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# SYLLABUS OF SECOND YEAR [AI AND DS]

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JUNE 25, 2022

# DKTE Society's Textile and Engineering Institute, Ichalkaranji

(An Autonomous Institute)

Teaching and evaluation Scheme for year 2021-22

Second Year B. Tech. (Semester – III) In AI and Data Science

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme					
				L	T	P	Contact Hrs/ wk		Theory			Practical		TOTAL
									CIE		SEE	CIE	SEE	
									SE-I	SE-II				
1	DSL201	Applied Mathematics	BSC	4	-	-	4	4	25	25	50	-	-	100
2	DSL202	Automata Theory	PCC	4	-	-	4	4	25	25	50	-	-	100
3	DSL203	Open Elective-I Digital Systems and Microprocessors	OEC	3	-	-	3	3	25	25	50	-	-	100
4	DSL204	Data Structure	PCC	3	-	-	3	3	25	25	50	-	-	100
5	DSL205	Computer Network	PCC	3	-	-	3	3	25	25	50	-	-	100
6	DSP206	Computer Network Lab	PCC	-	-	2	2	2	-	-	-	50	50	100
7	DSP207	Programming in C Lab	PCC	2	-	4	6	4	-	-	-	50	50	100
8	DSP208	Open Elective-I Digital System and Microprocessor Lab	OEC	-	-	2	2	1	-	-	-	50	50	100
9	DSL209-A	Environmental Studies	HSMC	2	-	-	2	-	-	-	-	-	-	-
		Total		21	-	8	29	24	125	125	250	150	150	800

L-Lecture

T-Tutorial

P-Practical

SE-I : Semester Examination-I

SE-II : Semester Examination-II

CIE – Continuous In Semester Evaluation

SEE- Semester End Examination

Course Category	HSMC (Hum. & Social Sc., Mgt)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Prof. Core Courses)	PEC (Prof. Elect. Courses)	OEC (Open Elct. Courses)	MC (Mandatory Courses)	PST ( Project / Seminar / Ind. Training)
<b>Credits</b>	--	08	--	09	--	04	--	--
<b>Cumulative Sum</b>	03	15	22	--	--	--	--	--

**Progressive Total Credits: 40 + 21= 61**

**DKTE Society's Textile and Engineering Institute, Ichalkaranji**  
(An Autonomous Institute)

Teaching and evaluation Scheme for year 2021-22  
Second Year B. Tech. (Semester – IV) In AI and Data Science

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme					
				L	T	P	Contact Hrs/wk		Theory			Practical		TOTAL
									CIE		SEE	CIE	SEE	
									SE-I	SE-II				
1	DSL210	Statistic for Data Science	PCC	4	-	-	4	4	25	25	50	-	-	100
2	DSL211	Advanced Computer Networks	PCC	3	-	-	3	3	25	25	50			100
3	DSL212	Open Elective-II-Operating System	OEC	3	-	-	3	3	25	25	50	-	-	100
4	DSL213	Computer Algorithms	PCC	3	-	-	3	3	25	25	50	-	-	100
5	DSL214	Software Engineering	PCC	4	-	-	3	3	25	25	50	-	-	100
6	DSP215	Object Oriented Programming using C++	PCC	2	-	4	6	4	-	-	-	50	50	100
7	DSP216	Open Elective-II Lab-Operating System	OEC	-	-	2	2	1	-	-	-	50	50	100
8	DSP217	Computer Algorithms Lab	PCC	-	-	2	2	1	-	-	-	50	50	100
9	DSL209	Environmental Studies	HSMC	2	-	-	2	-	-	-	70	30	-	-
		Total		21	-	8	28	22	125	125	320	180	150	800

L- Lecture

T-Tutorial

P-Practical

SE-I : Semester Examination-I

SE-II : Semester Examination-II

CIE – Continuous In Semester Evaluation

SEE- Semester End Examination

Course Category	HSMC (Hum. & Social Sc., Mgt)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Prof. Core Courses)	PEC (Prof. Elect. Courses)	OEC (Open Elct. Courses)	MC (Mandatory Courses)	PST ( Project / Seminar / Ind. Training)
<b>Credits</b>	--	--	--	18	--	04	--	--
<b>Cumulative Sum</b>	03	23	22	09	--	04	--	--

**Progressive Total Credits: 61+22 = 83**

**DKTE Society's Textile and Engineering Institute, Ichalkaranji**  
**Second Year B. Tech. (Semester – IV)**  
**DSL201: Applied Mathematics**

<b>Teaching Scheme:</b> Lectures: 04 Hrs /Week Tutorials: 00Hrs/Week Practicals: 00 Hrs/Week	<b>Credits</b>  04	<b>Evaluation Scheme:</b> SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

- ☐ Remember the theory of counting, basic concepts of statistics.
- ☐ Use the knowledge to solve the examples of counting principle, correlation, regression, curve fitting
- ☐ Use the knowledge to study the data given with respect to dispersion.
- ☐ Apply the knowledge to test the correlation, to test hypothesis, to do sample tests

**Course Contents**

<b>Unit I</b>	<b>Introduction to statistics</b>	<b>06 Hours</b>
Definitions of Population, Variable, Attribute, Census Survey, Sample Survey, Random sample. Raw statistical data, collection, classification, Frequency distribution, class limits & boundary, class width, midpoint. Histogram, Frequency polygon, Frequency curve. Measures of central tendency: Arithmetic Mean (A.M.), Median, Mode, Combined Mean.		
<b>Unit II</b>	<b>Measures of dispersion</b>	<b>06 Hours</b>
Range, Quartile deviation, Mean deviation Standard deviation as Absolute measures of dispersion, Coefficient of range, quartile deviation, mean deviation, coefficient of variation as Relative measures of dispersion, coefficient of variation as Relative measures of dispersion, consistency of data		
<b>Unit III</b>	<b>Probability</b>	<b>06 Hours</b>
Counting Principle, Rule of Sum & Product, Random Experiments, Sample space, Events, Concept of Probability, Conditional Probability, Independent events, Random Variables, Probability Distribution Function, Bayes' Theorem.		
<b>Unit IV</b>	<b>Testing of hypothesis and Large Sample Tests</b>	<b>06 Hours</b>
Introduction, Hypothesis, Statistic, Critical Region, Errors in testing, Level of Significance. Test for population mean, equality of population means population proportion & equality of population proportions.		
<b>Unit V</b>	<b>Mathematical Logic</b>	<b>06 Hours</b>
Introduction, Statements and notations, Connectives, Statement formulas and truth tables, Well-formed formulas, Tautologies, Equivalence of formulas, Duality law, Tautological implications, functionally complete sets of connectives, Normal Forms, completely parenthesized infix and polish notations, Theory of Inference for statement calculus – validity using truth table, rules of inference, consistency of premises and indirect method of proof.		
<b>Unit VI</b>	<b>Combinatorial Analysis</b>	<b>06 Hours</b>
First counting principle, second counting principle, permutation, combination, Pigeonhole principle.		

