>SL.NO.</b>	<b>WEEK</b>	<b>FROM</b>	<b>TO</b>
1	<b>WEEK1</b>	<b>24.06.2017</b>	<b>-</b>
2	<b>WEEK2</b>	<b>27.06.2017</b>	<b>01.07.2017</b>
3	<b>WEEK3</b>	<b>03.07.2017</b>	<b>08.07.2017</b>
4	<b>WEEK4</b>	<b>10.07.2017</b>	<b>15.07.2017</b>
5	<b>WEEK5</b>	<b>17.07.2017</b>	<b>22.07.2017</b>
6	<b>WEEK6</b>	<b>24.07.2017</b>	<b>29.07.2017</b>
7	<b>WEEK7</b>	<b>31.07.2017</b>	<b>05.08.2017</b>
8	<b>WEEK8</b>	<b>07.08.2017</b>	<b>12.08.2017</b>
9	<b>WEEK9</b>	<b>16.08.2017</b>	<b>19.08.2017</b>
10	<b>WEEK10</b>	<b>21.08.2017</b>	<b>26.08.2017</b>
11	<b>WEEK11</b>	<b>28.08.2017</b>	<b>1.09.2017</b>
12	<b>WEEK12</b>	<b>4.09.2017</b>	<b>9.09.2017</b>
13	<b>WEEK13</b>	<b>11.09.2017</b>	<b>16.09.2017</b>
14	<b>WEEK14</b>	<b>18.09.2017</b>	<b>23.09.2017</b>
15	<b>WEEK15</b>	<b>25.09.2017</b>	<b>28.09.2017</b>
16	<b>WEEK16</b>	<b>3.10.2017</b>	<b>7.10.2017</b>
17	<b>WEEK17</b>	<b>09.10.2017</b>	<b>14.10.2017</b>

## SUBJECT CONTENTS

S.No	SUB CODE	SUBJECT NAME
<b>THEORY</b>		
1	IT6701	Information Management
2	CS6701	Cryptography and Network Security
3	IT6702	Data Ware Housing and Data Mining
4	CS6703	Grid and Cloud Computing
5 Elective(s)	IT6004	Software Testing
	CS6003	Ad hoc and Sensor Networks
<b>PRACTICAL</b>		
6	IT6711	Data Mining Laboratory
7	IT6712	Security Laboratory
8	IT6713	Grid and Cloud Computing Laboratory

## TEST / EXAM SCHEDULE

<b>SL. NO</b>	<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>	<b>UNIT TEST I</b>	<b>UNIT TEST II</b>	<b>Pre Model Exam</b>	<b>UNIT TEST IV</b>	<b>MODEL EXAM</b>
1	IT6701	Information Management	10.07.2017 FN	27.07.2017 FN	06.08.2017 FN	7.09.17 FN	28.09.2017 FN
2	CS6701	Cryptography and Network Security	10.07.2017 AN	27.07.2017 AN	07.08.2017 AN	7.09.17 AN	04.10.2017 FN
3	IT6702	Data Ware Housing and Data Mining	11.07.2017 FN	28.07.2017 FN	08.09.2017 FN	8.09.17 FN	06.10.2017 FN
4	CS6703	Grid and Cloud Computing	11.07.2017 AN	28.07.2017 AN	09.08.2017 AN	8.09.17 AN	9.10.2017 FN
5	IT6004/ CS6003	Software Testing / Ad hoc and Sensor Networks	12.07.2017 FN	29.07.2017 FN	10.08.2017 FN	9.09.17 FN	11.10.2017 FN

## **IT6701 INFORMATION MANAGEMENT**

### **WEEK 1: UNIT I DATABASE MODELLING, MANAGEMENT AND DEVELOPMENT**

Database design and modeling

#### **WEEK 2:**

Java database Connectivity (JDBC), Database connection Manager, Stored Procedures. Trends in Big Data systems including NoSQL, Business Rules and Relationship;

#### **WEEK 3:**

Hadoop HDFS, MapReduce, Hive, and enhancements.

#### **WEEK 4: UNIT TEST-I**

### **UNIT II DATA SECURITY AND PRIVACY**

Program Security, Malicious code and controls against threats; OS level protection;

#### **WEEK 5:**

Security – Firewalls, Network Security Intrusion detection systems.

