VEL TECH MULTI TECH
Dr RANGARAJAN Dr.SAKUNTHALA ENGINEERING COLLEGE

(An ISO 9001: 2008 Certified Institution)
(Owned by 'VEL Shree R. Rangarajan
Dr. Sakunthala Rangarajan Educational Academy)
(Approved by AICTE, New Delhi &
Govt. of Tamil Nadu and affiliated to Anna University)

SYLLABUS

WEEKLY SCHEDULE

IV SEMESTER 2015-16

DEPARTMENT OF CSE

IV DEGREE COURSE

42, Avadi – Alamathi Road,
Chennai – 600062
Telefax – 044-26841061
E-mail: veltech@md3.vsnl.net.in
Website : www.vel-tech.org

SEM : IV YEAR : II

ACADEMIC YEAR: 2015-16

S.NO	WEEKS	DATE	
		FROM	TO
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

CONTENTS

PRACTICAL

TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	PRE MODEL EXAM	MODEL EXAM
1	MA6453	Probability and Queueing Theory	01.02.16	15.02.16	29.02.06	01.04.16
2	CS6551	Computer Networks	02.02.16	16.02.16	01.03.16	04.04.16
3	CS6401	Operating Systems	03.02.16	17.02.16	02.03.16	06.04.16
4	CS6402	Design and Analysis of Algorithms	04.02.16	18.02.16	03.03.16	08.04.16
5	EC6504	Microprocessor and Microcontroller	05.02.16	19.02.16	04.03.16	11.04.16
6	CS6403	Software Engineering	06.02.15	20.02.16	05.03.16	13.04.16

MA6453 PROBABILITY AND QUEUEING THEORY

AIM

The probabilistic models are employed in countless applications in all areas of science and engineering. Queuing theory provides models for a number of situations that arise in real life. The course aims at providing necessary mathematical support and confidence to tackle real life problems.

OBJECTIVES

At the end of the course, the students would

- Have a well – founded knowledge of standard distributions which can describe real life phenomena.
- Acquire skills in handling situations involving more than one random variable and functions of random variables.
- Understand and characterize phenomena which evolve with respect to time in a probabilistic manner.
- Be exposed to basic characteristic features of a queuing system and acquire skills in analyzing queuing models.

UNIT I RANDOM VARIABLES

Week 1: Discrete and continuous random variables - Moments – Moment generating functions and their properties- Binomial, Poisson, Geometric, Negative binomial- Uniform, Exponential, Gamma, and Weibull distributions.

Week 2:UNIT TEST-1

UNIT II TWO DIMENSIONAL RANDOM VARIABLES

Week 2: Joint distributions

Week 3: Marginal and conditional distributions

Week 4: Covariance Correlation and regression

Week 5: Transformation of random variables - Central limit theorem.]

Week 6:UNIT TEST-2

UNIT III RANDOM PROCESSES

Week 6: Classification - Stationary process - Markov process

Week 7: Poisson process – Discrete parameter Markov chain

Week 8: Chapman Kolmogorov equations – Limiting distributions.

Week 9: PRE MODEL EXAM

UNIT IV QUEUEING MODELS

Week 9: Markovian queues – Birth and Death processes – Single and multiple server queueing models

Week 10: Little's formula - Queues with finite waiting rooms- Queues with impatient customers: Balking and reneging.

Week 11: **UNIT TEST-4**

UNITV ADVANCED QUEUEING MODELS

Week 12: Finite source models - M/G/1 queue- Pollaczek Khinchin formula

Week 13: M/D/1 and $M/E_K/1$ as special cases – Series queues – Open Jackson networks.

Week 14:UNIT TEST-5

Week 15: Model Practical Examinations

Week 16: Model Exam

Week 17: Model Exam

TEXT BOOKS

1. O.C. Ibe, "Fundamentals of Applied Probability and Random Processes", Elsevier, 1st Indian Reprint, 2007 (For units 1, 2 and 3).
2. D. Gross and C.M. Harris, "Fundamentals of Queueing Theory", Wiley Student edition, 2004 (For units 4 and 5).

