



**VELTECH MULTI TECH Dr. RANGARAJAN Dr. SAKUNTHALA ENGINEERING  
COLLEGE**

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**SYLLABUS  
WEEKLY SCHEDULE**

**SEMESTER II**

**2015-16**

**I YEAR ME COMPUTER SCIENCE AND ENGINEERING (WITH SPECIALIZATION  
IN COMPUTER NETWORKS)**

**II YEAR COURSE**

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**VELTECH MULTITECH Dr.RANGARAJAN Dr.SAKUNTHALA ENGG. COLLEGE  
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**WEEKLY SCHEDULE**

**SEM : II                      YEAR : I  
ACADEMIC YEAR: 2015-16**

<b>S.NO</b>	<b>WEEKS</b>	<b>DATE</b>	
		<b>FROM</b>	<b>TO</b>
1	WEEK 1	18.01.16	23.01.16
2	WEEK 2	25.01.16	30.01.16
3	WEEK 3	01.02.16	06.02.16
4	WEEK 4	08.02.16	13.02.16
5	WEEK 5	15.02.16	20.02.16
6	WEEK 6	22.02.16	27.02.16
7	WEEK 7	29.02.16	05.03.16
8	WEEK 8	07.03.16	12.03.16
9	WEEK 9	16.03.16	20.03.16
10	WEEK 10	22.03.16	26.03.16
11	WEEK 11	27.03.16	02.04.16
12	WEEK 12	03.04.16	09.04.16
13	WEEK 13	11.04.16	16.04.16
14	WEEK 14	18.04.16	23.04.16
15	WEEK 15	25.04.16	30.04.16

## 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>MODEL EXAM</b>
1	CP7201	THEORETICAL FOUNDATIONS OF COMPUTER SCIENCE	01.02.16	15.02.16	29.02.06	01.04.16
2	NE7201	NETWORK PROGRAMMING	02.02.16	16.02.16	01.03.16	04.04.16
3	NE7202	NETWORK AND INFORMATION SECURITY	03.02.16	17.02.16	02.03.16	06.04.16
4	CP7202	ADVANCED DATABASES	04.02.16	18.02.16	03.03.16	08.04.16
5	CP7007	SOFTWARE REQUIREMENTS ENGINEERING	05.02.16	19.02.16	04.03.16	11.04.16
6	NE7007	NETWORK MANAGEMENT	06.02.15	20.02.16	05.03.16	13.04.16

## **CP7201 THEORETICAL FOUNDATIONS OF COMPUTER SCIENCE**

### **UNIT I- FOUNDATIONS**

**WEEK-1** Sets –relations –equivalence relations –partial orders –functions- recursive functions  
sequences induction principle –structural induction –recursive algorithms –counting  
pigeonhole principle –permutations and combinations –recurrence relations

**WEEK – 2 UNIT TEST 1**

### **UNIT II - LOGIC AND LOGIC PROGRAMMING**

**WEEK-2** Propositional logic – syntax – interpretations and models – deduction theorems –  
normal forms –

**WEEK-3** inference rules – SAT solvers - predicate logic – syntax – proof theory – semantics  
of predicate logic

**WEEK-4** undecidability of predicate logic – inferences in first-order logic – logic  
programming – definite programs

**WEEK-5** SLD resolution – normal programs – SLDNF resolution –introduction to Prolog

**WEEK-6 UNIT TEST - 2**

### **UNIT – III - LAMBDA CALCULUS AND FUNCTIONAL PROGRAMMING**

**WEEK-7**Lambda notation for functions – syntax – curried functions – parametric  
polymorphism lambda reduction – alpha reduction

**WEEK-8** beta reduction – beta abstraction – extensionality theorem  
delta reduction – reduction strategies – normal forms – Church-Rosser Theorems

**WEEK-9** – pure lambda calculus – constants – arithmetic – conditionals – Iteration – recursion –  
introduction to functional programming

**WEEK-9 UNIT TEST 3**

### **UNIT – IV GRAPH STRUCTURES**

**WEEK-10** Tree Structures – Graph structures – graph representations – regular graph structures  
– random graphs – Connectivity – Cycles

