
# SHIVAJI UNIVERSITY KOLHAPUR

REVISED SYLLABUS AND STRUCTURE

SECOND YEAR (B. Tech)

# Computer Science and Engineering

To be introduced from the academic year 2019-20

(i.e. from June 2019) onwards

**(Subject to the modifications will be made from time to time)**

| SECOD YEAR COMPUTER SCIENCE AND ENGINEERING - CBCS PATTERN | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEMESTER - III | | | | | | | | | | | | | | | | | | | | | | | |
| | | TEACHING SCHEME | | | | | | | | | EXAMINATION SCHEME | | | | | | | | | | | | |
| Sr. N0. | Course Subject / Title | THEORY | | | TUTORIAL | | | PRACTICAL | | | THEORY | | | | | PRACTICAL | | | TERMWORK | | | | |
| | | Credits | N0. Of Lectures | Hours | Credits | No.of Hours | Hours | Credits | No . of Hours | Hours | Hours | mode | marks | Total Marks | MIN. | Hours | MAX | MIN. | Hours | MAX | MIN. | | |
| 1 | BSC - CS301 Applied Maths | 3 | 3 | 3 | 1 | 1 | 1 | | | | | CIE | 30 | 100 | 40 | AS PER BOS GUIDELINES | | | AS PER BOS GUIDELINES | 25 | 10 | | |
| | | | | | | | | | | | | ESE | 70 | | | | | | | | | | |
| 2 | PCC- CS302 Discreate Mathematics & Structures | 3 | 3 | 3 | 1 | 1 | 1 | | | | | CIE | 30 | 100 | 40 | | | | | 25 | 10 | | |
| | | | | | | | | | | | | ESE | 70 | | | | | | | | | | |
| 3 | PCC- CS303 Data Structures | 3 | 3 | 3 | | | | | | | | CIE | 30 | 100 | 40 | | | | | | | | |
| | | | | | | | | | | | | ESE | 70 | | | | | | | | | | |
| 4 | PCC- CS304 Computer Networks - I | 3 | 3 | 3 | | | | 1 | 2 | 2 | | CIE | 30 | 100 | 40 | | 50 | 20 | | 25 | 10 | | |
| | | | | | | | | | | | | ESE | 70 | | | | | | | | | | |
| 5 | PCC- CS305 Microprocessors | 3 | 3 | 3 | | | | 1 | 2 | 2 | | CIE | 30 | 100 | 40 | | | | | 25 | 10 | | |
| | | | | | | | | | | | | ESE | 70 | | | | | | | | | | |
| 6 | PCC- CS306 C programming | 3 | 3 | 3 | | | | 2 | 4 | 4 | | | | | | | 50 | 20 | | 50 | 20 | | |
| 7 | HM- CS307 Soft Skills | | | | | | | 1 | 2 | 2 | | | | | | | 25 | 10 | | 25 | 10 | | |
| | ***Total*** | ***18*** | ***18*** | ***18*** | ***2*** | ***2*** | ***2*** | ***5*** | ***10*** | ***10*** | | | | ***500*** | | | ***125*** | | | ***175*** | | | |

| SEMESTER - IV | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | PCC-CS401 Automata Theory | 3 | 3 | 3 | | | | | | | | CIE<br>ESE | 30<br>70 | 100 | 40 | AS PER BOS GUIDELINES | | | AS PER BOS GUIDELINES | | |
| 2 | PCC- CS402 Computer Networks - II | 3 | 3 | 3 | | | | 1 | 2 | 2 | | CIE<br>ESE | 30<br>70 | 100 | 40 | | 50 | 20 | | 25 | 10 |
| 3 | PCC- CS403 Computer Organization and Architechture | 3 | 3 | 3 | | | | | | | | CIE<br>ESE | 30<br>70 | 100 | 40 | | | | | | |
| 4 | PCC- CS404 Operating Systems - I | 3 | 3 | 3 | 1 | 1 | 1 | | | | | CIE<br>ESE | 30<br>70 | 100 | 40 | | | | | 25 | 10 |
| 5 | PCC- CS405 Software Engineering | 3 | 3 | 3 | | | | | | | | CIE<br>ESE | 30<br>70 | 100 | 40 | | | | | | |
| 6 | PCC- CS406 Object Oriented Programming | 2 | 2 | 2 | | | | 2 | 4 | 4 | | | | | | | 50 | 20 | | 50 | 20 |
| 7 | PW- CS407 Mini Project | | | | | | | 1 | 2 | 2 | | | | | | | 50 | 20 | | 50 | 20 |
| 8 | MC-CS408 | 2 | 2 | 2 | | | | 1 | 2 | 2 | | CIE<br>ESE | 30<br>70 | 100 | 40 | | | | | | |
| | ***Total*** | ***19*** | ***19*** | ***19*** | ***1*** | ***1*** | ***1*** | ***5*** | ***10*** | ***10*** | | | | ***600*** | | | ***125*** | | | ***175*** | |
| | **Total** | **37** | **37** | **37** | **3** | **3** | **3** | **10** | **20** | **20** | | | | **1000** | | | **250** | | | **350** | |

CIE- Continuous Internal Evaluation

ESE – End Semester Examination

| | |
|---|---|
| • Candidate contact hours per week : 30 Hours (Minimum) | • Total Marks for S.E. Sem III & IV : **800 + 900 = 1700** |
| • Theory and Practical Lectures : 60 Minutes Each | • Total Credits for S.E. Sem III & IV : **51 (SEM-I: 25 + SEM – II: 25)** |
| • In theory examination there will be a passing based on separate head of passing for examination of CIE and ESE. | |
| • There shall be separate passing for theory and practical (term work) courses. | |

**Note:**

1. **BSC-CSE**: Basic Science Course – Computer Science and Engineering are compulsory.
2. **ESC-CSE:** Engineering Science Course - Computer Science and Engineering are compulsory.
3. **PCC-CSE** Professional Core Course – Computer Science and Engineering are compulsory.
4. **MC-CSE:** Mandatory Course - Environmental Studies which is compulsory for theory 70 marks and project work 30 marks.