REFERENCES

1. Robertazzi, "Computer Networks and Systems: Queueing Theory

and performance evaluation", Springer, 3rd Edition, 2006.

2. Taha. H.A., "Operations Research", Pearson Education, Asia, 8th Edition, 2007.
3. Trivedi.K.S., "Probability and Statistics with Reliability, Queueing and Computer Science Applications", John Wiley and Sons, 2nd Edition, 2002.
4. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw Hill Edition, New Delhi, 2004.
5. Yates. R.D. and Goodman. D. J., "Probability and Stochastic Processes", Wiley India Pvt. Ltd., Bangalore, 2nd Edition, 2012.

6551-COMPUTER NETWORKS

OBJECTIVES:

The student should be made to:

Understand the division of network functionalities into layers.
Be familiar with the components required to build different types of networks
Be exposed to the required functionality at each layer
Learn the flow control and congestion control algorithms

UNIT I FUNDAMENTALS & LINK LAYER

Week 1:Building a network – Requirements - Layering and protocols- Internet Architecture – Network software-: Performance ; Link layer Services - Framing - Error Detection - Flow control

Week2: **UNIT TEST-1**

UNIT II MEDIA ACCESS & INTERNETWORKING

Week 2: Media access control - Ethernet (802.3)
Week 3: Wireless LANs – 802.11 – Bluetooth - Switching and bridging
Week 4: Unit Test 2

Week 5: Basic Internetworking (IP, CIDR, ARP, DHCP,ICMP)

Week 6: UNIT TEST-2

UNIT III ROUTING

Week 6 : Routing (RIP, OSPF, metrics) – Switch basics
Week 7 : Global Internet (Areas, BGP, IPv6), Multicast
Week 8 : Addresses – multicast routing (DVMRP, PIM)

Week 9: **PRE MODEL EXAM**
UNIT IV TRANSPORT LAYER

Week 9 :Overview of Transport layer - UDP - Reliable byte stream (TCP)
Week 10: Connection management - Flow control - Retransmission TCP Congestion control
Week 11 : Congestion avoidance (DECbit, RED) – QoS Application requirements

Week 11 : **UNIT TEST-4**

UNIT V APPLICATION LAYER

Week 12:Traditional applications -Electronic Mail (SMTP, POP3)
Week 13:(IMAP, MIME) – HTTP- Web Services – DNS –SNMP

Week 14 : **UNIT TEST-5**
Week 15: Model Practical Examinations
Week 16: Model Exam
Week 17: Model Exam

OUTCOMES:

At the end of the course, the student should be able to:

Identify the components required to build different types of networks

Choose the required functionality at each layer for given application Identify solution for each functionality at each layer

Trace the flow of information from one node to another node in the network

TEXT BOOK:

Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers, 2011.

CS6401 OPERATING SYSTEMS

AIM:

To learn the various aspects of operating systems such as process management, memory management, and I/O management

UNIT I OPERATING SYSTEMS OVERVIEW

Week 1: Computer System Overview-Basic Elements, Instruction Execution, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-objectives and functions, Evolution of Operating System.- Computer System Organization-Operating System Structure and Operations- System Calls, System Programs, OS Generation and System Boot.

Week 2: UNIT TEST-1

UNIT II PROCESS MANAGEMENT

Week 2: Processes-Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication

Week 3: Threads- Overview, Multicore Programming, Multithreading Models; Windows 7 -

Week 4: Thread and SMP Management. Process Synchronization

Week 5: Critical Section Problem, Mutex Locks, Semophores, Monitors; CPU Scheduling and Deadlocks.