**WEEK-11** Graph Coloring – Cliques, Vertex Covers, Independent sets Spanning Trees –  
network flows – matching

**WEEK-12 CYCLE TEST – 4**

### **UNIT – V STATE MACHINES**

**WEEK-13** Languages and Grammars – Finite State Machines – State machines and languages –

Turing Machines

**WEEK-14** Computational Complexity – computability – Decidability – Church's Thesis

**WEEK-15 UNIT TEST 5**

**WEEK-16 MODEL EXAM THEORY**

**WEEK-17 MODEL EXAM THEORY**

**REFERENCES:**

1. Uwe Schoning, “Logic for Computer Scientists”, Birkhauser, 2008.
2. M. Ben-Ari, “Mathematical logic for computer science”, Second Edition, Springer, 2003.
3. John Harrison, “Handbook of Practical Logic and Automated Reasoning”, Cambridge University Press, 2009.
4. Greg Michaelson, “An introduction to functional programming through lambda calculus”, Dover Publications, 2011.
5. Kenneth Slonneger and Barry Kurtz, “Formal syntax and semantics of programming languages”, Addison Wesley, 1995.
6. Kenneth H. Rosen, “Discrete Mathematics and its applications”, Seventh Edition, Tata McGraw Hill, 2011.
7. Sriram Pemmaraju and Steven Skiena, “Computational Discrete Mathematics”, Cambridge University Press, 2003.
8. M. Huth and M. Ryan, “Logic in Computer Science – Modeling and Reasoning about systems”, Second Edition, Cambridge University Press, 2004.
9. Norman L. Biggs, “Discrete Mathematics”, Second Edition, Oxford University Press, 2002.
10. Juraj Hromkovic, “Theoretical Computer Science”, Springer, 1998.
11. J. E. Hopcroft, Rajeev Motwani, and J. D. Ullman, “Introduction to Automata Theory, Languages, and Computation”, Third Edition, Pearson, 2008.

**NE7202**

**NETWORK PROGRAMMING**

**UNIT I INTRODUCTION**

**WEEK 1:** Overview of UNIX OS - Environment of a UNIX process  
Process control – Process relationships  
Signals – Interprocess Communication- overview of TCP/IP protocols

**WEEK 2 UNIT TEST 1**

**UNIT II - ELEMENTARY TCP SOCKETS**

**WEEK-2** Introduction to Socket Programming –Introduction to Sockets –

**WEEK-3** Socket address Structures Byte ordering functions – address conversion functions

**WEEK 4** Elementary TCP Sockets – socket,

**WEEK-5** connect, bind, listen, accept, read, write , close functions

– Iterative Server – Concurrent Server.

## **WEEK -6 UNIT TEST 2**

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## **UNIT – III APPLICATION DEVELOPMENT**

**WEEK-7** - TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients –boundary conditions: Server process Crashes, Server host Crashes,

**WEEK-8** Server Crashes and reboots, Server Shutdown – I/O multiplexing – I/O Models – select function – shutdown function

**WEEK-9** TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing)

## **WEEK-9 UNIT TEST 3**

## **UNIT – IV SOCKET OPTIONS, ELEMENTARY UDP SOCKETS**

**WEEK-10** Socket options – get socket and set socket functions – generic socket options – IP socket options– ICMP socket options – TCP socket options

**WEEK-11**– Elementary UDP sockets – UDP echo Server –UDP echo Client – Multiplexing TCP and UDP sockets – Domain name system –gethostbyname function – Ipv6 support in DNS –get hostbyadr function – get serv by name and get serv by port functions.

## **WEEK-12 UNIT TEST 4**

## **UNIT – V ADVANCED SOCKETS**

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**WEEK-13** Ipv4 and Ipv6 interoperability – threaded servers – thread creation and termination – TCP echo server using threads

**WEEK-14** server using threads – Multiplexes – condition variables – raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program

## **WEEK-15 UNIT TEST 5**

## **WEEK-16 MODEL EXAM THEORY**

## **WEEK-17 MODEL EXAM THEORY**

## **REFERENCES:**

1. W. Richard Stevens, B. Fenner, A.M. Rudoff, “Unix Network Programming – The Sockets Networking API”, 3rd edition, Pearson, 2004.
2. W. Richard Stevens, S.A Rago, “Programming in the Unix environment”, 2nd edition, Pearson, 2005

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## **UNIT I INTRODUCTION**

**WEEK 1:** An Overview of Computer Security-Security Services-Security Mechanisms Security Attacks-Access Control Matrix, Policy-Security policies,Confidentiality policies, Integrity policies and Hybrid policies