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## BSC-CS301–Applied Mathematics

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory :** 3 Hrs/Week | **Term work:** 25 marks |
| | **Tutorial :** 1 Hrs/Week | **Theory :** 100 marks |
| | **Practical: --** | **Practical : --** |

**Prerequisite:** Basic probability, Statistics

**Course Objectives:**

1. To develop mathematical skills and enhance thinking power of students.
2. To give the knowledge to the students of fuzzy set theory, numerical methods probability and statistics with an emphasis on the application of solving engineering problems
3. To prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

**Course Outcomes:**

1. Upon successful completion of this course, the student will be able to:
2. Describe the statistical data numerically by using Lines of regression and Curve fittings.
3. Solve basic problems in probability theory, including problems involving the binomial, Poisson, and normal distributions.
4. Calculate numerical Integration.
5. Define fuzzy sets using linguistic words and represent these sets by membership functions, convexity, Normality, support, etc.
6. Solve examples on the principle in performing fuzzy number arithmetic operations such as Addition, Multiplication & fuzzy equation.
7. Solve assignment problems by using different techniques of operation research.

| Unit No. | Unit Name and Contents | No. of Lectures |
|---|---|---|
| 1. | **Correlation, Regression & Curve Fitting:**<br>1.1 Introduction<br>1.2 Karl Pearson's Coefficient of Correlation.<br>1.3 Lines of regression of bivariate data.<br>1.4 Fitting of Curves by method of Least-squares:<br>1.4.1 Fitting of Straight lines.<br>1.4.2 Fitting of exponential curves.<br>1.4.3 Fitting of second degree Parabolic curves. | 06 |
| 2. | **Probability Distribution:**<br>2.1 Random variables.<br>2.2 Discrete Probability distribution. | 06 |

2.3 Continuous probability distribution.
2.4 Binomial Distribution
2.5 Poisson Distribution.
2.6 Normal Distribution.

3. **Numerical Integration:**
3.1 Newton Cotes formulae.
3.2 Trapezoidal Rule.
3.3 Simpson's 1/3rd rule.
3.4 Simpson's $3/8^{th}$ rule.
3.5 Weddle's Rule. 06

4. **Introduction to Fuzzy sets:**
4.1 Crisp set and Fuzzy set.
4.2. Basic concepts of fuzzy sets.
4.3 Basic operations on fuzzy sets.
4.4 Properties of fuzzy sets 06

5. **Fuzzy Arithmetic:**
5.1 Fuzzy numbers.
5.2 Fuzzy cardinality.
5.3 Arithmetic Operations on Fuzzy numbers.
5.4 Solutions of Fuzzy equations of type A + X = B & A.X 06

6. **Assignment Problem:**
6.1 Definition, Balanced and Unbalanced assignment problem
6.2 Hungarian Method.
6.3 Balanced assignment problems.
6.4 Unbalanced assignment problems.
6.5 Traveling salesmen problem. 06

**REFERENCE BOOKS:**


1. Advance Engineering Mathematics by Erwin Kreyszig (Wiley India).
2. Mathematical Methods of Science and Engineering, by Kanti B. Datta (Cengage Learning)
3. Advanced Engineering Mathematics, 3e, by Jack Goldberg (Oxford University Press).
4. Engineering Mathematics by V. Sundaram (Vikas Publication).
5. Higher Engineering Mathematics, by B. S. Grewal (Khanna Publication Delhi).
6. Higher Engineering Mathematics, by B. V. Ramana (Tata McGraw-Hill).
7. Advanced Engineering Mathematics, by H. K. Das (S. Chand Publication).
8. Fuzzy Sets and Fuzzy Logic: Theory and Applications, by George J. Klir and Bo Yuan (Prentice Hall of India Private Limited).
9. Applied Mathematics by Navneet D. Sangle (Cengage Publication)

**General Instructions:**

1. For the term work of 25 marks, batch wise tutorials are to be conducted. The number of students per batch per tutorial should be as per University rules.
2. Number of assignments should be at least six (All units should be covered).

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## PCC-CS302– Discrete Mathematical Structures

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory :** 3 3 Hrs/Week | **Term work:** 25 marks |
| | **Tutorial :** 1 3 Hrs/Week | **Theory :** 100 marks |
| | **Practical:** .. credit | **Practical :** .. |

**Prerequisite:** Basic Mathematics

**Course Objectives:**

1. To expose the students to the mathematical logic related to computer science areas.
2. To enhance the problem solving skills in the areas of theoretical computer science.
3. To use mathematical concepts in the development of computer applications.

**Course Outcomes:**

Upon successful completion of this course, the student will be able to –

1. Apply logic concepts in designing a program.
2. Illustrate basic set concepts & apply operations on set.
3. Minimize the Boolean Function.
4. Apply basic concepts of probability to solve real world problem.
5. Represent data structures using graph concepts.
6. Design abstract machine, detect deadlocks.

1 **Mathematical Logic:** 10

Statements & Notations, Connectives, Statement Formulas & truth table, Well formed formulas, Tautologies , Equivalence of formulas, Duality law, Tautological Implications, Functionally complete set of connectives, Other connectives, Normal Forms, Theory of Inference for statement calculus.

2 **Set Theory:** 04

Basic concepts of set theory, Operations on Sets, Ordered pairs & n-tuples, Cartesian product

3 **Relations & Functions:** 06

Relations., Properties of binary relations., Matrix & Graph Representation of Relation., Partition & covering of Set., Equivalence Relations. , Composition of Binary Relation., POSET & Hasse Diagram., Functions, Types of Functions, Composition of functions..

4 **Algebraic Systems:** 06

Algebraic Systems: Examples & general properties., Semi groups & Monoids, Groups: Definitions & Examples, Subgroup & Homomorphism.

| | | |
|---|---|---|
| 5 | **Lattice and Boolean Algebra:**<br>Lattice as partially ordered sets., Lattice as Algebraic Systems., Special Lattices., Boolean Algebra: Definitions & examples, Boolean Functions., Representation & Minimization of Boolean Functions. | 08 |
| 6 | **Graph Theory:**<br>Basic concepts of graph theory., Paths, Reachability & Connectedness, Matrix Representations of Graphs., Storage Representation & Manipulations of Graphs. PERT & Related technologies. | 05 |

**Text Books:**

1. It should consist of minimum 10 to 12 assignments based on topics of syllabus & Exercise problems mentioned in text books.
2. 4 to 5 implementations of above assignments using 'C' programming language.

**Text Books:**

1. "Discrete Mathematical Structures with Application to Computer Science" by J. P. Tremblay & R. Manohar (MGH International)

**Reference Books:**

1. Discrete Mathematics - Semyour Lipschutz, MarcLipson (MGH), Schaum's outlines.
2. Discrete Mathematics and its Applications - Kenneth H. Rosen (AT&T Bell Labs) (mhhe.com/rosen)
3. Discrete Mathematical Structures – Bernard Kolman, Robert Busby, S.C.Ross and Nadeemur-Rehman (Pearson Education)

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## PCC-CS303 –Data Structures

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory:** 3 Hrs./ Week. | **Term work: --** |
| | **Tutorial: --** | **Theory:** 100 marks |
| | **Practical: --** | **Practical : --** |

**Prerequisite:** Logical Thinking

**Course Objectives:**

1. To make the students familiar with basic data structures.
2. To provide students with foundation in computer programming/ problem.
3. To teach the students to select appropriate data structures in computer applications.
4. To provide the students with the details of implementation of various data structures.

