

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
CIRCULAR NO.SU/Engg./S.Y.B.Tech./02/2017

It is hereby informed to all concerned that, the syllabi prepared by the Committees & recommended by the Dean, Faculty of Science & Technology, the **Academic Council at its meeting held on 20 & 21 June 2017 has accepted the following syllabi in accordance with Choice Based Credits & Grading System for all Branches S.Y.B.Tech** under the Faculty of Science & Technology as enclosed herewith.

Sr.No.	Syllabi as per CBC & GS
[1]	Second Year B.Tech.[Civil Engineering],
[2]	Second Year B.Tech. [Mechanical Engineering],
[3]	Second Year B.Tech. [Agricultural Engineering],
[4]	Second Year B.Tech.[Electrical Engineering],
[5]	Second Year B.Tech. [Plastic & Polymer Engineering],
[6]	Second Year B.Tech [Electronics & Telecommunication Engg.],
[7]	Second Year B.Tech. [Computer Science Engineering].

This is effective from the Academic Year 2017-2018 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO. SU/S.Y.B.TECH.2017/2173-84

Date:- 28-06-2017.

*
*
*
*
*
*
*
*
*


Deputy Registrar,
Syllabus Section.

Copy forwarded with compliments to :-

- 1] **The Principals, affiliated concerned Colleges, Dr. Babasaheb Ambedkar Marathwada University.**
- 2] The Director, University Network & Information Centre, UNIC, with a **request to upload this Circular on University Website.**

Copy to :-

- 1] The Director, Board of Examinations & Evaluation,
- 2] **The Section Officer,[Engineering Unit] Examination Branch,**
- 3] The Section officer, [Eligibility Unit],
- 4] **The Programmer [Computer Unit-1] Examinations,**
- 5] **The Programmer [Computer Unit-2] Examinations,**
- 6] The In-charge, [E-Suvidha Kendra],
- 7] The Public Relation Officer,
- 8] The Record Keeper,

SCHEME AND DETAILED SYLLABUS

of

S. Y. B. Tech. (Computer Science and Engineering)

Under Choice Based Credit & Grading System

(w.e.f. academic year 2017-18 & onwards/-)

(w.e.f. academic year 2017-18)

FOUR YEAR DEGREE COURSE IN SCIENCE & TECHNOLOGY



**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
AURANGABAD**

**FACULTY OF SCIENCE AND TECHNOLOGY
Revised Structure w.e. f. 2017-2018**

S.Y. B. Tech. (Computer Science and Engineering)

Course Code	SEMESTER-III	Contact Hrs / Week				Examination Scheme						
	Course	L	T	P	Total	CT	TH	TW	P	Total	Credits	Duration of Theory Exam
BSH 201	Engineering Mathematics III	3	1	-	4	20	80	-	-	100	4	3 Hrs
CSE202	Discrete Mathematics	3	1	-	4	20	80	-	-	100	4	3 Hrs
CSE203	Digital Electronics and Microprocessor	4	-	-	4	20	80	-	-	100	4	3 Hrs
CSE204	Computer Graphics	4	-	-	4	20	80	-	-	100	4	3 Hrs
CSE205	Data Structures	4	-	-	4	20	80	-	-	100	4	3 Hrs
CSE206	Advanced C	2	-	-	2	10	40	-	-	50	2	2 Hrs
CSE 221	Lab I: Digital Electronics and Microprocessor	-	-	2	2	-	-	25	25	50	1	
CSE 222	Lab II: Computer Graphics	-	-	2	2	-	-	50	-	50	1	
CSE223	Lab III: Data Structures	-	-	2	2	-	-	25	25	50	1	
CSE224	Lab IV: Computer Laboratory I (Advanced C)	-	-	2	2	-	-	25	25	50	1	
BSH 225	Lab V: Development of Skills II	-	-	2	2	-	-	50	-	50	1	
	Total of Semester-III	20	2	10	32	110	440	175	75	800	27	
Course Code	SEMESTER-IV	Contact Hrs / Week				Examination Scheme						
	Course	L	T	P	Total	CT	TH	TW	P	Total	Credits	Duration of Theory Exam
BSH251B	Engineering Mathematics IV	3	1	-	4	20	80	-	-	100	4	3 Hrs
CSE 252	Object Oriented Programming Paradigm	4	-	-	4	20	80	-	-	100	4	3 Hrs
CSE 253	Database Management System	4	-	-	4	20	80	-	-	100	4	3 Hrs
CSE254	Computer Organization	3	1	-	4	20	80	-	-	100	4	3 Hrs
CSE291-293	Programme Elective-I	4	-	-	4	20	80	-	-	100	4	3 Hrs
CSE255	Web Programming	2	-	-	2	10	40	-	-	50	2	2 Hrs
CSE271	Lab VI: Object Oriented Programming Paradigm	-	-	2	2	-	-	25	25	50	1	
CSE272	Lab VII: Database Management System	-	-	2	2	-	-	25	25	50	1	
CSE273	Lab VIII: Computer Laboratory II (Python Programming)	-	-	2	2	-	-	25	25	50	1	
CSE274	Lab IX: Web Programming	-	-	2	2	-	-	50	-	50	1	
CSE275	Lab X: DOS III: Technical Report Writing	-	-	2	2	-	-	50	-	50	1	
	Total of Semester-IV	20	2	10	32	110	440	175	75	800	27	
	Grand Total of III&IV									1600	54	