#### **WEEK 6: UNIT TEST II**

Data Privacy principles. Data Privacy Laws and compliance.

#### **WEEK 7: UNIT III INFORMATION GOVERNANCE**

Master Data Management (MDM) – Overview, Need for MDM,

#### **WEEK 8:**

Privacy, regulatory requirements and compliance. Data Governance, Synchronization and data quality management

#### **WEEK 9: PRE MODEL**

#### **WEEK 10: PREMODEL**

#### **WEEK 11: UNIT IV INFORMATION ARCHITECTURE**

Principles of Information architecture and framework, Organizing information, Navigation systems and Labelling systems,

**WEEK 12:** Conceptual design, Granularity of Content.

#### **WEEK 13: UNIT TEST-IV**

### **UNIT V INFORMATION LIFECYCLE MANAGEMENT**

Data retention policies; Confidential and Sensitive data handling, lifecycle management costs.

#### **WEEK 14:**

Archive data using Hadoop; Testing and delivering big data applications for performance and functionality;

#### **WEEK 15:**

Challenges with data administration;

#### **WEEK 16: MODEL EXAM**

#### **WEEK 17:MODEL EXAM**



**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Alex Berson, Larry Dubov MASTER DATA MANAGEMENT AND DATA GOVERNANCE, 2/E, Tata McGraw Hill, 2011
2. Security in Computing, 4/E, Charles P. Pfleeger, Shari Lawrence Pfleeger, Prentice Hall; 2006
3. Information Architecture for the World Wide Web; Peter Morville, Louis Rosenfeld ; O'Reilly Media; 1998

**REFERENCES:**

1. Jeffrey A. Hoffer, Heikki Topi, V Ramesh - MODERN DATABASE MANAGEMENT, 10 Edition, PEARSON, 2012
2. <http://nosql-database.org/> Next Gen databases that are distributed, open source and scalable.
3. <http://ibm.com/big-data> - Four dimensions of big data and other ebooks on Big Data Analytics
4. Inside Cyber Warfare: Mapping the Cyber Underworld- Jeffrey Carr, O'Reilly Media; Second Edition 2011

## **CS6701 CRYPTOGRAPHY AND NETWORK SECURITY**

### **WEEK 1: UNIT I INTRODUCTION & NUMBER THEORY**

Services, Mechanisms and attacks-the OSI security architecture-

#### **WEEK 2:**

FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclids algorithm-Finite fields- Polynomial Arithmetic –Prime numbers- Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).

#### **WEEK 3:**

Fermat' s and Euler"s theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms.

#### **WEEK 4: UNIT TEST-I**

### **UNIT II BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY**

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm.

#### **WEEK 5:**

**Public key cryptography:** Principles of public key cryptosystems-The RSA algorithm-Key management.

#### **WEEK 6: UNIT TEST-II**

Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

#### **WEEK 7: UNIT III HASH FUNCTIONS AND DIGITAL SIGNATURES**

Authentication requirement – Authentication function – MAC

#### **WEEK 8:**

Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC- Digital signature and authentication protocols – DSS – El Gamal – Schnorr.

#### **WEEK 9: PRE MODEL**

#### **WEEK 10: PREMODEL**

### **WEEK 11: UNIT IV SECURITY PRACTICE & SYSTEM SECURITY**

Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions.

#### **WEEK 12:**

Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

#### **WEEK 13: UNIT TEST-IV**

## **UNIT V E-MAIL, IP & WEB SECURITY**

**E-mail Security:** Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME.

### **WEEK 14:**

**IPSecurity:** Overview of IPSec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding).

### **WEEK 15:**

**Web Security:** SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSL Attacks fixed in v3- Exportability-Encoding-Secure Electronic Transaction (SET).

### **WEEK 16: MODEL EXAM**

### **WEEK 17: MODEL EXAM**

## **TOTAL: 45 PERIODS**

### **TEXT BOOKS:**

1. William Stallings, Cryptography and Network Security, 6th Edition, Pearson Education, March 2013. (UNIT I,II,III,IV).
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002. (UNIT V).