**Text Books:**

1. Discrete Mathematics and its Applications - Kenneth H. Rosen (AT&T Bell Labs)
2. Mathematical Statistics -J.Fruend.
3. Applied Statistics & Probability of Engineers -Montgomeri&Runger

**References Books:**

1. Modern Digital Electronics by R.P.Jain Tata McGraw-Hill Education
2. Microprocessors and Microcontrollers by N. Senthil Kumar, M. Saravanan, S.

**Useful Links:**

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**Second Year B. Tech. (Semester – III)**  
**DSL202: Automata Theory**

Teaching Scheme: Lectures: 04 Hrs /Week Tutorials: 00 Hrs/Week Practicals: 00 Hrs/Week	Credits  04	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

- ☐ Prove statements using Mathematical Induction.
- ☐ Describe terminology related to Grammar, Languages, Finite Automata, Pushdown Automata and Turing Machine
- ☐ Design Regular Expression corresponding to Regular language
- ☐ Design FA and Context Free Grammar for language.
- ☐ Design Push Down Automata to solve a given problem
- ☐ Design Turing Machine to solve a given problem

**Course Contents**

<b>Unit I</b>	<b>Proofs and Regular Languages</b>	<b>07 Hours</b>
Types of Proofs, Mathematical Induction and Recursive definitions, Regular expressions & Regular languages, Operations on Regular languages.		
<b>Unit II</b>	<b>Finite Automata</b>	<b>09 Hours</b>
Finite automata definition and representation, union, intersection and complement of Regular Languages and their corresponding FA. Mealy and Moor machines.		
<b>Unit III</b>	<b>Nondeterminism and Kleen's theorem</b>	<b>08 Hours</b>
Nondeterministic Finite Automata, Nondeterministic Finite Automata with $\Lambda$ –transitions, Conversion of NFAA to NFA and DFA. Kleen's theorem. Minimization of FA		
<b>Unit IV</b>	<b>Context Free Languages and Grammar</b>	<b>08 Hours</b>
Examples and definition, Regular Grammar, Derivation and ambiguity, An Unambiguous CFG, Union, concatenation kleen * of CFL, Simplified forms and Normal Forms, Pumping Lemma for context free languages, Intersection and complements of context Free Languages		
<b>Unit V</b>	<b>Push Down Automata</b>	<b>08 Hours</b>
Definition, examples, DPDA, Acceptance of string by PDA, PDA corresponding to CFG, Parsing		
<b>Unit VI</b>	<b>Turing Machines</b>	<b>08 Hours</b>
Models of computation, definition of Turing Machine as Language acceptors, combining Turing Machines, Computing a function with a TM Variations in Turing Machines: Turing machines with doubly-infinite tapes, more than one tape, Non-deterministic TM and Universal TM.		

<b>Text Books:</b>
1. Introduction to Languages & theory of computations—John C. Martin (MGH)
<b>References Books:</b>
1. An Introduction to Formal Languages and Automata- Fifth edition, Peter Linz. 2. Theory of Computer Science Automata, Languages, and Computation- Third edition
<b>Useful Links:</b>

**DKTE Society's Textile and Engineering Institute, Ichalkaranji**  
**Second Year B. Tech. (Semester – III) AI and Data Science**  
**DSL203: Open Elective-I: Digital Systems and Microprocessors**

Teaching Scheme: Lectures: 03 Hrs /Week Tutorials: 00Hrs/Week Practicals: 00 Hrs/Week	Credits  03	Evaluation Scheme:  SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

- ☐ Explain terminology in digital system and architecture, instructions and Functionality of 8085 Microprocessor.
- ☐ Design and Simplify Simple Logic Circuit using Basic gates.
- ☐ Design of Combination and sequential circuits.
- ☐ Design Memory and IO device interfacing with 8085 Microprocessor.
- ☐ Write assembly language programs using 8085 Instruction set.

**Course Contents**

<b>Unit I</b>	<b>Fundamental Concepts</b>	<b>06 Hours</b>
Analog and digital systems, Digital and logic circuits, Basic logic operations and gates- OR, AND, NOT. Describing logic circuits algebraically, implementing circuit from Boolean expression. NOR and NAND gates. Boolean theorems, De Morgan's theorems, Universality of NAND & NOR gate, Minterm, Maxterm and Karnaugh Map		
<b>Unit II</b>	<b>Binary arithmetic</b>	<b>06 Hours</b>
Binary addition, Signed numbers, Addition and Subtraction in 2's Complement system, overflow, multiplication and division of binary numbers, BCD addition, Hexadecimal addition and subtraction, Design Full adder and Full sub tractor with state table and timing diagram.		
<b>Unit III</b>	<b>Flip-Flops, Registers and counters</b>	<b>06 Hours</b>
Flip –flop using NOR and NAND gates, clocked flip flops, clocked S-R, J-K, D and T flip flops, Data storage and transfer, shift register, Counter- Asynchronous counter using Flip-flop, Synchronous counter Design- Johnson and Ring counter		
<b>Unit IV</b>	<b>Microprocessor Architecture and Microcomputer System</b>	<b>06 Hours</b>
Microprocessor Architecture and its operation- Microprocessor initiated operations, internal operation, and Peripheral operation. memory map and addresses, memory and instruction fetch, Input and output devices, logic devices used for interfacing- Tri-State devices, buffer, decode, encoder.		
<b>Unit V</b>	<b>8085 Microprocessor Architecture</b>	<b>06 Hours</b>
The 8085 MPU, Microprocessor communication and bus timing, De-multiplexing address and Data bus, Generating control signals, The 8085 Architecture, machine cycles and bus timing, op-code fetch machine cycle, Memory read and write machine cycle, IO read and Write machine cycle, Memory interfacing-memory structure, basic concepts in memory interfacing.		
<b>Unit VI</b>	<b>8085 Assembly Language Programming</b>	<b>08 Hours</b>
The 8085 programming model, instruction Classification, instruction and data format, Writing and execution assembly language Program. The 8085 instruction-data transfer operations, addressing modes, Arithmetic Operation, Flag concept and cautions, Logic operations, Branch operations, Stack and interrupt.		



**Text Books:**

- 1 Digital Systems, Principles and Applications-Ronal Tocci, Neal Widmer, Gregory Moss (Pearson Education) 9th Edition.
- 2 Microprocessor Architecture-Programming and applications with 8085-Ramesh Gaonkar (Penram International) 4th Edition.