**Course Outcomes:**

Upon successful completion of this course, the student will be able to –

1. Identify the appropriate data structure for specific application.
2. Design and analyze programming problem statements.
3. Chose appropriate sorting and searching algorithms.
4. Outline the solution to the given software problem with appropriate data structure.

| | | |
|---|---|---|
| 1 | **Basic of Data Structures**<br>Data structure- Definition, Types of data structures, Data Structure Operations, Algorithms: Complexity, Time and Space complexity. | 03 |
| 2 | **Searching and Sorting Techniques**<br>Linear search, Binary search, Hashing – Definition, hash functions, Collision, Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort, Radix sort, Complexity and analysis. | 07 |
| 3 | **Stacks and Queues**<br>Stack: Definition, operations, Array representation of stack, applications Queue: Definition, operations, Array representation of queue, applications, Circular queue, Priority queue, Deque. | 07 |
| 4 | **Linked Lists**<br>Definition, representation, operations, implementation and applications of singly, doubly and circular linked lists. Linked representation of stack and Queue. | 06 |

5 **Trees**
Terminology, representation, binary tree, traversal methods, binary search tree, AVL search tree, B tree, B+ tree, Heaps- Operations and their applications, Heap sort. 06

6 **Graphs:**

Basic concept of graph theory, storage representation, graph traversal techniques- BFS and DFS, Graph representation using sparse matrix.

06

**TEXT BOOKS :**

1. Schaum's Outlines Data Structures – Seymour Lipschutz (MGH)

**REFERENCE BOOKS :**

1. Data Structure using C- A. M. Tanenbaum, Y. Langsam, M. J. Augenstein (PHI)
2. Data Structures- A Pseudocode Approach with C – Richard F. Gilberg and Behrouz A. Forouzon 2nd Edition

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

# PCC-CS304 –Computer Networks – I

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory : 3 Hrs. / Week** | **Term work: 25** |
| | **Tutorial : --** | **Theory : 100** |
| | **Practical: 2 Hrs./Week.** | **Practical : 50** |

**Prerequisite:**

**Course Objectives:**

1. To perceive fundamental concepts of Computer Networks
2. To understand layered architecture and basic networking protocols
3. To illustrate the TCP/IP protocol internal details

**Course Outcomes:**

Upon successful completion of this course, the student will be able to –

1. Graduates will understand the fundamental concepts of Computer Networks.
2. Graduates will have the ability to learn the OSI and TCP/IP layered architecture
3. Graduates will apply practical knowledge of network and data link layer.
4. Graduates will have ability to perceive TCP protocol in detail.
5. Graduates will have ability to analyze the protocol structure using network analyzing tools.
6. Graduates will apply the principals of socket programming in the networks.

| | | |
|---|---|---|
| 1 | **Introduction to Computer Network:**<br>Overview of OSI layer Model and TCP/IP protocol model, Addressing, Underlying technologies for LANs, WANs, and Switched WANs. | 05 |
| 2 | **Data Link Layer**<br>Design issues for Data Link Layers, Framing methods, Error control: detection and correction, Flow control, Elementary Data Link protocols, Sliding window Protocols, Go back n, Selective repeat. | 06 |
| 3 | **Medium Access Control Sub layer:**<br>Static and Dynamic channel allocation, Multiple Access protocols ALHOA, CSMA, Collision Free Protocols, Ethernet: IEEE 802.3, IEEE 802.4, IEEE 802.5 standards, Wireless LANS 802.11 standards | 06 |
| 4 | **Network Layer:**<br>IPv4 Addresses: Classful Addressing Other Issues, Sub-netting and Super netting, Class less Addressing, Delivery, Forwarding and routing; Routing methods: | 06 |

| | | |
|---|---|---|
| | Shortest path, Link state, Distance vector routing and broadcast routing, Congestion control algorithms: Principles, Congestion prevention policies, congestion control in datagram subnet, Load Shedding, Jitter Control. | |
| 5 | **Internet Protocol:**<br>IP Datagram format, Fragmentation and reassembly models, ARP, RARP, ICMP, IGMP | 08 |
| 6 | **Transport Layer:**<br>The Transport service primitives,<br>UDP: Process to Process communication, User Datagram Format, Operation and uses of UDP.<br>TCP: TCP Services and Features, TCP segment format, TCP Connections, Flow and error<br>control in TCP, TCP Timers; Berkeley Sockets: Socket Addresses, Elementary Socket system calls byte ordering and address conversion routines, connectionless iterative server, connection oriented concurrent server, TCP and UDP Client server Programs. | 08 |

**TERM WORK**

1. Study and demo of LAN, WAN and various connecting devices and components List out component and devices required for a std. LAN, WAN
2. Study, design and configuration of IEEE 802.3 Ethernet and IEEE 802.11 Wireless LANs (Referring RFCs)
3. Study of following connectivity test tools with all its options –
   - ifconfig, arp, route, traceroute
   - nmap, netstat, finger
4. Implementing Framing methods
5. Implementing Elementary data link protocol (Stop & wait protocol)
6. Implementation of Error detection (CRC) code
7. Implementation of Error detection codes (Hamming)
8. Programs to understand IP addressing, classful & classless addressing
9. Implementation of sliding window protocol.
10. Implement shortest path routing algorithm.
11. Programs for connection oriented (TCP) client-server using socket programming
12. Programs for connection less (UDP) client-server using socket programming
13. Study of network protocol analyzer (Ethereal or Wire-Shark) and understanding packet formats for UDP, TCP, ARP, ICMP protocols.

**INTRUCTIONS FOR PRACTICAL EXAMINATIONS :**

Term Work: It should consist of 10-12 experiments based on the syllabus and should be implemented by using Socket Programming. The study experiments should consist of some practical work and observations.

**TEXT BOOKS :**

1. TCP/IP protocol suit 4th Ed. – Behrouz A. Forouzen (Tata Mag. Hill)
2. Computer Networks – Andrew S. Tanenbaum (PHI)
3. Unix Network Programming – W. Richard Stevens (PHI)

**REFERENCE BOOKS*:***

1. TCP/IP Illustrated, The Protocols, Vol. I – W. Richard Stevens, G. Gabrani (Pearson Education.)
2. Internetworking with TCP/IP, Vol. I Principles, Protocols, and Architectures – D. E. Comer (Pearson Ed.)
3. Internetworking with TCP/IP, Vol. III, Client-Server Programming and Application (2nd Ed.) – D. E. Comer, David L. Stevens (Pearson Ed.)