### **WEEK 2 UNIT TEST -1**

## **UNIT II - CRYPTOSYSTEMS & AUTHENTICATION**

**WEEK -2** Classical Cryptography

**WEEK-3**-Substitution Ciphers-permutation Ciphers-Block Ciphers-

**WEEK-4** – DES Modes of Operation- AES-Linear Cryptanalysis, Differential Cryptanalysis-Hash Function

**WEEK-5** SHA 512- Message Authentication Codes-HMAC - Authentication Protocols

### **WEEK -6 UNIT TEST -2**

## **UNIT – III PUBLIC KEY CRYPTOSYSTEMS 9**

**WEEK-7** Introduction to Public key Cryptography- Number theory- The RSA Cryptosystem and Factoring Integer-

**WEEK-8**Attacks on RSA-The EL Gamal Cryptosystem Digital Signature Algorithm-Finite Fields-Elliptic Curves Cryptography- Key management –

**WEEK-9** Session and Interchange keys, Key exchange and generation-PKI

### **WEEK-9 UNIT TEST 3**

## **UNIT – IV SYSTEM IMPLEMENTATION 9**

**WEEK-10** Design Principles, Representing Identity, Access Control Mechanisms, Information Flow and Confinement Problem Secured Coding - OWASP/SANS Top Vulnerabilities

**WEEK-11 Secure Software Development:** -Buffer Overflows - Incomplete mediation - XSS - Anti Cross Site Scripting Libraries -Canonical Data Format - Command Injection - Redirection - Inference – Application Controls

### **WEEK-12 UNIT TEST 4**

## **UNIT – V NETWORK SECURITY 9**

**WEEK-13** Secret Sharing Schemes-Kerberos- Pretty Good Privacy (PGP)-

**WEEK-14** Secure Socket Layer (SSL)-Intruders – HIDS- NIDS - Firewalls – Viruses

### **WEEK-15 UNIT TEST 5**

### **WEEK-16 MODEL EXAM THEORY**

### **WEEK-17 MODEL EXAM THEORY**



## **REFERENCES:**

1. William Stallings, “Cryptography and Network Security: Principles and Practices”, Third Edition, Pearson Education, 2006.
2. Matt Bishop , “Computer Security art and science ”, Second Edition, Pearson Education, 2002
3. Wade Trappe and Lawrence C. Washington, “Introduction to Cryptography with Coding Theory” Second Edition, Pearson Education, 2007
4. Jonathan Katz, and Yehuda Lindell, Introduction to Modern Cryptography, CRC Press, 2007
5. Douglas R. Stinson, “Cryptography Theory and Practice”, Third Edition, Chapman & Hall/CRC, 2006
6. Wenbo Mao, “Modern Cryptography – Theory and Practice”, Pearson Education, First Edition, 2006.
7. Network Security and Cryptography, Menezes Bernard, Cengage Learning, New Delhi, 2011
8. Man Young Rhee, Internet Security, Wiley, 2003
9. OWASP top ten security vulnerabilities: <http://xml.coverpages.org/OWASPTopTen.Pdf>

## **CP7202**

## **ADVANCED DATABASES**

### **UNIT I PARALLEL AND DISTRIBUTED DATABASES**

**WEEK 1:** Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism Inter and Intra operation Parallelism –Design of Parallel Systems- Distributed Database Concepts - Distributed Data Storage –Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Case Studies

### **WEEK 2: UNIT TEST 1**

### **UNIT II - OBJECT AND OBJECT RELATIONAL DATABASES**

**WEEK-2** Concepts for Object Databases: Object Identity

**WEEK-3** Object structure – Type Constructors –Encapsulation of Operations – Methods

**WEEK-4** – Persistence – Type and Class Hierarchies –Inheritance – Complex Objects – Object Database Standards

**WEEK-5** Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems: Object Relational features in SQL/Oracle – Case Studies

### **WEEK-6 UNIT TEST - 2**

## **UNIT – III INTELLIGENT DATABASES**

**WEEK-7** Active Databases: Syntax and Semantics (Starburst, Oracle, DB2)- Taxonomy- Applications-Design Principles for Active Rules- Temporal Databases: Overview of Temporal Databases-TSQL2-

**WEEK-8** Deductive Databases: Logic of Query Languages – Datalog- Recursive Rules Syntax and Semantics of Datalog Languages- Implementation of Rules and Recursion- Recursive Queries in SQL- Spatial Databases-

**WEEK-9** Spatial Data Types- Spatial Relationships- Spatial Data Structures-Spatial Access Methods- Spatial DB Implementation

### **WEEK-9 UNIT TEST-3**

## **UNIT – IV ADVANCED DATA MODELS**

**WEEK-10** Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution -

**WEEK-11** Mobile Transaction Models -Concurrency Control - Transaction Commit Protocols- Multimedia Databases- Information Retrieval- Data Warehousing- Data Mining-Text Mining.