### **REFERENCES:**

1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007.
2. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
3. Charles Pfleeger, "Security in Computing", 4th Edition, Prentice Hall of India, 2006.
4. Ulysess Black, "Internet Security Protocols", Pearson Education Asia, 2000.
5. Charlie Kaufman and Radia Perlman, Mike Speciner, "Network Security, Second Edition, Private Communication in Public World", PHI 2002.
6. Bruce Schneier and Neils Ferguson, "Practical Cryptography", First Edition, Wiley Dreamtech India Pvt Ltd, 2003.
7. Douglas R Simson "Cryptography – Theory and practice", First Edition, CRC Press, 1995.
8. <http://nptel.ac.in/>.

## **IT6702 DATA WAREHOUSING AND DATA MINING**

### **WEEK 1: UNIT I DATA WAREHOUSING**

Data warehousing Components –Building a Data warehouse

### **WEEK 2:**

Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support

### **WEEK 3:**

Data Extraction, Cleanup, and Transformation Tools –Metadata.

### **WEEK 4: UNIT TEST-I**

### **UNIT II BUSINESS ANALYSIS**

Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu

### **WEEK 5:**

Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP, Categories of Tools – OLAP Tools and the Internet.

### **WEEK 6: PRE MODEL**

### **WEEK 7: (UNIT TEST-II) UNIT III DATA MINING**

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns –

### **WEEK 8:**

Classification of Data Mining Systems – Data Mining Task Primitives

### **WEEK 9: UNIT TEST IV**

Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing.

### **WEEK 10: PREMODEL**

### **WEEK 11: UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION**

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction.

### **WEEK 12:**

Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

### **WEEK 13: UNIT TEST-IV**

### **UNIT V CLUSTERING AND TRENDS IN DATA MINING**

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – K-means– Partitioning Methods – Hierarchical Methods

**WEEK 14:**

Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis

**WEEK 15:**

Data Mining Applications.

**WEEK 16: MODEL EXAM****WEEK 17: MODEL EXAM****TOTAL: 45 PERIODS****TEXT BOOKS:**

1. Alex Berson and Stephen J.Smith, “Data Warehousing, Data Mining and OLAP”, Tata McGraw – Hill Edition, Thirteenth Reprint 2008.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Third Edition, Elsevier, 2012.

**REFERENCES:**

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction to Data Mining”, Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Aja, “Insight into Data Mining Theory and Practice”, Eastern Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, “Introduction to Data Mining with Case Studies”, Eastern Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, “Data Mining Methods and Models”, Wiley-Interscience, 2006.

## **CS6703 GRID AND CLOUD COMPUTING**

### **WEEK 1: UNIT I INTRODUCTION**

Evolution of Distributed computing:

### **WEEK 2:**

Grid computing Infrastructures – cloud computing - service oriented architecture- Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computer

### **WEEK 3:**

Introduction to Grid Architecture and standards – Elements of Grid – Overview of Grid Architecture.

### **WEEK 4: UNIT TEST-I**

### **UNIT II GRID SERVICES**

Introduction to Open Grid Services Architecture (OGSA) – Motivation – Functionality Requirements.

### **WEEK 5:**

Practical & Detailed view of OGSA/OGSI – Data intensive grid service models- OGSA services.

### **WEEK 6: UNIT TEST-II**

### **WEEK 7: (UNIT TEST-II) UNIT III VIRTUALIZATION**

Cloud deployment models: public, private, hybrid, community – Categories of cloud computing:

### **WEEK 8:**

Everything as a service: Infrastructure, platform, software - Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices - virtual clusters and Resource Management – Virtualization for data center automation.

### **WEEK 9: PREMODEL**

### **WEEK 10: UNIT IV PROGRAMMING MODEL**

Open source grid middleware packages – Globus Toolkit (GT4) Architecture

### **WEEK 11:**

Configuration – Usage of Globus – Main components and Programming model

**WEEK 12:** Introduction to Hadoop Framework - Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.

### **WEEK 13: UNIT TEST-IV**

### **UNIT V SECURITY**

Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure

### **WEEK 14:**

Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security,

**WEEK 15:**

Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

**WEEK 16: MODEL EXAM**

**WEEK 17: MODEL EXAM**

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, “Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet”, First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012.