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## PCC-CS305 – Microprocessors

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory:** 03 Hrs / Week | **Term work:** 25 marks |
| | **Tutorial:** -- | **Theory:** 100 marks |
| | **Practical:**02 Hrs / Week | **Practical : --** |

**Prerequisite:** Fundamental of Electronics and Basic Computer

**Course Objectives:**

1. To learn the Architecture and Basic Programming model.
2. To give the hands on experience of Assembly language programming for 8085 and 8086 Microprocessors
3. Differentiate between Microprocessors and Microcontrollers
4. To differentiate the microprocessor family.

**Course Outcomes:**

Upon successful completion of this course, the student will be able to –

1. Describe the Architecture of 8085 microprocessors and microcontroller
2. Classify the 8086 Assembly Instructions set and use in Assembly language Programs
3. Explain Programming model's of 8086 microprocessors
4. Classify the 8086 Assembly Instructions set and use in Assembly language Programs
5. Understand the higher processor architecture
6. Understand the need for other Microprocessors

| | | |
|---|---|---|
| 1 | Architecture of 8085<br>(Ref 2.2 from N. Senthil Kumar)<br>Classification of Instructions, Instruction set of 8085<br>(Ref 3.2,3.3 from N. Senthil Kumar)<br>Introduction to 8051 Microcontrollers<br>(Ref 9.2,9.3,9.4,9.5 from N. Senthil Kumar | 06 |
| 2 | The Microprocessor and its Architecture:<br>a) Internal Microprocessor Architecture b) Real Mode Addressing<br>Addressing Mode:<br>a) data Addressing Mode b) Program Memory Addressing Mode<br>c) Stack memory Addressing mode. (Ref. Bary B Brey : 2.1,2.2,3.1.3.2,3.3). | 06 |
| 3 | Data movement Instruction , PUSH and POP , Load Effective Address<br>String Data Transfer<br>Arithmetic Instruction:<br>a) Addition b) Subtraction c)Comparison d) Multiplication e) Division<br>BCD & ASCII Arithmetic, Assembler Details , (Ref. Bary B Brey : 4.2,4.3,4.7,5,1,5.2,5.3) | 06 |
| 4 | Logic & Program Control Instruction: | 06 |

| | | |
|---|---|---|
| | a) Basic Logic Instruction<br>Shift & Rotate, Jump Group and Procedures<br>Machine Control & Miscellaneous Instructions<br>Basic Interrupt Processing, Hardware Interrupts<br>(RefBary B Brey : 5.4, 5.5,6.1,6.3,,6.5,12.1,12.2) | |
| 5 | 80386 Microprocessor:<br>a) Introduction to Protected Mode memory Addressing<br>b) Memory Paging Mechanism<br><br>Introduction to 80386 Microprocessor, The Memory System<br>Special 80386 Registers<br>80386 Memory Management , Virtual 8086 Mode<br>(Ref. Bary B Brey : 2.3,2.4,17.1,17.2,17.3,17.4,17.5) | 06 |
| 6 | Pentium, Pentium Pro and Pentium 5 Microprocessor:<br>a) Introduction to Pentium Microprocessor, The memory System<br>b) Special Pentium Registers c) Pentium Memory Management<br>Introduction to Pentium Pro Microprocessor,<br>Internal Structure of the Pentium Pro, The Memory System<br>The Pentium 4 and Core2, Memory Interface, Register Set<br>,Hyper Threading Technology, Multiple Core technology, CPUID<br>(Ref. Bary B Brey : 18.1,18.2,18.3,18.5,19.4) | 06 |

**Experiment List:**

**Experiment no. 1**

**Title** - Number system and logic gate

**Aim** - To convert different number forms like decimal to binary, octal to hexadecimal & vice versa & also study of logic gates.

**Experiment no. 2**

**Title -** Study & practical demonstration of 8085 ANSHUMAN kit

**Aim** - 1 ) Perform hands on experiment for use of 8085 kit.

2 ) Storing and observing the content stored at different registers and memory location

3 ) By using ANSHUMAN kit executing different 8085 programs.

**Experiment no. 3**

**Title** - Practical demonstration of 8085 programs involving data transfer and arithmetic instruction set.

**Aim** - To study different instruction set which include -

1 ) data transfer instruction like MOV, MVI, LDA, STA, etc.

2 )Arithmetic instruction like ADD, ADC, SUB, SBB, etc.

**Experiment no. 4**

**Title** - Practical demonstration of 8085 programs involving logical and bit manipulation instruction set.

**Aim** - To study the implementation of instruction set which involves logical instruction like AND, OR, EX-OR, 1's compliment, 2'complement & also bit manipulation and rotate instruction.

**Experiment no. 5**
**Title** - Practical demonstration of 8086 programs involving branch instruction and machine control instruction set.
**Aim** - To study different branch instruction like conditional & unconditional branch instruction, machine control instruction like HALT, NOP, etc.

**Experiment no. 6**
**Title**- Practical demonstration of DOS debugs utility.
**Aim** - 1 ) Demonstrate different debug commands & utilities & use it.
2) Writing 8086 assembly program using debug and execute.

**Experiment no.7**
**Title**- Use of assembler directive and find the count and the sum of even, odd numbers from the given array.
Aim- 1) Practical use of assembler directive db, dup, offset.
2) Use of the shift instruction.

**Experiment no.8**
**Title-** Practical demonstration of string data transfer instructions and use of Db directive for declaration of 2-D array
**Aim-** 1) Demonstrate declaration of 2D array using DB directive.
2) Practical of using string instructions.

**Experiment no.9**
**Title**- Practical demonstration of Dos interrupt to read char from keyboard and display on the screen.
**Aim**- To use Dos interrupt to read char from keyboard and display on to the screen.

**Experiment no.10**
**Title**- Practical demonstration of basic logic instruction, shift and rotate instruction and BCD and ACSII arithmetic instructions.
**Aim**- 1) Practical Demonstration of different basic logic instruction and shift rotate instructions.
2) Demonstration of BCD and ASCII arithmetic

**Experiment no.11**
**Title**- Study of 80386 memory management
**Aim**- To study the memory management unit of 80386 processor which include address calculation, descriptor and paging mechanisms.