L: Lecture hours per week T: Tutorial hours per week P: Practical hours per week CT: Class Test TH: University Theory Examination TW: Term Work P: Practical/Oral Examination

Elective I – CSE291-Multimedia Techniques

CSE292- Human Computer Interaction

CSE293- Principles of Programming Languages

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
(Faculty of Engineering & Technology)
Syllabus of S. Y. B. Tech. (All) Semester-III

Course Code: BSH201
Teaching Scheme: 04Hrs/week
Theory: 03Hrs/week
Tutorial: 01Hr/week
Credits:04

Course: Engineering Mathematics –III
Class Test: 20 marks
Theory Examination (Duration): 03 Hrs
Theory Examination (Marks): 80

Objectives	:	1. The contents aims to develop and apply the knowledge of the student in the direction of solving the practical problem of differential equation in the engineering and technology. 2. To develop Logical understanding of statistics. 3. To study the basic of Laplace transform.
Unit-I	:	Linear Differential Equation: Solution of linear differential equation of order n with constant coefficients: The complementary function, Method of finding particular integral: Short method, General method, Method of variation of parameters. Equations reducible to linear equations with constant coefficients: i) The Cauchy's linear equation. ii) The Legendre's linear equation. (10 Hrs)
Unit-II	:	Application of linear differential equations to: i) Mechanical system. ii) Electrical System iii) Beam and Shafts (04 Hrs)
Unit-III	:	Vector Differentiation: Differentiation of vectors, Radial, Transverse, Normal and tangential components of velocity and acceleration, Scalar and vector point function, Gradient of scalar point function, Divergence and curl of vector point function, Second order differentiation operator, Irrotational and solenoid fields. (10 Hrs)
Unit-IV	:	Laplace Transform: Definition, Laplace Transform of elementary function and its table, Theorem and properties of Laplace Transform: First shifting theorem, Second Shifting Theorem, Multiplication by t, Division by t, Change of scale property, Laplace Transform of integral, Laplace Transform of Derivative. Laplace Transform of some special functions: Periodic function, Heaviside Unit Step Function, Displaced Heaviside Unit Step Function Laplace Transform using Heaviside Unit function, Dirac delta function. Method to find inverse Laplace Transform: i. Use of Laplace Transform table ii. Use of Theorem and properties of Laplace iii. Use of partial fraction iv. Convolution theorem v. Use of development of Heaviside Unit Step Function Application of Laplace Transform to solve linear differential equation (12 Hrs)