**References Books:**

- 1 Modern Digital Electronics by R.P.Jain Tata McGraw-Hill Education
- 2 Microprocessors and Microcontrollers by N. Senthil Kumar, M. Saravanan, S.

**Useful Links:**

1. <https://www.youtube.com/watch?v=I78iyzXQrP4> (Working of 8085 Microprocessor animation)

<b>DKTES Textile and Engineering Institute, Ichalkaranji</b> <b>Second Year B. Tech. (Semester – III)</b> <b>DSL204: Data Structures</b>		
<b>Teaching Scheme:</b> Lectures: 03 Hrs./Week Tutorials: 00 Hrs./Week Practicals: 00 Hrs./Week	<b>Credits</b> 03	<b>Evaluation Scheme:</b> CIE: 50 Marks SEE: 50 Marks
<b>Course Outcomes:</b> On completion of the course, student will be able to– <ul style="list-style-type: none"> <li><input type="checkbox"/> Describe basic terminology of Data Structures.</li> <li><input type="checkbox"/> Apply data structures to solve given problem.</li> <li><input type="checkbox"/> Design algorithms to carry out different operations on data structures.</li> <li><input type="checkbox"/> Analyze performance of different data structures</li> </ul>		
<b>Course Contents</b>		
<b>Unit I</b>	<b>Linear List</b>	<b>10 Hours</b>
Abstract Data Types – model and implementation, Algorithm efficiency, General List – operations, List ADT, List implementations -Array-Algorithms and analysis. Linked List- Singly Linked List, Doubly Linked List, Circular Linked List.		
<b>Unit II</b>	<b>Stacks and Queues</b>	<b>08 Hours</b>
Stacks ADT, Stack Implementation using linked list and array, applications of stack. Queues – operations ADT, implementations, applications, Circular queue, Priority queues		
<b>Unit III</b>	<b>Sorting and Searching</b>	<b>06 Hours</b>
Sorting Techniques - Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort, Radix Sort Searching Techniques - Linear and binary search, Hashing – concept, hashing methods, hash collision, hash collision resolution methods.		
<b>Unit IV</b>	<b>Trees</b>	<b>06 Hours</b>
Basic tree concepts, binary tree – properties, implementation, traversal, expression tree, Huffman code binary search tree - concept, implementation, traversal, Search, Insertion, deletion.		
<b>Unit V</b>	<b>Balanced Trees</b>	<b>06 Hours</b>
AVL Tree - Concept, balancing tree, insertion, deletion, implementation. Heap –concept, operations: breheapup, reheapdown, build heap, insert and delete nodes, B and B+ tree		
<b>Unit VI</b>	<b>Graph</b>	<b>08 Hours</b>
Definition and storage, traversal – depth first and breadth first algorithm, Shortest path Warshall's and Dijkshtra algorithm, spanning tree algorithms.		

**Text Books:**

1. Data Structures: A Pseudocode Approach with C, Richard F. Gilberg & Behrouz A. Forouzan.
2. Data Structures using C – ISRD Group, TMH publication
3. Schaum's Outlines Data Structures – Seymour Lipschutz (MGH)

**References Books:**

1. Data Structures and Algorithm Analysis in C, 2 Edition, by Weiss, Pearson Education India.
2. Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles, by Narasimha Karumanchi, Careermonk Publications

**DKTES Textile and Engineering Institute , Ichalkaranji**  
**Second Year B. Tech.( Semester – III )**  
**DSL205: Computer Network**

Teaching Scheme: Lectures : 03 Hrs/Week Tutorials : 00Hrs/Week Practicals: 00Hrs/Week	Credits  03	Evaluation Scheme:  SE-I: 25Marks SE-II: 25Marks SEE: 50Marks
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**Course Outcomes:**

On completion of the course, student should be able to–

- ☐ Explain the basics of computer Networks.
- ☐ Explain the functionalities of different layers of network architecture.
- ☐ Students will be able to apply the knowledge of different layer to solve the problems.
- ☐ Students will be able to analyze the working and functionality of protocols available in different layers.

**Course Contents**

<b>Unit I</b>	<b>Communication Fundamentals, Protocols and Models</b>	<b>06 Hours</b>
Introduction to data communications, data and signals, transmission impairment, Network Representations and Topologies, Common Types of Networks, Internet Connections, Reliable Networks, Rules for communication, protocol requirement in communication, Layered network model: OSI, TCP/IP, Data Encapsulation, Data Access.		
<b>Unit II</b>	<b>Physical layer</b>	<b>05 Hours</b>
Purpose of the Physical Layer, transmission media: - Guided and Unguided media, Network Hardware components, wireless media, Ethernet, Ethernet Frame		
<b>Unit III</b>	<b>Data link layer</b>	<b>09 Hours</b>
Purpose of the Data Link Layer, Error detection & correction: cyclic codes, hamming code, Data Link Control: - Farming, Flow & error control, Protocol basics, Channel allocation Problem, MAC protocols, ALHOA, CSMA, CSMA/CD, CSMA/CA ,Ethernet MAC Address, The MAC Address Table.		
<b>Unit IV</b>	<b>Network Layer and addressing</b>	<b>08 Hours</b>
Network Layer Characteristics, IPv4 Address Structure, IPv4 Unicast, Broadcast, and Multicast, Types of IPv4 Addresses, Network Segmentation, Subnet an IPv4 Network, IPv4 Issues, IPv6 Address Representation, IPv6 Address Types, Dynamic Addressing for IPv6 GUAs, ICMP messages and message formats.		
<b>Unit V</b>	<b>Transport Layer</b>	<b>05 Hours</b>
Transportation of Data, TCP Overview, UDP Overview, Port Numbers, TCP Communication Process, Reliability and Flow Control, UDP Communication		
<b>Unit VI</b>	<b>Application Layer</b>	<b>05 Hours</b>
Name space, Domain Name Space, Distribution of Name Space, DNS in the Internet, Resolution, DNS message , Remote Login (SSH), Electronic mail, FTP, WWW & HTTP		

**Text Books:**

- 3 Data communication and networking -Behrouz A Forouzan, The McGraw Hill, 4<sup>th</sup> Edition.

**References Books:**

1. Computer Networks- A. S. Tenenbaum, PHI, 3<sup>rd</sup> Edition.
2. Data and Computer communications - William Stallings, Pearson Education, 8<sup>th</sup> Edition.
3. Data communication and Computer Networks- Ajit Pal, PHI Learning, Eastern Economy Edition.