**Experiment no.12**
**Title**- To study of Pentium and Pentium 4 microprocessor
***Aim-*** To study the internal architecture of Pentium pro and special register of Pentiu

**TEXT BOOKS :**

1. The INTEL Micriprocessors ; Architecture,Programming and Inerfacing By Barry B Brey ( 8th Edition)

2. Micriprocessorsand Microcontrollers- N.Senthi Kumar, M, Saravanam And S Jeevananthan (Oxford University Press)

REFERENCE BOOKS:

1. Micrcroprocessor Aarchitecture ,Programming and Application with 8085 By Ramesg Gaonkar
2 The Microcomputer Systems:the 8086.8088 Family By  Yu Chenn A . Gibson ( PHI Ltd)

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## PCC-CS306 – C Programming

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory :** 3 Hrs / Week | **Term work:** 50 marks |
| | **Tutorial :** | **Theory :** -- |
| | **Practical:** 4 Hrs. / Week | **Practical :** 50 marks |

**Prerequisite:** Basic knowledge of Electronics and Computers

**Course Objectives:**

1. To make the student learn a programming language.
2. To learn problem solving techniques.
3. To teach the student to write programs in C and to solve the problems.

**Course Outcomes:**

Upon successful completion of this course, the student will be able to –

1. Articulate the principles of procedure oriented problem solving and programming.
2. Explain programming fundamentals including statements, control flow and recursion
3. Able to formulate problems and implement algorithms in C . .
4. Analyze and use data structures to solve the complex problem statements. .
5. Demonstrate file operations using file handling concepts through developing applications.

| | | |
|---|---|---|
| 1 | **Introduction to C:**<br>The Form of a C Program, The Library and Linking, Separate Compilation, Compiling a C Program, C's Memory Map; Expressions – The Basic Data Types, Modifying the Basic Types, Identifies Names, Variables, The Four C Scopes, Type Qualifiers-const, volatile, Storage Class Specifiers; Statements - Selection Statements, Iteration Statements, Jump Statements, Expression Statements, Block Statements. | 6 |
| 2 | **Console I/O & Basics of Array and Strings.**<br>Console I/O: Reading and Writing Characters, Reading and Writing Strings, Formatted Console I/O, printf(), scanf(), Suppressing Input.Arrays and Strings- Two-Dimensional Arrays, Arrays of Strings, Multidimensional Arrays, Array Initialization, Variable-Length Arrays. | 6 |
| 3 | **Functions:**<br>The General Form of a Function, Understanding the Scope of a Function, Parameter passing, Passing arrays to functions, Function Arguments, argc and argv-Arguments to main(),The return Statement, What Does main( ) Return?, Recursion, Function Prototypes, Declaring Variable Length Parameter Lists, The inline Keyword. | 6 |

| | | |
|---|---|---|
| 4 | **Pointers:**<br>What Are Pointers?, Pointer Variables, The Pointer 0perators, Pointer Expressions, Pointers and Arrays, Arrays of Pointers, Multiple Indirection, Initializing Pointers, Pointers to Functions and structures, C's Dynamic Allocation Functions, restrict-Qualified Pointers, Problems with Pointers. | |
| 5 | **Structures, Unions, Enumerations, and typedef :**<br>Structures, Arrays of Structures, Passing Structures to Functions, Structure Pointers, Arrays and Structures Within Structures, Unions, Bit-Fields, Enumerations, Using sizeof to Ensure Portability, typedef . | 6 |
| 6 | **File I/O :**<br>File I/O, Standard C vs. Unix File I/O, Streams and Files, File System Basics, fread( ) and fwrite(), fseek() and Random-Access I/O, fprintf( ) and fscanf(), The Standard Streams. | 6 |

**Instructions for Practical Examinations:**

It should consist of minimum 10-12 experiments based on the syllabus and concepts mention below. Students of different batches should implement different programs. Student should perform at least 5 Practical's on Turbo C and Remaining on GCC.

**List of Experiments**

1. Branching Statements
2. Looping
3. Arrays
4. Functions
5. Storage Class.
6. Structures.
7. Implementation of STACK.
8. Implementation of QUEUE.
9. Implementation of LINKED LIST.
10. Copy Contents of one file to another file.
11. Implementation of GRAPH.
12. Implementation of TREE.

**Breakup of term work marks:**

- MCQ Test to check the C Programming Skills -10 Marks.
- Mid-semester Practical test – 10 Marks.
- End-semester Practical test – 10 Marks.
- Practical performance – 20 Marks.

**TEXT BOOKS :**

1. C the Complete Reference by Herbert Schild (Tata McGraw Hill) 4th Edition.

2. The C Programming Language- Brian W. Kernighan, Dennis Ritchie 2nd Edition.

**REFERENCE BOOKS:**

1. Programming in ANSI C by E. Balaguruswamy.(Tata McGraw Hill)4th Edition.
2. Let Us C By Yashavant P. Kanetkar, 5th Edition.

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## HM-CS307– SOFT SKILLS

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory :** | **Term work:** 25 Marks |
| | **Tutorial :** | **Theory :** -- |
| | **Practical:** 2 Hrs. / Week | **Practical :** 25 Marks |

**Prerequisite:**

**Course Objectives:**

1. To make the engineering students aware of the importance, the role and the content of soft skills through instruction, knowledge acquisition, demonstration and practice.
2. To develop and nurture the soft skills of the students through individual and group activities.
3. To expose students to right attitudinal and behavioral aspects and to build the same through activities
4. To encourage the all round development of students by focusing on soft skills.

**Course Outcomes:**

Upon successful completion of this course, the student will be able to –

1. Effectively communicate through verbal/oral communication and improve the listening skills
2. Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
3. Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.

| | |
|---|---|
| 1 | Understanding Communication Skills: Verbal Communication - Effective Communication - Active listening – Articulation Paraphrasing – Feedback<br>➢ Non- Verbal Communication - Body Language of self and others |
| 2 | Behavioral Skills /Self Development: SWOT Analysis, Confidence improvement, values, positive attitude, positive thinking and self esteem. |
| 3 | Leadership and Team Building<br>➢ Culture and Leadership- Salient Features of Corporate Culture, Leadership Styles, Leadership Trends<br>➢ Team Building- Team Development Stages, Types of Teams, Attributes of a successful team – Barriers involved |
| 4 | Developing Writing skills<br>➢ E-mail writing, report writing, resumes writing, practice. |
| 5 | Stress and Time Management<br>➢ Stress in Today‘s Time- Identify the Stress Source, Signs of Stress, Ways to Cope with Stress.<br>➢ Healthier Ways to Combat Stress, Steps to be taken in the Organizations: Open communication, Time Management, Working towards Your Goals, Smart Work, Prioritize your Tasks |
| 6 | Professional Skill<br>➢ Ethics, Etiquette and Mannerism-All types of Etiquette (at Meetings, Etiquette at Dining. Involuntary Awkward Actions, Public Relations Office(PRO)‘s Etiquettes)<br>➢ Technology Etiquette: Phone Etiquette, Email Etiquette, Social Media Etiquette, Video Conferencing Etiquette, Interview Etiquette.<br>➢ Dressing Etiquettes: for Interview, offices and social functions.<br>➢ Ethical Values: Importance of Work Ethics, Problems in the Absence of Work |