Unit-V	:	Fourier Transform: Fourier integral: Complex form of Fourier integral, sine and cosine integral, Fourier transform and inverse transform. D.U.I.S. rule (only statement), Fourier transform and inverse transform for even and odd function, Fourier sine and cosine transform and inverse transform. (7 Hrs)
Unit-VI	:	Statistics: Measures of central tendency: Mean, Median, Quartiles and Mode. Measures of dispersion: Quartile deviation, Mean deviation, Standard deviation, coefficient of variation. (5 Hrs)
Reference Books:	:	<ol style="list-style-type: none"> 1) A Text Book of Applied Mathematics Volume-III by P.N. Wartikar J.N.Wartikar, Pune VidyarthiGrihaPrakashan. 2) Advanced Engineering Mathematics by H. K. Dass, S. Chand and Co. Ltd. 3) Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers. 4) Higher Engineering Mathematics by B. V. Ramana, Tata McGraw-Hill Publishing Co. Ltd. 5) Solution to Higher Engineering Mathematics Volume –III by C. P. Gandhi

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science and Technology)

Syllabus of S.Y.B. Tech. (Computer Science and Engineering) Semester-III

Code No.: CSE202

Course: Discrete Mathematics

Teaching Scheme: 04 Hours per week

Class Test: 20

Theory: 03 Hours per week

Theory Examination (Duration): 03 Hrs

Tutorial: 01 Hr per week

Theory Examination (Marks): 80

Credits: 04

Course Objectives	<ol style="list-style-type: none">1. To learn formal logic, proofs, sets, relations and functions.2. To relate the ideas of mathematical induction to recursion and recursively defined structures.3. To learn graphs and trees related algorithms.4. To apply these concepts to various areas of computer science.
Unit-I	<p>: Set Theory and Logic: Discrete Mathematics, Significance of Discrete Mathematics in Computer Engineering.</p> <p>Sets Sets, Set Operations, Finite and Infinite Sets, Uncountable Infinite Sets, Mathematical Induction, Principle of Inclusion and Exclusion.</p> <p>Propositional Logic Logic, Logical Connectives, Propositional Equivalences, Predicates and Quantifiers, Application of Propositional Logic-Translating English Sentences, Proof Methods and Strategy. (08Hrs)</p>
Unit-II	<p>Relations and Functions Relations – Definition, Properties of binary relations, N-ary Relations and their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings, partitions, Hasse Diagram, Lattices, Chains and Anti-Chains.</p> <p>Functions- Surjective, Injective and Bijective functions, Inverse Functions and Compositions of Functions, The Pigeonhole Principle. (08Hrs)</p>
Unit-III	<p>: Recurrence Relations Recurrence Relation, Linear Recurrence Relations with constant Coefficients, Homogeneous Solutions, Total solutions, Solutions by the method of generating functions. (08Hrs)</p>
Unit-IV	<p>: Permutations and Combinations The rule of sum and product, Permutations, Combinations, Binomial Coefficients, Generalized Permutations and Combinations, Algorithms for generating Permutations and Combinations. (08Hrs)</p>
Unit-V	<p>: Graphs Basic terminology, multi graphs and weighted graphs, Representation of graph, Operations on Graphs, Hamiltonian and Eulerian paths and circuits, Shortest path-Dijkstra's algorithm, Traveling salesman problem, Factors of a graph, Planer graphs, Graph Coloring. Trees: Introduction, Basic Terminology. (08 Hrs)</p>
Unit-VI	<p>: Algebraic Structures The Structure of Algebras, Semigroups, Monoids and Groups, Homomorphism and Normal Subgroups, Rings, Integral Domains and Fields, Polynomial Rings and Polynomial Codes. (08 Hrs)</p>

Reference Books:	:	<ol style="list-style-type: none"> 1. “Elements of Discrete Mathematics”, BY C.L. LIU, Tata McGrawHill publication. 2. “Discrete Mathematics and its Application”, BY Kenneth H. Rosen, Tata McGraw-Hill, 7th Edition. 3. “Discrete Mathematics”, BY R. Johnsonbaugh, Pearson Education publication. 4. “Discrete Mathematics with Graph Theory”, BY E. Goodaire, M. Parmenter, Pearson Education. 5. Elements of Discrete Mathematics”, BY C.L LIU, D.P. Mohapatra, Tata McGraw-Hill publication.
-------------------------	---	--

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Note:12 Tutorials should be based on above syllabus