### **WEEK-12 UNIT TEST – 4**

## **UNIT – V EMERGING TECHNOLOGIES**

**WEEK-13** XML Databases: XML-Related Technologies-XML Schema- XML Query Languages- Storing XML in Databases-XML and SQL- Native XML Databases- Web Databases- Geographic Information Systems- Biological Data Management-

**WEEK-14** Cloud Based Databases: Data Storage Systems on the Cloud- Cloud Storage Architectures-Cloud Data Models- Query Languages-Introduction to Big Data-Storage-Analysis.

### **WEEK-15 UNIT TEST 5**

### **WEEK-16 MODEL EXAM THEORY**

### **WEEK-17 MODEL EXAM THEORY**

## **REFERENCES:**

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education/Addison Wesley, 2007.
2. Thomas Cannolly and Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education, 2007.
3. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, Fifth Edition, McGraw Hill, 2006.
4. C.J.Date, A.Kannan and S.Swamynathan, ”An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
5. Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems”, McGraw Hill, Third Edition 2004.

## **CP7007 SOFTWARE REQUIREMENTS ENGINEERING**

### **UNIT I DOMAIN UNDERSTANDING**

**WEEK 1:** Introduction – Types of requirements – Requirements engineering process – Validating requirements – Requirements and design – Requirements and test cases – introduction to business domain – Problem analysis – Fish bone diagram – Business requirements – Business process modeling – Business use cases – Business modeling notations – UML Activity diagrams

#### **WEEK 2- UNIT TEST-1**

### **UNIT II REQUIREMENTS ELICITATION**

**WEEK-2** Introduction – Understanding stakeholders' needs

**WEEK-3** Elicitation techniques

**WEEK-4** interviews, questionnaire, workshop, brainstorming, prototyping

**WEEK-5** Documenting stakeholders' needs

#### **WEEK-6 UNIT TEST 2**

### **UNIT III FUNCTIONAL REQUIREMENTS**

**WEEK-6** Introduction – Features and Use cases – Use case scenarios

**WEEK-7** Documenting use cases

**WEEK- 8** Levels of details – SRS documents

#### **WEEK-9 UNIT TEST 3**

### **UNIT IV QUALITY ATTRIBUTES AND USER EXPERIENCE**

**WEEK-10** Quality of solution – Quality attributes – Eliciting quality attributes – Quality attribute workshop (QAW) – Documenting quality attributes

**WEEK-11** Six part scenarios – Usability requirements – Eliciting and documenting usability requirements – Modeling user experience – Specifying UI design

#### **WEEK-12 UNIT TEST 4**

### **UNIT V MANAGING REQUIREMENTS**

**WEEK-13** Defining scope of the project – Context diagram – Managing requirements – Requirements properties

**WEEK-14** Traceability – Managing changes – Requirements metrics – Requirements management tools

#### **WEEK-15 UNIT TEST 5**

#### **WEEK-16 MODEL EXAM THEORY**

#### **WEEK-17 MODEL EXAM THEORY**

### **REFERENCES:**

1. Axel van Lamsweerde, "Requirements Engineering", Wiley, 2009

2. Gerald Kotonya, Ian Sommerville, "Requirements Engineering: Processes and Techniques", John Wiley and Sons, 1998
  3. Dean Leffingwell and Don Widrig, "Managing Software Requirements: A Use Case Approach (2nd Edition)", Addison-wesley, 2003
  4. SEI Report, "Quality Attributes Workshop", <http://www.sei.cmu.edu/library/abstracts/reports/03tr016.cfm> , 2003
  5. J Nielsen, "Usability Engineering", Academic Press, 1993
- NE7007 NETWORK MANAGEMENT**

## **UNIT I FUNDAMENTALS OF COMPUTER NETWORK TECHNOLOGY 9**

**WEEK 1:** Network Topology, LAN, Network node components- Hubs, Bridges, Routers, Gateways, Switches, WAN, ISDN Transmission Technology, Communications protocols and standards Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network