**Useful Links:**

2. <https://www.netacad.com>.
3. [https://www.tutorialspoint.com/data\\_communication\\_computer\\_network](https://www.tutorialspoint.com/data_communication_computer_network)

**DKTE Society's Textile and Engineering Institute , Ichalkaranji**  
**Second Year B. Tech.( Semester – III )**  
**DSP206: Computer Networks Lab**

Lab Scheme: Practicals: 02Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50Marks SEE: 50Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

- ☐ Describe basic concepts of computer Networks
- ☐ analyze the network related problems
- ☐ Develop programs for data communication and networking.

**List of Experiments**

**(It should consist of 10-12 experiments based on the following topics.)**

<b>1</b>	Demonstration of different types of Network cables and practically implements the cross-wired cable and straight through cable using clamping tool.
<b>2</b>	Demonstration of different networking hardware components.
<b>3</b>	Study of basic network command and Network configuration commands
<b>4</b>	Performing an Initial Switch Configuration using cisco packet tracer.
<b>5</b>	Performing an Initial Router Configuration using cisco packet tracer.
<b>6</b>	Performing TELNET Configuration using cisco packet tracer.
<b>7</b>	Implementation of framing using one of different framing techniques.
<b>8</b>	Implementation of Error Detecting Code (CRC).
<b>9</b>	Implementation of Error Correcting Code (Hamming Code).
<b>10</b>	Write a program to find class of an IP address, Network id, Host id and Default mask
<b>11</b>	Implementation of a program to calculate first, last and total number of addresses in the block from one of the given IP addresses in the same block.

**DKTE Society's Textile and Engineering Institute, Ichalkaranji**  
**Second Year B. Tech. (Semester – III)**  
**DSP207: Programming in C Lab**

Teaching Scheme: Lectures: 02 Hrs./Week Tutorials: 00 Hrs./Week Practicals: 04 Hrs./Week	Credits  04	Evaluation Scheme:  CIE: 50 Marks SEE: 50 Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

- ☐ Explain terminology in C Language
- ☐ Design algorithm to solve the problem.
- ☐ Build a program for developed algorithm in C Language.
- ☐ Analyze a C program.
- ☐ Prepare documentation for the design.

**Course Contents**

<b>Unit I</b>	<b>Algorithm Design and Revision of C</b>	<b>10 Hours</b>
Solving problems using computer – Writing algorithm, representing it with flowcharts, Introduction to C, data types and variables, operators and expressions, program analysis and complexity, Testing and debugging of code		
<b>Unit II</b>	<b>IO and Control statements</b>	<b>08 Hours</b>
Common Pre-processor directives, Constants, Formatted input and output statements, branching statements (if, if-else and switch), looping statements (while, do-while, for), break, continue statements, Bit wise operations		
<b>Unit III</b>	<b>User defined data types and operations</b>	<b>06 Hours</b>
Array, one dimensional array, two-dimensional array, strings, string handling functions, structure, array of structures and union		
<b>Unit IV</b>	<b>Modular Programming with Functions and Recursion</b>	<b>06 Hours</b>
Modular Programming with Functions (From Data Structure a pseudo code approach in c and C++ plus Data structure Nell Dale) Function declaration and definition, calling function by value and by reference, return statement, Scope and lifetime of variables (Storage classes) and recursion		
<b>Unit V</b>	<b>Pointers</b>	<b>06 Hours</b>
Pointer, pointer arithmetic, double pointers, constant pointer, pointer to constant, array of pointers, pointer to array, pointer to string, pointer to structure, pointer to function, dynamic memory allocation and deallocation		
<b>Unit VI</b>	<b>File Handling</b>	<b>08 Hours</b>
Types of files, modes of opening files, reading and writing data from file using fgetc, fputc, fprintf and fscanf, random access files using fseek, ftell, rewind, fread and fwrite		

**Text Books:**

1. Problem Solving And Program Design in C, by Jeri R. Hanly, Elliot B. Koffman
2. C Programming Language 2nd Edition, Brian W. Kernighan , Dennis Ritchie
3. C How to Program 7e, by Deitel

**References Books:**

1. Let Us C, 14 Edition, Yashavant Kanetkar, BPB Publication
2. C in Depth, 3rd Edition, S K Srivastava,, BPB Publication



**DKTES Textile and Engineering Institute , Ichalkaranji**  
**Second Year B. Tech. (Semester – III ) AI and Data Science**  
**DSP208: Open Elective-I Lab: Digital Systems and Microprocessors Lab**

Lab Scheme: Practical: 02 Hrs /Week	Credits 01	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

- ☐ Design and Implement Combinational Logic circuits.
- ☐ Design and Implement Sequential Logic circuits.
- ☐ Write assembly language programs using 8085 Instruction set.

**List of Experiments**

**(It should consist of 10-12 experiments based on the following topics.)**

<b>1</b>	Verification of De Morgan's Theorem using gates.
<b>2</b>	To realize NAND & NOR Gates are Universal Gates.
<b>3</b>	To realize Half adder and Full adder
<b>4</b>	To design and setup the following circuit using IC 7483. I) 4-bit binary parallel adder II) 4-bit binary parallel Sub-tractor.
<b>5</b>	Verify Truth table of Flip Flops
<b>6</b>	Verify Truth table of Decade counter
<b>7</b>	Assembly language program to move a block of data from source to destination.
<b>8</b>	Assembly language program for array addition.
<b>9</b>	Assembly Language program to alter the contents of flag register in 8085
<b>10</b>	To Find Number of one's in a given 8-bit number stored in memory location.
<b>11</b>	Assembly Language program to generate RST 7.5 Interrupt.
<b>12</b>	Assembly Language program to generate Square wave on SOD pin.



**DKTES Textile and Engineering Institute, Ichalkaranji**  
**Second Year B. Tech. (Semester – IV)**  
**DSL209: Environmental Studies**

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs./Week	04	SE-I: 25Marks
Tutorials: 01Hrs./Week		SE-II: 25Marks
Practicals: 00 Hrs./Week		SEE: 50Marks

**Course Outcomes:**

On completion of the course, student will be able to–

- ☐ Understand definition and importance of environment.
- ☐ Identify causes and effects of environmental pollution.
- ☐ Understand control measure of industrial pollution.
- ☐ Understand social issues and local environmental problems (Group project)

**Course Contents**

<b>Unit I</b>	<b>Fundamentals of Quantitative Design and Analysis</b>	<b>06 Hours</b>
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Introduction - Definition: genetic, species and ecosystem diversity, Bio-geographical classification of India. Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation. Western Ghats as a bio-diversity region. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, mad wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

<b>Unit II</b>	<b>Memory Hierarchy Design</b>	<b>06 Hours</b>
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Definition: Causes, effects and control measures of Air pollution. Water pollution. Soil pollution, Marine pollution. Noise pollution. Thermal pollution & Nuclear hazards. Solid Waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.