Week 6:UNIT TEST-2

UNIT III STORAGE MANAGEMENT

Week 6: Main Memory-Contiguous Memory Allocation, Segmentation, Paging, 32 and 64 bit architecture Examples

Week 7: Virtual Memory- Demand Paging, Page Replacement, Allocation, Thrashing;

Week 8: Allocating Kernel Memory, OS Examples.

Week 9: PRE MODEL EXAM

UNIT IV I/O SYSTEMS

Week 9: Mass Storage Structure- Overview, Disk Scheduling and Management; File System Storage

Week 10: File Concepts, Directory and Disk Structure, Sharing and Protection; File System Implementation-

Week 11 File System Structure, Directory Structure, Allocation Methods, Free Space Management, I/O Systems.

Week 11: UNIT TEST-4

UNIT V CASE STUDY

Week 12: Linux System- Basic Concepts;System Administration-Requirements for Linux System Administrator, Setting up a LINUX Multifunction Server

Week 13: , Domain Name System, Setting Up Local Network Services; Virtualization- Basic Concepts, Setting Up Xen,VMware on Linux Host and Adding Guest OS.

Week 14: UNIT TEST-5
Week 15: Model Practical Examinations
Week 17: Model Examinations
Week 18: Model Examinations

TEXT BOOK:

1. Silberschatz, Galvin, and Gagne, "Operating System Concepts", Sixth Edition, Wiley India Pvt Ltd, 2003.

REFERENCES:

1. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Pearson Education, 2004.
2. Gary Nutt, "Operating Systems", Third Edition, Pearson Education, 2004.
3. Harvey M. Deital, "Operating Systems", Third Edition, Pearson Education, 2004.

CS6402 DESIGN AND ANALYSIS OF ALGORITHMS

OBJECTIVES:

The student should be made to:

Learn the algorithm analysis techniques.
Become familiar with the different
Algorithm design techniques
Understand the limitations of
Algorithm power

UNIT –I INTRODUCTION

Week 1:

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms.

Week 2:

Unit Test – I

UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER

Brute Force - Closest-Pair and Convex-Hull Problems

Week 3:

Exhaustive Search - Traveling Salesman Problem - Knapsack Problem

Week 4:

Assignment problem.-Divide and conquer methodology – Merge sort – Quick sort –

Week 5:

Binary search - Multiplication of Large Integers – Strassen's Matrix Multiplication

Week 6:

Closest-Pair and Convex-Hull Problems – Unit Test – II

Week 7:

Unit –III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE

Computing a Binomial Coefficient – Warshall's and Floyd' algorithm

Week 8:

Optimal Binary Search Trees – Knapsack Problem and Memory functions - Greedy Technique– Prim's algorithm

Week 9:

Kruskal's Algorithm-Dijkstra's Algorithm-Huffman Trees.-

PRE MODEL EXAM

Week 10:

UNIT IV ITERATIVE IMPROVEMENT

The Simplex Method-The Maximum-Flow Problem

Week 11:

Maxim Matching in Bipartite Graphs- The Stable marriage Problem.

Week 12:

Unit Test – IV

UNIT V COPING WITH THE LIMITATIONS OF ALGORITHM POWER

Limitations of Algorithm Power-Lower-Bound Arguments

Week 13:

Decision Trees-P, NP and NP-Complete Problems--Coping with the Limitations - Backtracking – n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem-Branch and Bound

Week 14:

Assignment problem – Knapsack Problem – Traveling Salesman Problem- Approximation Algorithms for NP – Hard Problems – Traveling Salesman problem – Knapsack problem.

Week 15:

Unit Test – 5

Week 16:

Model Exam

Week 17:

Model Exam

TEXT BOOK:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.

REFERENCES:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.

2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
3. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.
4. http://nptel.ac.in/

EC6504 MICROPROCESSOR AND MICROCONTROLLER

OBJECTIVES:

The student should be made to:

Study the Architecture of 8086 microprocessor. Learn the design aspects of I/O and Memory interfacing circuits, study About communication and bus interfacing. Study the Architecture of 8051 microcontroller.