### **WEEK 2: UNIT TEST-1**

## **UNIT II - OSI NETWORK MANAGEMENT 9**

WEEK 2: OSI Network management model

**WEEK-3&4** OSI Network management model (contd)-Organizational models, Information model, communication model

**WEEK-5** –Abstract Syntax Notation - Encoding structure, Macros Functional model CMIP/CMIS

### **WEEK-6 UNIT TEST-2**

## **UNIT – III INTERNET MANAGEMENT (SNMP)**

**WEEK-7** Active SNMP (V1 and V2)-Organizational model-System Overview

**WEEK-8** The information model, communication model-Functional model, SNMP proxy server, Management information,

**WEEK-9** protocol remote monitoring- , RMON SMI and MIB, RMON1,RMON2 - A Case Study of Internet Traffic Using RMON.

### **WEEK-9 - UNIT TEST-3**

## **UNIT – IV BROADBAND NETWORK MANAGEMENT**

**WEEK-10** Broadband networks and services, ATM Technology-VP,VC, ATM Packet, Integrated service, ATMLAN emulation, Virtual Lan ATM Network Management-ATM Network reference model, integrated local management Interface.

**WEEK-11** ATM Management Information base, Role of SNMD and ILMI in ATM Management, M1, M2, M3, M4 Interface. ATM Digital Exchange Interface Management-TMN conceptual Model- TMN Architecture, TMN Management Service Architecture

#### **WEEK-12 UNIT TEST-4**

### **UNIT – V NETWORK MANAGEMENT APPLICATIONS**

**WEEK-13** Configuration management, Fault management, performance management, Event Correlation Techniques security Management, Accounting management, Report Management, Policy Based Management Service Level Management-

**WEEK-14** Network Management Tools, Network Statistics Measurement Systems – Web Based Management, XML Based Network Management - : Future Directions.

#### **WEEK-15 UNIT TEST-5**

#### **WEEK-16 MODEL THEORY EXAM**

#### **WEEK-17 MODEL THEORY EXAM**

#### **REFERENCES:**

1. Mani Subramanian, “Network Management Principles and practice ”, Pearson Education, New Delhi, 2010.
2. STALLINGS, WILLIAM, “SNMP, SNMPv2, SNMPv3, and RMON 1 and 2,” Pearson Education, 2012
3. Salah Aaidarous, Thomas Plevayk, “Telecommunications Network Management Technologies and Implementations ”, eastern Economy Edition IEEE press, New Delhi, 1998.
4. Lakshmi G. Raman, “Fundamentals of Telecommunication Network Management ”, Eastern Economy Edition IEEE Press, New Delhi, 1999.

### **NE7211**

### **ADVANCED DATABASE LABORATORY**

#### **LIST OF EXPERIMENTS**

- 1) Implement parallel sorting and aggregates.
- 2) Implement parallel joins and Hash joins
- 3) Implement semi join and bloom join in distributed DBMS
- 4) Implement two phase commit in distributed DBMS
- 5) Implementation of cube operator in OLAP queries in data warehousing and decision support system
- 6) Implement decision tree of data mining problem
- 7) Implement a priori algorithm in data mining
- 8) Simulation of a search engine
- 9) Implement view modification and materialization in data warehousing and decision support

systems

10) Implementation of data log queries for deductive databases (Negation, Aggregate, Recursive etc.)

11) Implement R Trees in spatial databases

12) Implementation of spatial database queries

Minimum 8 to 10 experiments based on the syllabus and above experiment list should be implemented using ORACLE / MSSQL SERVER / JAVA.

## **NE7212 CASE STUDY - NETWORK PROTOCOL AND SECURITY IMPLEMENTATION (Team Work)**

**1. A real-time, confidential, bulk amount of data is to be transferred across a network.**

**Write programs to transfer the data applying the following conditions:**

The data is to be transferred in real time, so the data packet should be given higher priority among others.

Since it is more confidential, implement some security algorithm so that the hackers never hack the data.

It is a bulk amount of data. So, there should not be any data loss.

Apply suitable networking protocols and implement the above scenario. Give examples and explanations for the other protocols which are not appropriate

**2. Consider the following scenario and answer the questions below.**

A network administrator receives an alert from the central virus console reporting that approximately 5 percent of the machines in a local area network have been infected with the latest virus. In addition to the alert message it also lists the IP addresses of the infected machines.

As a lab administrator, what will be your immediate action after the threat alert?

Develop corrective and preventive measures for the threat mentioned above.

Perform an analysis which measures the percentage of loss the threat may create in network system when the threat goes undetected for a week, a month and a year.

2. Build a security system which detects the following threat in a computer system and measures the tolerance of every system in the network against the threat. Software which when installed in a computer of a Local Area Network slowly migrates to every other computer in the network in few months or year.