<b>Unit III</b>	<b>Instruction-Level Parallelism and Its Exploitation</b>	<b>08 Hours</b>
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Disaster Management: Floods, earthquake, cyclone and landslides. Tsunami. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Environmental Ethics: Issue and possible solutions. Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act.

**Text Books:**

1. Environmental studies for Undergraduates publisher Shivaji university Kolhapur.

**References Books:**

1. Agarwal, K.C.2001, Environmental Biology, Nidi Pub. Ltd., Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380013, India, Email:mapin@icenet.net (R)
3. Brunner R.C.,1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p

**Useful Links:**

1. <https://nptel.ac.in/courses/120/108/120108004/>

**DKTE Society's Textile and Engineering Institute, Ichalkaranji**  
**Second Year B. Tech. (Semester – IV)**  
**DSL210: Statistic for Data Science**

Teaching Scheme: Lectures: 04 Hrs /Week Tutorials: 00 Hrs/Week Practicals: 00 Hrs/Week	Credits  04	Evaluation Scheme:  SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

- ☐ Apply principles of dispersion and measures of central tendency to the dataset supplied.
- ☐ To Analyze tests for hypothesis and its significance.
- ☐ To Evaluate the statistical data numerically by using correlation, regression and curve fittings.
- ☐ To Solve basic problems in probability theory, including problems involving the binomial, Poisson, and normal distributions.
- ☐ To use the recurrence relation to address counting problems and problems with program analysis.

**Course Contents**

<b>Unit I</b>	<b>Frequency distribution and measure of central Tendency</b>	<b>06 Hours</b>
Frequency distribution, Continuous frequency distribution, Graphical representation of a Frequency distribution- Histogram, frequency polygon, Measure of central tendency Arithmetic mean, median and mode, Range, Quartile deviation, Mean deviation, Standard deviation		
<b>Unit II</b>	<b>Testing of hypothesis</b>	<b>06 Hours</b>
Introduction, Statistical hypothesis (Simple and Composite), Null hypothesis, Alternative hypothesis, Critical region, Type I and Type II errors, Level of significance, Test for goodness of fit of chi square distribution.		
<b>Unit III</b>	<b>Correlation and Regression</b>	<b>06 Hours</b>
Introduction, Types of correlation, Karl Pearson's coefficient of correlation, Interpretation of the coefficients of corrections, Computation of coefficient of correlation for ungroup data, Lines of regression, Calculations of equations of the lines of regression.		
<b>Unit IV</b>	<b>Probability Distribution Functions</b>	<b>06 Hours</b>
Introduction, Elementary theory of probability, Random variables. Discrete probability distribution, Continuous probability distribution, Binomial distribution, Poisson distribution, Normal distribution.		
<b>Unit V</b>	<b>Recurrence Relation</b>	<b>06 Hours</b>
Fitting of curve by method of lest squares, Fitting of straight lines, Fitting of exponential curve, Fitting of second-degree parabolic curve.		
<b>Unit VI</b>	<b>Curve Fitting</b>	<b>08 Hours</b>
Introduction, Elementary theory of probability, Random variables, Discrete probability distribution, Continuous probability distribution, Binomial distribution, Poisson distribution, Normal distribution.		

**Text Books:**

- 1** Walpole, Myers, Myers, Ye, Probability and Statistics for Engineers and Scientists, Pearson Education Inc., 8th Edition, 2007, ISBN: 978-81-317-1552-9..
- 2** Numerical Methods in Engineering and Science, by Dr. B. S. Grewal.

**References Books:**

- 1** Douglas C Montgomery, George C Runger, Applied statistics and Probability for Engineers, Wiley Asia Student Edition, 4th Edition, 2007, ISBN: 978-81-265-2315
- 2** Purna Chandra Biswal, Probability and Statistics, PHI Learning Private Limited, Eastern Economy Edition, 2007, ISBN: 978-81-203-3140-2

**Useful Links:**

<https://nptel.ac.in/courses/120/108/120108004/>

**DKTES Textile and Engineering Institute , Ichalkaranji**  
**Second Year B. Tech.( Semester – IV )**  
**DSL211: Advanced Computer Networks**

Teaching Scheme: Lectures : 03 Hrs/Week Tutorials : 00Hrs/Week Practicals: 00Hrs/Week	Credits  03	Evaluation Scheme:  SE-I: 25Marks SE-II: 25Marks SEE: 50Marks
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**Course Outcomes:**

On completion of the course, student should be able to–

- ☐ Explain the basics of computer Networks.
- ☐ Explain the functionalities of different layers of network architecture.
- ☐ Students will be able to apply the knowledge of different layer to solve the problems.
- ☐ Students will be able to analyze the working and functionality of protocols available in different layers.

**Course Contents**

<b>Unit I</b>	<b>Wired LANs-Ethernet</b>	<b>06 Hours</b>
Introduction, IEEE standards, Standard Ethernet (IEEE 802.3), MAC Addressing, Categories of Standard Ethernet, Changes in the Standard, Fast Ethernet(IEEE 802.3u), Gigabit Ethernet(IEEE 802.3z),		
<b>Unit II</b>	<b>Switching, VLAN and Inter-VLAN Routing</b>	<b>06 Hours</b>
Switching Concept, Frame Forwarding, Switching Domains, Overview of VLANs, VLANs in a Multi-Switched Environment, VLAN Configuration, VLAN Trunks Dynamic Trunking Protocol, Inter-VLAN Routing Operation, Router-on-a-Stick Inter-VLAN Routing, Inter-VLAN Routing using Layer 3 Switches, Troubleshoot Inter-VLAN Routing.		
<b>Unit III</b>	<b>STP Concepts and EtherChannel</b>	<b>10 Hours</b>
Purpose of STP, STP Operations, Evolution of STP, Ether Channel Operation, Configure Ether Channel, Verify and Troubleshoot Ether Channel.		
<b>Unit IV</b>	<b>SLAAC and DHCP</b>	<b>08 Hours</b>
DHCP4 Concepts, Configure a Cisco IOS DHCP4 Server, Configure a DHCP4 Client, IPv6 Global Unicast Address Assignment, SLAAC, DHCPv6.		
<b>Unit V</b>	<b>Unicast Routing Protocols</b>	<b>05 Hours</b>
Introduction to Unicast Routing, Routing Table, Routing Information Protocol, Link State Routing, Open Shortest Path First.		
<b>Unit VI</b>	<b>WLAN Concepts</b>	<b>06 Hours</b>
Introduction to Wireless, Components of WLANs, WLAN Operation, CAPWAP Operation, Channel Management, WLAN Threats, Secure WLANs, WLAN Configuration		

**Text Books:**

- 1 TCP/IP Protocol Suite-Behrouz Forouzan. McGraw Hill, 4thEdition.
- 2 Computer network by andrew s tanenbaum, 5thEdition

**References Books:**

1. Internetworking with TCP/IP: principles, protocols, and architectures Volume one - Douglas E. Comer, Prentice Hall, 4thEdition.