UNIT –I THE 8086 MICROPROCESSOR

Week 1:

Introduction to 8086 – Microprocessor architecture – Addressing

modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

Week 2:

Unit Test – I

UNIT II 8086 SYSTEM BUS STRUCTURE

8086 signals – Basic configurations System bus timing –System design using 8086 – IO programming

Week 3:

Introduction to Multiprogramming – System Bus Structure

Week 4:

Multiprocessor configurations – Coprocessor

Week 5:

Closely coupled and loosely Coupled configurations –

Week 6:

Introduction to advanced processors

Unit Test – II

Week 7:

Unit –III I/O INTERFACING

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer

Week 8:

Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control

Week 9:

LED display, LCD display, Keyboard display interface and Alarm Controller

PRE MODEL EXAM

Week 10:

UNIT IV MICROCONTROLLER

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits

Week 11:

Instruction set – - Addressing modes - Assembly language

programming

Week 12:

Unit Test – IV

UNIT V INTERFACING MICROCONTROLLER

Programming 8051 Timers - Serial Port Programming

Week 13:

Interrupts Programming – LCD & Keyboard Interfacing - ADC

Week 14:

DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

Week 15:

Unit Test – 5

Week 16:

Model Exam

Week 17:

Model Exam

TEXT BOOKS:

1. Yu-Cheng Liu, Glenn A.Gibson, "Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design", Second Edition, Prentice Hall of India, 2007.
2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Second Edition, Pearson Education, 2011

REFERENCE:

1. Doughlas V.Hall, "Microprocessors and Interfacing Programming and Hardware:,TMH, 2012

CS6403 SOFTWARE ENGINEERING

OBJECTIVES:

The student should be made to:

Understand the phases in a software project

Understand fundamental concepts of requirements engineering and Analysis Modelling. Understand the major considerations for enterprise integration and deployment.

Learn various testing and maintenance measures

UNIT -I SOFTWARE PROCESS AND PROJECT MANAGEMENT

Week 1:

Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models – Software Project Management: Estimation – LOC and FP Based Estimation, COCOMO Model – Project Scheduling – Scheduling, Earned Value Analysis - Risk Management.

Week 2:

Unit Test – I

UNIT II REQUIREMENTS ANALYSIS AND SPECIFICATION

Requirements: Functional and Non-Functional, User requirements

Week 3:

System requirements, Software Requirements Document – Requirement Engineering Process:

Week 4:

Feasibility Studies, Requirements elicitation and analysis, requirements,

Week 5:

validation, requirements management-Classical analysis: Structured system Analysis

Week 6:

Petri Nets- Data Dictionary

Unit Test – II

Week 7:

Unit –III SOFTWARE DESIGN

Design process – Design Concepts-Design Model– Design Heuristic - Architectural Design – Architectural styles, Architectural Design

Week 8:

Architectural Mapping using Data Flow- User Interface Design: Interface analysis, Interface Design.

Week 9:

Designing Class based components, traditional Components.

PRE MODEL EXAM

Week 10:

UNIT IV TESTING AND IMPLEMENTATION

Software testing fundamentals-Internal and external views of Testing-white box testing- basis path testing-control structure testing-black box testing

Week 11:

Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing And Debugging – Software Implementation Techniques**:** Coding practices-Refactoring.

Week 12:

Unit Test – IV

UNIT V PROJECT MANAGEMENT

Estimation – FP Based, LOC Based, Make/Buy Decision, COCOMO II

Week 13:

Planning – Project Plan, Planning Process, RFP Risk Management – Identification, Projection, RMMM - Scheduling and Tracking

Week 14:

Relationship between people and effort, Task Set & Network, Scheduling, EVA - Process and Project Metrics

Week 15:

Unit Test – 5

Week 16:

Model Exam

Week 17:

Model Exam

TEXT BOOK:

1. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Seventh Edition, Mc Graw-Hill International Edition, 2010.