| | |
|---|---|
| | Ethics. |

**TERM WORK:**

1. The instructor shows videos to enhance skills supporting career aspects and discussion about same videos. Multiple set of observations based on videos can be prepared by students.
2. Multiple set of activity based assignments can be prepared to allow multiple skills exposure for example a group task encouraging discussions, team building, value sharing, leadership and role play all at the same time. Every student must be given adequate opportunity to participate actively in each activity.
3. Each student will write one report based on visit / project / business proposal etc.
4. Faculty may arrange one or more sessions from following: Yoga and Meditation. Stress management, relaxation exercises, and fitness exercises. Time management and personal planning sessions.
5. The student must prepare the journal in the form of report elaborating the activities performed in the lab. Continuous assessment of laboratory work is to be done based on overall performance and lab assignments performance of student. Each lab assignment assessment will assign grade/marks based on parameters with appropriate weightage. Suggested parameters for overall assessment as well as each lab assignment assessment include- timely completion, performance, punctuality, neatness, enthusiasm, participation and contribution in various activities-SWOT analysis, presentations, team activity, event management, group discussion, Group exercises and interpersonal skills and similar other activities/assignments.

**TEXT BOOKS :**

1. Developing Communication Skills by Krishna Mohan and Meera Banerji; MacMillan India Ltd., Delhi
2. Gajendra Singh Chauhan, Sangeeta Sharma: Soft Skills – An Integrated Approach to Maximize Personality, WILEY INDIA, ISBN:13:9788126556397
3. Essentials of Effective Communication, Ludlow and Panthon; Prentice Hall of India.

**REFERENCE BOOKS:**

1. Indrajit Bhattacharya, ―An Approach to Communication Skills‖, Delhi, Dhanpat Rai, 2008.
2. Seven Spiritual Laws of Success - Deepak Chopra
3. Simon Sweeney, ―English for Business Communication‖, Cambridge University Press, ISBN 13:978-0521754507.

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## PCC-CS-401– Automata Theory

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory :** 3 Hrs/Week | **Term work:** 25 marks |
| | **Tutorial :** 1 Hrs/Week | **Theory :** 100 marks |
| | **Practical: --** | **Practical : --** |

**Prerequisite:** Basic Mathematical Concepts, Sets, graphs.

**Course Objectives:**

1. To introduce students to the mathematical foundations of computation, the theory of formal languages and grammars
2. To strengthen the students' ability to understand and conduct mathematical proofs for computations
3. To make the students understand the use of automata theory in Compliers & System Programming.
4. To analyze and design finite automata, pushdown automata, grammars & turing machines

**Course Outcomes:**

Upon successful completion of this course, the student will be able to –

1. Understand basic concepts of Regular Language and Regular Expressions
2. Select appropriate abstract machine to recognize a given formal language.
3. Generate complex languages by applying Union, Intersection, Complement, Concatenation and Kleene * operations on simple languages.
4. Apply parsing concepts for syntax analysis.
5. Be familiar with thinking analytically and intuitively for problem solving situations in related areas of theory in computer science.

| | | |
|---|---|---|
| 1 | **Regular Languages and Finite Automata**<br>Proofs, Recursive Definitions, Regular expressions and regular languages, Finite Automata, unions, intersection & complements of regular languages, Applications of FA | 7 |
| 2 | **Nondeterminism and Kleene's Theorem**<br>Nondeterministic finite automata, NFA with null transition, Equivalence of FA's, Kleene's Theorem (Part I & Part II), Minimal Finite Automata | 6 |
| 3 | **Context free Grammars**<br>Definition, Union, Concatenation and Kleene *'s of CFLs, Derivation trees and ambiguity, Simplified forms and normal forms | 5 |
| 4 | **Parsing and Pushdown Automata** | 6 |

Definition of Pushdown Automata, Deterministic PDA, Equivalence of CFG's & PDA's, Top down parsing, bottom up parsing.

**Context free languages**

5 CFL's and non CFL's**,** Pumping Lemma, intersections and complements of CFLs 5

**Turing Machines**

6 Definition, TM as language acceptors, combining Turing Machines**,** Computing partial function with a TM, Multi-tape TMs, and Universal TM 7

**Term work:**

- It should consist of minimum 10-12 assignments based on topics of syllabus, exercise problems from the textbooks.
- 3-4 assignments should be implemented using programming language.

**Text Books:**


1. Introduction to Languages & the Theory of Computations - John C. Martin (Tata MGH Edition)
2. Discrete Mathematical Structures with applications to Computer Science - J .P. Trembley & R. Manohar (MGH)


**Reference Books:**


1. Introduction to Automata Theory, Languages and computation - John E. Hopcraft, Raje
2. Motwani, Jeffrey D. Ullman (Pearson Edition)
3. Introduction to theory of Computations - Michael Sipser (Thomson Books/Cole)
4. Theory of Computation - Vivek Kulkarni
5. Theory of Computation A problem Solvin

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## PCC-CS-402– Computer Networks-II

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory :** 3 Hrs/Week | **Term work:** 25 marks |
| | **Tutorial : __** | **Theory :** 100 marks |
| | **Practical:** 2 Hrs/Week | **Practical :** 50 Marks |

**Prerequisite:** Computer Network-I.

**Course Objectives:**

1. To understand the Client server model & socket interface
2. To perceive IPv6 addressing and protocol
3. To explain and learn basic internet technology protocols
4. Simulate protocols using software tools.

**Course Outcomes:**

Upon successful completion of this course, the student will be able to –

1. Graduates will be able to program the client server model using sockets
2. Graduates will understand and apply next generation protocol and addressing model
3. Graduates will elaborate the fundamentals of Domain Name Systems
4. Graduates will apply the concepts of Remote login and FTP in network applications
5. Graduates will learn fundamentals of web, HTTP and e-mail communication protocols.
6. Graduates will understand multimedia streaming and relevant protocols.