2. Data and Computer communications - William Stallings, Pearson Education, 8<sup>th</sup> Edition.
3. Data communication and Computer Networks- Ajit Pal, PHI Learning, Eastern Economy Edition.

**Useful Links:**

1. <https://www.netacad.com>.
2. [https://www.tutorialspoint.com/data\\_communication\\_computer\\_network](https://www.tutorialspoint.com/data_communication_computer_network)

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**Second Year B. Tech. (Semester – IV)**  
**DSL212: Open Elective-II-Operating System**

Teaching Scheme: Lectures: 03 Hrs /Week Tutorials: 00 Hrs/Week Practicals: 00 Hrs/Week	Credits  03	Evaluation Scheme:  SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

- ☐ Demonstrate the structure, functions and services of an operating system
- ☐ Apply the knowledge of process management, process synchronization, deadlocks and CPU scheduling algorithms to solve the problems.
- ☐ Describe memory organization, memory management techniques and file system concepts.
- ☐ Illustrate the concept of I/O systems and their protection.

**Course Contents**

<b>Unit I</b>	<b>Introduction to OS and services</b>	<b>07 Hours</b>
Operating System fundamentals, computer system organization, computer system architecture, OS structure, OS operations, process management, memory management, storage management, computing environments, OS services, user and OS interface, system calls, types of system calls, OS structure, system boot.		
<b>Unit II</b>	<b>Process management</b>	<b>07 Hours</b>
Process concept, Process States, Process Control Block, Inter-process communication, process scheduling:- basic concepts, Scheduling Criteria, Scheduling Algorithms, Multiple processor scheduling, Real time CPU scheduling.		
<b>Unit III</b>	<b>Process synchronization and deadlocks</b>	<b>06 Hours</b>
Background, The critical section problem, Peterson's solution, Mutex Locks, Semaphores, Classic problems of synchronization. System model, deadlock characterization, handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock.		
<b>Unit IV</b>	<b>Memory management</b>	<b>07 Hours</b>
Background, swapping, contiguous memory allocation, segmentation, paging, structure of page table. Virtual memory background, demand paging, copy-on-write, page replacement, allocation of frames, thrashing.		
<b>Unit V</b>	<b>Storage management</b>	<b>06 Hours</b>
File concept, access methods, and Directory and disk structure, file system mounting, file sharing, protection.		
<b>Unit VI</b>	<b>Input /Output systems</b>	<b>06 Hours</b>
Overview, I/O hardware, application I/O interface, kernel I/O subsystem, transforming I/O requests to hardware operations, streams, performance.		



**Text Books:**

1. Abraham Silberschatz, Peter B Galvin, Gerg Gagne “ Operating System Concepts”, 9<sup>th</sup> Edition.
2. William Stallings, Operating System: Internals and Design Principles, Prentice Hall, ISBN-10: 0-13-380591-3, ISBN-13: 978-0-13-380591-8, 8th Edition

**References Books:**

1. Operating system with case studies in Unix, Netware and Windows NT – Achyut S. Godbole (TMGH).
2. “Operating systems: concepts and design” - Milan Milenkovic (TMGH).
3. “Operating Systems: Internals and Design Principles” by William Stallings

**Useful Links: --**

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**Second Year B. Tech. (Semester – IV)**  
**DSL213: Computer Algorithms**

Teaching Scheme: Lectures: 03 Hrs /Week Tutorials: 00Hrs/Week Practicals: 00 Hrs/Week	Credits  03	Evaluation Scheme:  SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

1. Describe fundamentals of algorithms.
2. Discover solution to problems using algorithm design paradigms like Divide and Conquer and Greedy Approach.
3. Apply Dynamic Programming and Backtracking Approach to tackle the problems.
4. Analyze performance of algorithms using asymptotic analysis.

**Course Contents**

<b>Unit I</b>	<b>Fundamentals of Algorithms</b>	<b>06 Hours</b>
Introduction, Characteristics of algorithms, Pseudo code Conventions, Recursive Algorithms, Performance analysis, Asymptotic notations ( $O$ , $\Omega$ , $\Theta$ ), Performance measurement, Randomized Algorithms, Recurrence relations, Sorting Techniques – Bubble Sort, Insertion Sort, Selection Sort.		
<b>Unit II</b>	<b>Divide and Conquer</b>	<b>06 Hours</b>
General method, Binary Search, Ternary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Selection.		
<b>Unit III</b>	<b>The Greedy Method</b>	<b>07 Hours</b>
General method, Knapsack Problem, Job Sequencing with Deadlines, Minimum-Cost Spanning Trees – Prim's and Kruskal's Algorithms, Optimal Storage on Tapes, Optimal Merge Patterns, Huffman codes, Single Source Shortest Paths.		
<b>Unit IV</b>	<b>Dynamic Programming</b>	<b>08 Hours</b>
General method, Multistage Graphs, All Pairs Shortest Paths, Optimal Binary Search Trees, 0/1 Knapsack, Reliability Design, Traveling Salesperson Problem, Flow shop scheduling.		
<b>Unit V</b>	<b>Backtracking</b>	<b>06 Hours</b>
General method, N-Queens Problem, Permutation Tree, Sum of Subsets, Graph Coloring, Hamiltonian Cycle, Knapsack Problem.		
<b>Unit VI</b>	<b>NP Hard and NP Complete</b>	<b>06 Hours</b>
Basic Concepts, P, NP, NP Complete, NP Hard, Cook's Theorem, NP Hard Graph problems, NP Hard Scheduling problems, NP Hard Code Generation Problems.		

**Text Books:**

1. Fundamentals of Computer Algorithms-Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, 2nd Edition, Universities Press.
2. Introduction to Algorithms- Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, 3rd Edition, The MIT Press.

**References Books:**

1. The Design and Analysis of Computer Algorithms-A. Aho, J. Hopcroft and J. Ullman, 1st Edition, Addison-Wesley.
2. Introduction to The Design and Analysis of Algorithms-Anany Levitin, 3rd Edition, Pearson.