REFERENCES:

1. Ian Sommerville, "Software Engineering", 9th Edition, Pearson Education Asia, 2011.
2. Rajib Mall, "Fundamentals of Software Engineering", Third Edition, PHI Learning Private Limited ,2009.
3. Pankaj Jalote, "Software Engineering, A Precise Approach", Wiley India, 2010.
4. Kelkar S.A., "Software Engineering", Prentice Hall of India Pvt Ltd, 2007.
5. Stephen R.Schach, "Software Engineering", Tata McGraw-Hill Publishing Company Limited, 2007.
6. http://nptel.ac.in/.

CS6411 NETWORKS LABORATORY

OBJECTIVES:

The student should be made to:

Learn socket programming.

Be familiar with simulation tools.

Have hands on experience on various networking protocols.

LIST OF EXPERIMENTS:

1. Implementation of Stop and Wait Protocol and Sliding Window Protocol.
2. Study of Socket Programming and Client – Server model
3. Write a code simulating ARP /RARP protocols.
4. Write a code simulating PING and TRACEROUTE commands
5. Create a socket for HTTP for web page upload and download.
6. Write a program to implement RPC (Remote Procedure Call)
7. Implementation of Subnetting .
8. Applications using TCP Sockets like
    a. Echo client and echo server
    b. Chat
    c. File Transfer
9. Applications using TCP and UDP Sockets like
    d. DNS
    e. SNMP
    f. File Transfer
10. Study of Network simulator (NS).and Simulation of Congestion Control Algorithms using NS
11. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
    i. Link State routing
    ii. Flooding
    iii. Distance vector

CS6412MICROPROCESSOR AND MICROCONTROLLER LABORATORY

OBJECTIVES:

The student should be made to:

Introduce ALP concepts and features Write ALP for arithmetic and logical operations in 8086 and 8051 Differentiate Serial and Parallel

Interface. Interface different I/Os with Microprocessors Be familiar with MASM

LIST OF EXPERIMENTS:

8086 Programs using kits and MASM

1. Basic arithmetic and Logical operations
2. Move a data block without overlap
3. Code conversion, decimal arithmetic and Matrix operations.
4. Floating point operations, string manipulations, sorting and searching
5. Password checking, Print RAM size and system date
6. Counters and Time Delay

Peripherals and Interfacing Experiments

7. Traffic light control
8. Stepper motor control
9. Digital clock
10. Key board and Display
11. Printer status
12. Serial interface and Parallel interface
13. A/D and D/A interface and Waveform Generation

8051 Experiments using kits and MASM

14. Basic arithmetic and Logical operations
15. Square and Cube program, Find 2's complement of a number
16. Unpacked BCD to ASCII

CS6413 OPERATING SYSTEMS LABORATORY

OBJECTIVES:

The student should be made to:

Learn shell programming and the use of filters in the UNIX environment. Be exposed to programming in C using system calls. Learn to use the file system related system calls. Be exposed to process creation and inter process communication. Be familiar with implementation of CPU Scheduling Algorithms, page replacement algorithms and Deadlock avoidance

LIST OF EXPERIMENTS:

1. Basics of UNIX commands.
2. Shell Programming.
3. Implement the following CPU scheduling algorithms

a) Round Robin b) SJF c) FCFS d) Priority

4. Implement all file allocation strategies
    a) Sequential b) Indexed c) Linked
5. Implement Semaphores
6. Implement all File Organization Techniques
    a) Single level directory b) Two level c) Hierarchical d) DAG
7. Implement Bankers Algorithm for Dead Lock Avoidance
8. Implement an Algorithm for Dead Lock Detection
9. Implement e all page replacement algorithms
    a) FIFO b) LRU c) LFU
10. Implement Shared memory and IPC
11. Implement Paging Technique of memory management.

Implement Threading & Synchronization Applications