| | | |
|---|---|---|
| 1 | **Client server model & socket interface:**<br>The Socket Interface, The Client Server model and Software design, Concurrent processing in client-server software, Algorithms and issues in Client-Server design, Multiprotocol Servers, Multiservice Servers, Concurrency in clients, Unix Internet Super server (inetd). | 6 |
| 2 | **Next Generation IPv6 and ICMPv6:**<br>IPV6 addresses, packet format, ICMPV6, Transaction from IPV4 to IPV6 | 5 |
| 3 | **BOOTP, DHCP and Domain name system:**<br>Name Space, Domain Name Space, Distribution of name space, and DNS in internet, Resolution, DNS massages, Types of records, Compression examples, and encapsulation.<br>BOOTP, DHCP | 6 |
| 4 | **Remote Login: TELNET and File Transfer FTP, TFTP:**<br>Concept, NVT, Embedding, Options & options/sub-option negotiation, controlling | 6 |

| | | |
|---|---|---|
| | the server, Out-of-band signaling, Escape charter, Mode of operation, user interface. **FTP:** Connections, Communication, Command processing, File transfer, User interface, Anonymous FTP, TFTP. | |
| | **Web Applications Service Protocols:** | |
| 5 | HTTP: Architecture, Web Documents, HTTP Transaction, Request and Response, HTTP Headers and Examples, Persistent Vs Non- Persistent HTTP, Proxy servers. **Electronic Mail:** Architecture, User agent, addresses, Delayed delivery, SMTP commands and responses, Mail transfer phases, MIME, POP3 | 7 |
| | **Multimedia In Internet:** | |
| 6 | Streaming stored audio/video, Streaming live audio/video, Real time interactive audio/video, Real Time Transport Protocol (RTP), Real Time Transport Control Protocol (RTCP), Voice Over IP (VoIP), Session Initiation Protocol (SIP) | 6 |

**Term work:**

It should consist of minimum 8 - 10 experiments based on the following guidelines

a. Client program using UDP to connect to well known services (echo, time of the day service etc.).
b. Implementing concurrent TCP multiservice client/server.
c. Implementing Iterative UDP client/server.
d. Study of following DNS Tools with all its options. nslookup, dig, host, whois.
e. Implement trivial file transfer protocol (TFTP).
f. Configuration of basic services for FTP,HTTP,Telnet etc. on Linux Platform
g. Write program to send a mail using SMTP commands and receive a mail using POP3 commands.
h. Capturing & Analyzing operation of various application layer protocols using network protocol analyzer. (Wireshark and tcpdump)
i. Study of various streaming multimedia protocols in Internet (Using various audio/video streaming services on the Internet)

**Text Books:**

1. TCP/IP Protocol Suite by Behrouz A. Forouzan McGraw-Hill Publication, 4th Edition.
2. Computer Networks by Andrew S Tanenbaum.

**Reference Books:**

1. Data Communications and Networking by Behrouz A Forouzan
2. Internetworking with TCP/IP by Douglas Comer
3. Computer Networking: A Top-Down Approach by Jim Kurose

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## PCC-CS-403–Computer Organization and Architecture

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory :** 3 Hrs/Week | **Term work:** -- |
| | **Tutorial : __** | **Theory :** 100 marks |
| | **Practical:** -- | **Practical :** -- |

**Prerequisite:** Basic Computer and Microprocessor

**Course Objectives:**

1. To provide a high-level overview of Computer organization.
2. To discuss the basic of I/O addressing and access.
3. To make the students aware of overall design and architecture of computer and its organization.
4. To analyze performance issues in processor and memory design of a digital computer.

**Course Outcomes:**

Upon successful completion of this course, the student will be able to –

1. Students will be able to recapitulate the history of computer system and the basic concepts of computer architecture and organization.
2. Students will be able to understand the concept of I/O organization.
3. Students will able to apply the different algorithms to perform arithmetic operations.
4. Students will be able to articulate the design issues in the development of processor.
5. Students will be able to conceptualize instruction level parallelism.
6. Students will be able to understand the concept of memory techniques.

| | | |
|---|---|---|
| 1 | **Computer Evolution and Performance**<br>Evolution of computer – Mechanical Era: Babbage's Difference Engine, Electronic Era: First generation, IAS Computers, Instruction Set and Instruction Execution, Second generation, Input-Output Operation, Programming Language, Third generation and VLSI Era - IC Circuits, Performance Consideration and Measures, Speed up Techniques, Difference between RICS and CISC. | 5 |
| 2 | **Input and Output Organization**<br>Accessing I/O devices, Direct Memory Access (DMA), Buses: Synchronous Bus and Asynchronous Bus, Interface Circuits, Standard IO Interface. | 6 |
| 3 | **Arithmetic**<br>Addition and Subtraction of Signed Numbers, Design of fast Adders, Multiplication of Positive numbers , Signed Operand Multiplication, Fast Multiplication, Integer Division, Floating Point Number Operations: IEEE 754 Floating Point Format, Arithmetic Operations | 8 |
| 4 | **The Processing Unit**<br>Some fundamental Concepts, Execution of complete Instruction, Multiple bus organization, Hardwired control, Microprogrammed Control | 6 |

**Pipelining**

| | | |
|---|---|---|
| 5 | Basic Concepts: Role of Cache Memory, Pipeline Performance. Data Hazards: Operand Forwarding, Handling Data Hazards in Software and Side Effects and Instruction Hazards: Unconditional Branches and Conditional Branches and Branch Prediction | 5 |

**Computer Memory System**

| | | |
|---|---|---|
| 6 | Some Basic Concepts, Types of Memories :ROM and RAM, Semiconductor RAM memory, Cache Memories: Mapping functions, Replacement Algorithms, Example of Mapping Techniques | 6 |

**Text Books:**


1. Computer Architecture and Organization-John P Hayes (MGH) 3rd Edition
2. Computer Organization – Carl Hamacher , Zvonko Vranesic and Safwat Zaky . Publisher: Tata McGraw Hill. 5th Edition.


**Reference Books:**


4. Computer Systems Organization & Architecture – John D. Carpinelli (Pearson Education)
5. http://cse.stanford.edu/class/sophomore-college/projects-00/risc/risccisc/(RISC vs CISC)
6. http://www.cpu-world.com/sspec/

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## PCC-CS-404– Operating System I

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory :** 3 Hrs/Week | **Term work:** 25 marks |
| | **Tutorial :** 1 Hrs/Week | **Theory :** 100 marks |
| | **Practical: --** | **Practical :** -- |

**Prerequisite:** Computer Network-I.

**Course Objectives:**

1. To make the students understand basic concepts of operating system
2. To expose the students to various functions of the Operating system and their usage
3. To give hands on exposure to Linux commands and system calls.