**Useful Links:**

1. <http://personal.kent.edu/~rmuhamma/Algorithms/algorithm.html>
2. <https://www.ics.uci.edu/~goodrich/teach/cs260P/notes/>

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**Second Year B. Tech. (Semester – IV)**  
**DSL214: Software Engineering**

Teaching Scheme: Lectures: 03 Hrs./Week Tutorials: 01Hrs./Week Practicals: 00 Hrs./Week	Credits  04	Evaluation Scheme:  SE-I: 25Marks SE-II: 25Marks SEE: 50Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

- ☐ Explain different software engineering processes.
- ☐ Describe various concepts of software engineering problem domain.
- ☐ Describe basics concepts of software engineering solution domain.
- ☐ Apply the software engineering principles to the give problem

**Course Contents**

<b>Unit I</b>	<b>Introduction to Software Engineering</b>	<b>08 Hours</b>
The nature of Software, Defining the discipline, The Software Process, Software Engineering Practices, A Generic Process Model, Defining The Framework Activities, Identifying Task Set, Process Patterns, Process Assessment And Improvements, Prescriptive Process Model, Specialized Process Models, Unified Process, Personal And Team Process Model		
<b>Unit II</b>	<b>Requirements Engineering</b>	<b>07 Hours</b>
Requirements Engineering, Establishing The Groupwork, Eliciting Requirements, Developing Use Cases, Building The Analysis Model, Negotiating Requirements, Requirements Monitoring, Validating Requirements. Requirement Analysis, Scenario Based Modelling, UML Models That Supplements Use Cases, Class Based Methods, Identifying Analysis Classes, Specifying Attributes, Defining Operations, Class Responsibility Collaboration Modeling, Association and Dependencies, Analysis packages, State Representations, Pattern for Requirement Modeling		
<b>Unit III</b>	<b>Design Concept</b>	<b>06 Hours</b>
Design Within the Context of Software Engineering, The Design Process, Design Concepts, The Design Model.		
<b>Unit IV</b>	<b>Architectural Design</b>	<b>06 Hours</b>
Software Architecture, Architectural Genres, Architectural Styles, Architectural Consideration, Architectural Design, Assessing Alternative Architectural Design, Pattern Based Architectural Review, Architectural Conformance Checking, Agility And Architecture.		
<b>Unit V</b>	<b>Software Component and Interface Design</b>	<b>06 Hours</b>
Components, Designing Class-Based Components, Conducting Component-Level Design, Component-Based Development, The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps		

Unit VI	Software Testing	07 Hours
A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Validation Testing, System Testing, The Art of Debugging, Internal and External Views of Testing, White-Box Testing, Basis Path Testing, Control Structure Testing, Black-Box Testing		
<b>Text Books:</b>		
1. <a href="http://www.amazon.in/s/ref%3Ddp_byline_sr_book_1?ie=UTF8&amp;field-author=Parag%2BHimanshu%2BDave&amp;search-alias=stripbooks">http://www.amazon.in/s/ref%3Ddp_byline_sr_book_1?ie=UTF8&amp;field-author=Parag%2BHimanshu%2BDave&amp;search-alias=stripbooks</a> Software engineering- A practitioner's Approach- Roger S.Pressman McGraw-Hill International Edition, 8th edition, 2001.		
<b>References Books:</b>		
4. Software Engineering- Ian Sommerville, Pearson Higher Education, 10th Edition, 2016 5. An Integrated Approach to Software Engineering-Pankaj Jalote, Springer New York, 2nd Edition, 2013. 6. The Unified Modeling Language User Guide- G. Booch, J. Rumbaugh, and I. Jacobson, Addison Wesley, 2nd Edition, 2005.		
<b>Useful Links:</b>		
1. <a href="https://cse.iitkgp.ac.in/~dsamanta/courses/se/index.html">https://cse.iitkgp.ac.in/~dsamanta/courses/se/index.html</a> 2. <a href="https://nptel.ac.in/courses/106/105/106105087/">https://nptel.ac.in/courses/106/105/106105087/</a>		

<b>DKTE Society's Textile and Engineering Institute, Ichalkaranji</b> <b>Second Year B. Tech. (Semester – IV)</b> <b>DSP215: Object Oriented Programming using C++</b>		
<b>Teaching Scheme:</b> Lectures: 02 Hrs./Week Practicals: 04 Hrs./Week	<b>Credits</b> 04	<b>Evaluation Scheme:</b> CIE: 50 Marks SEE : 50 Marks
<b>Course Outcomes:</b> On completion of the course, student will be able to– <ul style="list-style-type: none"> <li><input type="checkbox"/> Describe terminology of Object-Oriented Programming using C++</li> <li><input type="checkbox"/> Develop programs employing features of C++.</li> <li><input type="checkbox"/> Design object-oriented solutions using C++</li> <li><input type="checkbox"/> Analyze programs written in C++</li> </ul>		
<b>Course Contents</b>		
<b>Unit I</b>	<b>Introduction</b>	<b>08 Hours</b>
C++ Program Structure, variables, operators, control structure – if, if- else, switch, looping while, do-while, for, C++ keywords. Input/output – I/O streams and standard I/O devices, cin and associated functions, cout and formatted output. User Defined function- declaration, definition & calling function, function call stack and activation records, storage classes, scope rules, function -default arguments. Reference and reference arguments to the function. Pointer variables, new and delete operator, dynamic arrays		
<b>Unit II</b>	<b>Object Oriented Programming - Class and Object</b>	<b>07 Hours</b>
Object Oriented fundamentals, Class and object- concept and need, Class declaration, Class members- member variables and functions, access specifiers, UML notations for class, implementation of member functions. Object Declaration, Accessing class members, class scope, accessor and mutator functions, order of public and private members of the class. Constructors, invoking a constructor, constructors and default parameters, array of objects and constructor, destructor. this pointer, static members, constant objects and member function, Data abstraction, structure and class, information hiding		
<b>Unit III</b>	<b>Inheritance and Composition</b>	<b>06 Hours</b>
Inheritance – concept, implementation, base classes and derived classes, members in base classes and derived classes, overriding base class members, UML notations for inheritance, constructors of derived and base classes, destructor in derived class, Inheritance as public, protected and private Composition (Aggregation) and association – concept, implementation and UML Notation		
<b>Unit IV</b>	<b>Polymorphism</b>	<b>06 Hours</b>
Polymorphism – need, concept, implementation using function overloading, Multiple Inheritance, function overriding, virtual function, pure virtual function, abstract classes, Friend function and friend classes, accessing base class functions from derived class objects, accessing derived class functions from base class objects. Operator overloading: -fundamentals of operator overloading, overloading binary operators, overloading unary operator		