**REFERENCES:** 1. Jason Venner, “Pro Hadoop- Build Scalable, Distributed Applications in the Cloud”, A Press, 2009

2. Tom White, “Hadoop The Definitive Guide”, First Edition. O’Reilly, 2009.

3. Bart Jacob (Editor), “Introduction to Grid Computing”, IBM Red Books, Vervante, 2005

4. Ian Foster, Carl Kesselman, “The Grid: Blueprint for a New Computing Infrastructure”, 2nd Edition, Morgan Kaufmann.

5. Frederic Magoules and Jie Pan, “Introduction to Grid Computing” CRC Press, 2009.

6. Daniel Minoli, “A Networking Approach to Grid Computing”, John Wiley Publication, 2005.

7. Barry Wilkinson, “Grid Computing: Techniques and Applications”, Chapman and Hall, CRC, Taylor and Francis Group, 2010.

## **IT6004 SOFTWARE TESTING**

### **WEEK 1: UNIT I INTRODUCTION**

Testing as an Engineering Activity

### **WEEK 2:**

The Tester's Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design, – Testing as a Process – Testing axioms – Basic definitions – Software Testing Principles

### **WEEK 3:**

Defect Examples – Developer/Tester Support of Developing a Defect Repository – Defect Prevention strategies.

### **WEEK 4: UNIT TEST-I**

#### **UNIT II TEST CASE DESIGN**

Test case Design Strategies – Using Black Box Approach to Test Case Design – Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning

### **WEEK 5:**

State-based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing.

### **WEEK 6: UNIT TEST-II**

Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Evaluating Test Adequacy Criteria.

### **WEEK 7: (UNIT TEST-II) UNIT III LEVELS OF TESTING**

The need for Levers of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results

### **WEEK 8:**

Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing- Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation – Website testing.

### **WEEK 9: PRE MODEL**

### **WEEK 10: UNIT IV TEST AMANAGEMENT**

People and organizational issues in testing – Organization structures for testing teams

**WEEK 11:** – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items –



**WEEK 12:**

Test management – test process – Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

**WEEK 13: UNIT TEST-IV****UNIT V TEST AUTOMATION**

Software test automation – skill needed for automation – scope of automation

**WEEK 14:**

Design and architecture for automation – requirements for a test tool – challenges in automation

**WEEK 15:**

Test metrics and measurements – project, progress and productivity metrics.

**WEEK 16: MODEL EXAM****WEEK 17: MODEL EXAM****TOTAL: 45 PERIODS****TEXT BOOKS:**

1. Srinivasan Desikan and Gopaldaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson Education, 2006.
2. Ron Patton, “ Software Testing”, Second Edition, Sams Publishing, Pearson Education, 2007.

**REFERENCES:**

1. Ilene Burnstein, “ Practical Software Testing”, Springer International Edition, 2003.
2. Edward Kit,” Software Testing in the Real World – Improving the Process”, Pearson Education, 1995.
3. Boris Beizer,” Software Testing Techniques” – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4. Aditya P. Mathur, “Foundations of Software Testing \_ Fundamental Algorithms and Techniques”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

## **CS6003 AD HOC AND SENSOR NETWORKS**

### **WEEK 1: UNIT I INTRODUCTION**

Fundamentals of Wireless Communication Technology

### **WEEK 2:**

– The Electromagnetic Spectrum – Radio propagation Mechanisms – Characteristics of the Wireless Channel – Mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs) :concepts and architectures. Applications of Ad Hoc and Sensor networks.

### **WEEK 3:**

Design Challenges in Ad hoc and Sensor Networks.

### **WEEK 4: UNIT TEST-I**

### **UNIT II MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS**

Issues in designing a MAC Protocol- Classification of MAC Protocols

### **WEEK 5:**

Contention based protocols- Contention based protocols with Reservation Mechanisms-

### **WEEK 6: UNIT TEST II**

Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.11

### **WEEK 7: (UNIT TEST-II) UNIT III ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS**

Issues in designing a routing and Transport Layer protocol for Ad hoc networks-

### **WEEK 8:**

Proactive routing, reactive routing (on-demand), hybrid routing, Classification of Transport Layer solutions-TCP over Ad hoc wireless Networks.

### **WEEK 9: PREMODEL**

### **WEEK 10: UNIT IV**

Wireless Sensor Networks (Wsns) And Mac Protocols

**WEEK 11:** Single node architecture: hardware and software components of a sensor node

**WEEK 12:** WSN Network architecture: typical network architectures-data relaying and aggregation strategies -MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC-IEEE 802.15.4.