1 **Overview of OS** — 6

1.1. Abstract view of an operating system
1.2 Fundamental principles of OS operations
1.3 OS interaction with the computer and user programs
1.4 Efficiency ,system performance and user service
1.5Batch Processing System
1.6 Multiprogramming System
1.7 The Time Sharing System
1.8 The Real Time Operating System
1.9 Distributed operating system
1.10 Operation of OS, Operating system with monolithic structure
1.11Virtual machine operating system
1.12Kernel based operating system, Microkernel based operating system

2 **Processes, Threads and Synchronization** — 6

2.1 Processes and programs
2.2 Implementing processes
2.3 Threads
2.4 Process synchronization
2.5 Race condition, Critical Section, Synchronization approaches
2.6 Classic process synchronization problems
2.7 Semaphores, Monitors

3 **Process Scheduling** — 6

3.1 Scheduling terminology and concepts
3.2 Non preemptive scheduling policies
3.3 Preemptive scheduling policies

| | | |
|---|---|---|
| | 3.4 Long, Medium and short term scheduling | |
| | **Deadlock** | |
| 4 | 4.1 What is deadlock<br>4.2 Deadlock in resource allocation<br>4.3 Handling Deadlocks : Deadlock Detection and Resolution<br>4.4 Deadlock prevention<br>4.5Deadlock avoidance | 6 |
| | **Memory Management** | |
| 5 | 5.1 Managing the memory hierarchy<br>5.2 Static and Dynamic Memory Allocation<br>5.3 Heap Management<br>5.4 Contiguous Memory Allocation and Non Contiguous Allocation<br>5.5 Segmentation and Segmentation with paging<br>5.6 Virtual memory basics, Demand paging<br>5.7Page replacement policies | 6 |
| | **File systems and I/O systems** | |
| 6 | 6.1Overview of file processing<br>6.2Files and file operations<br>6.3Fundamental file organizations and access methods<br>6.4 Layers of the Input Output control system<br>6.5 Overview of I/O system | 6 |

**Term work:**

The tutorials should be conducted on the following guidelines.

1. Six assignments should be based on theoretical / analytical concepts, preferably from the exercises of the books covering all topics of the syllabus.
2. Four assignments should on usage of Unix / Linux commands and system calls concerned with General purpose utilities, file system, handling ordinary files, basic file attributes, the Shell, the Process and Filters using regular expressions as mentioned in the reference book at serial no. 1.
3. Installation of any two operating system using VMware.
   These assignments should be practically conducted during the tutorial sessions.

**Text Books:**


1. Operating Systems -A Concept Based approach -Dhananjay M Dhamdhere (TMGH).3rd edition.
2. Operating System Concepts -Abraham Silberschatz, Peter B. Galvin & Grege Gagne (Wiley)


**Reference Books:**


1. Unix Concepts and Applications –Sumitabha Das (TMGH).
2. Operating System: Concepts and Design -Milan Milenkovic ( TMGH)
3. Operating System with case studies in Unix, Netware and Windows NT -Achyut S. Godbole (TMGH).

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## PCC-CS-405– Software Engineering

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory :** 3 Hrs/Week | **Term work:** -- |
| | **Tutorial :** -- | **Theory :** 100 marks |
| | **Practical: --** | **Practical :** -- |

**Course Objectives:**

1. To expose the students to basic concepts & principles of software engineering.
2. To make the student aware of the importance of SDLC in their project development work.
3. To expose the students to software testing techniques and software quality management.

**Course Outcomes:**

1. Comprehend systematic methodologies of SDLC(Software Development Life Cycle)
2. Discriminate competing and feasible system requirements indicating correct real world problem scope and prepare stepwise system conceptual model using stakeholder analysis and requirement validation.
3. Prepare SRS document for a project
4. Apply software design and development techniques
5. Develop a quality software project through effective team-building, planning, scheduling and risk
6. Understand testing methods at each phase of SDLC

1 **Unit 1: The software Problem**
1.1 Cost, Schedule & Quality
1.2 Scale and Change 6
1.3 Software Processes: Process & Project, Component Software Processes, Software
Development process Models, Project Management Process.

2 **Software Requirements Analysis & specification** 5
2.1 Value of Good SRS
2.2 Requirement Process
2.3 Requirements Specification
2.4 Other Approaches for Analysis
2.5 Validation

3 **Software Planning & Scheduling** 6

3.1 Responsibilities of Software Project Manager
3.2 Project Planning
3.3 Project Scheduling
3.4 Project Staffing
3.5 People CMM
3.6 Risk Management

4 **Design** 6
4.1 Design Concepts
4.2 Function Oriented Design
4.3 Object Oriented Design
4.4 Detail Design
4.5 Verification
4.6 Metrics

**Coding & Testing**
5 5.1 Coding & Code Review 7
5.2 Testing
5.3 Unit Testing
5.4 Black Box Testing
5.5 White Box Testing
5.6 Program Analysis Tools
5.7 Integration Testing
5.8 System Testing

**Software Reliability & Quality Management**
6 6.1 Reliability 6
6.2 Software Quality
6.3 Software Quality Management System
6.4 ISO 9000
6.5 SEI capability Maturity Model
6.6 Six Sigma
6.7 Agile Software Development & Extreme Programming
6.8 Agile Project Management

**Text Books:**


1. Software Engineering: A precise Approach - Pankaj Jalote (Wiley India) (Unit 1,2,4).
2. Fundamentals of Software Engineering – Rajib Mall (3rd Edition)( PHI) (Unit 5, 6).
3. Software Engineering by Jan Sommerville (9th Edition) Pearson (Unit 6, 7 & 6.8).
4. Software Engineering Principles & Practices by Rohit Khurana ITLESL (2nd Edition) Vikas Publishing House Pvt. Ltd. (Unit 3).


**Reference Books:**


1. Software Engineering - Concepts & Practices -- Ugrasen Suman (Cenage Learning)
2. Software Engineering Fundamentals -- Behforooz & Hudson (Oxford: Indian Edition 1st)

# S. Y. B.Tech (Computer Science and Engineering) Sem – III

## PW-CS407– Mini Project

| | TEACHING SCHEME | EXAMINATION SCHEME |
|---|---|---|
| | **Theory : --** | **Term work:** 25 marks |
| | **Tutorial :** -- | **Theory : --** |
| | **Practical:** 2 Hrs/Week | **Practical :** 50 marks |

**Pre-requisites:** Knowledge of software engineering and C/C++

**Course Objectives:**

1. To expose the students to solve the real world problems.
2. To utilize the techniques. Skills and modern Engineering tools for building the project.
3. To follow the methods and tasks as per SDOLC Approach

**Course Outcomes:**

1. Define the problem statement.
2. Organize, Plan and prepare the detailed project activities.
3. Construct Flowchart, System Architecture based on the project description
4. Implement the solution for their problem.

**Platform: - C**, C++

**Course Contents/Description:-**

The Mini Project should be undertaken preferably by a group of 3-4 students who will jointly work together and implement the project. The Mini Project topic should be based on the any one subject concepts that students have studied for their Academic Year. The group will select the project with the approval of the guide and submit the name of the project with a synopsis of the proposed work not more than 02 to 03 pages. In the Synopsis they have to state Flowchart, Usage of the logic, algorithm, functions and suitable data structure for implementing the solution. They have to implement project using C, C++ languages.