<b>Unit V</b>	<b>Exceptions Handling and File Processing</b>	<b>06 Hours</b>
<p>Exception handling: Introduction, Handling exceptions within program, C++ mechanism of exception handling, throwing an exception, order of catch blocks, creating exception classes, rethrowing exceptions, exception handling techniques, Standard Library Exception Hierarchy.</p> <p>File Processing : Introduction, Files and streams, creating and opening a file, file opening modes, Reading data from file, updating file, Random access file – creating and opening a random access file, reading and writing to a random access file, object serialization.</p>		
<b>Unit VI</b>	<b>Template and Standard Template Library (STL)</b>	<b>06 Hours</b>
<p>Template: Introduction, function template, class template,</p> <p>STL – Introduction, STL containers, Common member functions in STL container, container headers, typedefs, iterators, iterator operations, STL Algorithms.</p>		
<b>Text Books:</b>		
<ol style="list-style-type: none"> <li>1. C++ Programming: From Problem Analysis To Program Design, (5<sup>th</sup> Edition), - D.S. MALIK, Cengage Learning.</li> <li>2. C++ How To Program (8<sup>th</sup> Edition) by Paul deitel, Harvey deitel, Pearson Publication  <a href="http://www.amazon.in/s/ref%3Ddp_byline_sr_book_1?ie=UTF8&amp;field-author=Parag%2BHimanshu%2BDave&amp;search-alias=stripbooks">http://www.amazon.in/s/ref%3Ddp_byline_sr_book_1?ie=UTF8&amp;field-author=Parag%2BHimanshu%2BDave&amp;search-alias=stripbooks</a> </li> </ol>		
<b>References Books:</b>		
<ol style="list-style-type: none"> <li>1. Object Oriented Programming in C++ (4<sup>th</sup> Edition) - Robert Lafore, SAMS Publication</li> <li>2. Effective C++ 55 Specific Ways to Improve Your Programs and Designs, (3<sup>rd</sup> Edition) - Scott Meyers, Addison Wesley Publication.</li> <li>3. The C++ Programming Language, (3<sup>rd</sup> edition) - Bjarne Stroustrup, Pearson Education India Publication.</li> </ol>		
<p><b>Practical Work:</b> Students have to carry out minimum 14 to 16 Practical based on features of C++, Object Oriented Design and data structure.</p>		
<b>Sample List of Experiments</b>		
<ol style="list-style-type: none"> <li>1. Write a program to implement complex numbers and provide basic arithmetic operations for them using structure (basic c++ program and class)</li> <li>2. Write a program to implement Matrix class and provide basic arithmetic operations for them (basic c++ program and class)</li> <li>3. Write a program to implement BMI calculator. (Class and Object)</li> <li>4. Write a program to calculate mode for a given set of number. Numbers can be integers, floating point numbers and double precision numbers (function overloading)</li> <li>5. Write a program to overload the basic arithmetic operators for the class complex numbers, also modify the show method to include I/O manipulators (Operator overloading)</li> <li>6. Write a program to overload insertion and extraction operators for the complex class using friend function (friend function)</li> <li>7. Write a program to implement hierarchy given in the figure. (simple inheritance)</li> <li>8. Write a program to implement linear search using template function. Input can be a set of integers, a set of double precision numbers, and a set of strings (Function template)</li> <li>9. Write a program to implement the given hierarchy (Multiple inheritance)</li> <li>10. Write a program to implement the has-a-relationship between given entities. (composition)</li> <li>11. Write a program to implement a class mySet as a template class and implement the following set operation union, intersection, difference and symmetric difference (Class template)</li> <li>12. Write a program to read a C++ program and check for error, if any in the parenthesis.</li> <li>13. The program should report the line numbers where error found (file handling).</li> </ol>		

14. Write a program to implement object serialization. (File handling)
15. Study of various containers available in Standard Template Library (STL)
16. Write a program to demonstrate various features of list container in STL

#### **Useful Links:**

1. C++ API Documentation : <https://devdocs.io/cpp/>
2. C++ API Reference : <https://en.cppreference.com/w/>



**DKTE Society's Textile and Engineering Institute, Ichalkaranji**  
**Second Year B. Tech. (Semester – III )**  
**DSP216: Open Elective-II Lab-Operating System**

Lab Scheme: Practicals: 02 Hrs /Week	Credits 01	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

- To explain the basics of the operating system.
- To simulate and implement operating system concepts.
- To design and solve inter-process communication issues between two processes.

**List of Experiments**

**(It should consist of 10-12 experiments based on the following topics.)**

<b>1</b>	Write a c program to simulate the CPU scheduling algorithm First Come First Serve (FCFS).
<b>2</b>	Write a program to stimulate the CPU scheduling algorithm Shortest job first (Non- Preemption).
<b>3</b>	Simulate the CPU scheduling algorithm round-robin.
<b>4</b>	Write a c program to simulate the CPU scheduling priority algorithm.
<b>5</b>	Write a C program to simulate producer-consumer problem using semaphores.
<b>6</b>	Write a C program to simulate the concept of Dining-Philosophers problem.
<b>7</b>	Write a program to find solution to Job Sequencing with Deadlines Problem Instance.
<b>8</b>	Implement and simulate the MFT algorithm.
<b>9</b>	Write a program to simulate the MVT algorithm.
<b>10</b>	Write a C program to simulate the following contiguous memory allocation techniques a) Worst-fit b) Best-fit c) First-fit
<b>11</b>	Implement FIFO page replacement technique.
<b>12</b>	Implement LRU page replacement technique

**DKTES Textile and Engineering Institute, Ichalkaranji**  
**Second Year B. Tech. (Semester – IV )**  
**DSP217: Computer Algorithms Lab**

Lab Scheme: Practicals: 02 Hrs /Week	Credits 01	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks
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**Course Outcomes:**

On completion of the course, student will be able to–

- Describe fundamentals of algorithms.
- Discover solution to problems using algorithm design paradigms like Divide & Conquer, Greedy Approach., Dynamic Programming and Backtracking Approach to tackle the problems.

**List of Experiments**

**(It should consist of 10-12 experiments based on the following topics.)**

<b>1</b>	Write a program to search an element in the list using Binary Search Approach and Compute its analysis.
<b>2</b>	Write a program to sort elements using Merge Sort Technique and Compute its complexity.
<b>3</b>	Write a program to sort elements using Quick Sort Technique and Compute its complexity.
<b>4</b>	Write program to find Single Source Shortest Path
<b>5</b>	Write a program to encode elements using Huffman Code.
<b>6</b>	Write a program to find solution to Knapsack Problem Instance.
<b>7</b>	Write a program to find solution to Job Sequencing with Deadlines Problem Instance.
<b>8</b>	Write a program to find All Pairs Shortest Path
<b>9</b>	Write a program to find solution to Reliability Design Problem Instance
<b>10</b>	Write a program to find solution to 0 / 1 Knapsack Problem Instance
<b>11</b>	Write a program to find solution to N-Queens Problem
<b>12</b>	Write a program to find solution to Sum of Subsets