### **WEEK 13: UNIT TEST-IV**

### **UNIT V WSN Routing, Localization & QOS**

Issues in WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, triangulation-QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues.

### **WEEK 16: MODEL EXAM**

**WEEK 17: MODEL EXAM**

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. C. Siva Ram Murthy, and B. S. Manoj, "Ad hoc Wireless Networks: Architectures and Protocols ", Prentice Hall Professional Technical Reference, 2008.

**REFERENCES:**

1. Carlos De Moraes Cordeiro, Dharma Prakash Agrawal "Ad Hoc & Sensor Networks: Theory and Applications", World Scientific Publishing Company, 2006.
2. Feng Zhao and Leonides Guibas, "Wireless Sensor Networks", Elsevier Publication – 2002.
3. Holger Karl and Andreas Willig "Protocols and Architectures for Wireless Sensor Networks", Wiley, 2005
4. Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor Networks-Technology, Protocols, and Applications", John Wiley, 2007.
5. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003.

## **IT6711 DATA MINING LABORATORY**

### **LIST OF EXPERIMENTS:**

1. Creation of a Data Warehouse.
2. Apriori Algorithm.
3. FP-Growth Algorithm.
4. K-means clustering.
5. One Hierarchical clustering algorithm.
6. Bayesian Classification.
7. Decision Tree.
8. Support Vector Machines.
9. Applications of classification for web mining.
10. Case Study on Text Mining or any commercial application.

**TOTAL : 45 PERIODS**

### **LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:**

**SOFTWARE:** WEKA, RapidMiner, DB Miner or Equivalent

**HARDWARE** Standalone desktops 30 Nos

## **IT6712 SECURITY LABORATORY**

### **LIST OF EXPERIMENTS**

1. Implement the following SUBSTITUTION & TRANSPOSITION TECHNIQUES concepts:
  - a) Caesar Cipher
  - b) Playfair Cipher
  - c) Hill Cipher
  - d) Vigenere Cipher
  - e) Rail fence – row & Column Transformation
2. Implement the following algorithms
  - a) DES
  - b) RSA Algorithm
  - c) Diffie-Hellman
  - d) MD5
  - e) SHA-1
- 3 Implement the SIGNATURE SCHEME - Digital Signature Standard
4. Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG).
5. Setup a honeypot and monitor the honeypot on network (KF Sensor)
6. Installation of rootkits and study about the variety of options
7. Perform wireless audit on an access point or a router and decrypt WEP and WPA.( Net Stumbler)
8. Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

**TOTAL: 45 PERIODS**

#### **LAB EQUIPMENTS FOR A BATCH OF 30 STUDENTS:**

**SOFTWARE:** C / C++ / Java or equivalent compiler GnuPG, KF Sensor or Equivalent, Snort, Net Stumbler or Equivalent

**HARDWARE:** Standalone desktops -30 Nos. (or) Server supporting 30 terminals or more.

## **IT6713 GRID AND CLOUD COMPUTING LABORATORY**

### **LIST OF EXPERIMENTS: GRID COMPUTING LAB:**

Use Globus Toolkit or equivalent and do the following:

1. Develop a new Web Service for Calculator.
2. Develop new OGSA-compliant Web Service.
3. Using Apache Axis develop a Grid Service.
4. Develop applications using Java or C/C++ Grid APIs
5. Develop secured applications using basic security mechanisms available in Globus Toolkit.
6. Develop a Grid portal, where user can submit a job and get the result. Implement it with and without GRAM concept.

### **CLOUD COMPUTING LAB:**

Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.

1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
2. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
3. Install a C compiler in the virtual machine and execute a sample program.
4. Show the virtual machine migration based on the certain condition from one node to the other.
5. Find procedure to install storage controller and interact with it.
6. Find procedure to set up the one node Hadoop cluster.
7. Mount the one node Hadoop cluster using FUSE.
8. Write a program to use the API's of Hadoop to interact with it.
9. Write a word count program to demonstrate the use of Map and Reduce tasks.

**TOTAL: 45 PERIODS**

### **LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:**

**SOFTWARE:** Globus Toolkit or equivalent Eucalyptus or Open Nebula or equivalent to

**HARDWARE** Standalone desktops 30 Nos