<p style="text-align: center;">Dr.BabasahebAmbedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S.Y.B. Tech. (Computer Science and Engineering) Semester-III Code No.: CSE 203</p> <p style="text-align: center;">Course: Digital Electronics and Microprocessor Class Test: 20 Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80</p>	
Course Objectives	<ol style="list-style-type: none"> 1. To understand the basics of digital electronics, Logic gates and Boolean Algebra 2. To understand the design and functionality of the Combinational and Sequential Logic circuits 3. To learn the basics, architecture and assembly language of microprocessor 8086 4. To understand the architecture and working of 8051 microcontroller
Unit-I	<p>Number systems and Codes:- Introduction to Digital Circuit and Digital Signal, Number systems(Binary, Octal, Decimal, hexadecimal), Number System conversions, Binary arithmetic, 1's and 2's complement method, Concept and Type of Codes(Weighted and Non-Weighted Codes), Binary to gray and gray to binary code conversion.(08Hrs)</p>
Unit-II	<p>Logic Gates and Boolean algebra –Basic Logic Gates, Universal gates and their truth tables, Realization of Basic logic gates using universal gates, Boolean Algebra, De-Morgan's Theorem, Implementation of Boolean equation with Logic Gates. (08Hrs)</p>
Unit-III	<p>Combinational and Sequential Logic Circuit - SOP and POS form, Min-term and Max-term, Representation of logical function, Minimization using K- Map (Upto 4 variables), QuinMcClusky method for minimization. Binary half and Full adders, Binary half and full subtractors, Multiplexers and Decoders. Introduction to Sequential Circuits – Basic Latch, Introduction to Flipflop and its type. (08Hrs)</p>
Unit-IV	<p>Microprocessor and Assembly Language Programming: Introduction to Microprocessor, Evolution of microprocessor family, Architecture of 8085, Features of 8085, Architecture of 8086, Signal descriptions of 8086, Addressing Modes of 8086, Instruction set of 8086/8088, Assembler Directives and operators, Assembly Language Programs, Interrupts - Maskable and Non Maskable Interrupts. (08Hrs)</p>
Unit-V	<p>Peripherals and their Interfacing with 8086/8088 : Introduction to Interfacing, Memory Interfacing, Programmable Input-Output Port 8255, Modes of operation of 8255, Programmable Interval Timer 8253, Programmable Communication Interface 8251 USART, DMA Controller 8257. (08 Hrs)</p>
Unit-VI	<p>Microcontroller: Introduction to Microcontroller, Comparison of Microprocessor and Microcontroller, Microcontroller 8051 - Block Diagram, Family of 8-bit Microcontrollers, Architecture of 8051, Features of 8051. (08 Hrs)</p>
Reference Books:	<ol style="list-style-type: none"> 1. R.P. Jain, Modern Digital Electronics, Tata McGraw Hill 2. A. Anand Kumar, Fundamentals of Digital Circuits” Second Edition, PHI 3. A.K. Ray and K. M. Bhurchandi, “Advanced Microprocessors and Peripherals” , Second Edition, Tata McGraw Hill 4. MuhammasMazidi, Janice Mazidi and RolinMcKinlay, —The 8051 Microcontroller and Embedded Systems using Assembly and C, Pearson Education. 5. Brey, Barry B, - The Intel Microprocessors 8086/8088, 80286, 80386 and 80486 Assembly Language

	Programming, Prentice Hall. 6. Scott Mackenzie, —The 8051 Microcontroller, Prentice Hall India, 7. Douglas Hall, Microprocessor and Interfacing, McGraw Hill
--	--

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

	2. Edward Angel, Interactive Computer Graphics. A Top-Down Approach Using OpenGL (fifth Edition), Pearson Education, 2008. 3. S. Harrington, "Computer Graphics", 2 nd Edition, McGraw-Hill Publications
Reference Books:	: 1. Edward Angel, OpenGL : A primer 2 nd edition, Addison-Wesley, 2005. 2. The OpenGL Programmer's Guide (the Redbook), Addison-Wesley . 3. The OpenGL Reference Manual (the Bluebook), Addison-Wesley .

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

	of BFS and DFS. Finding shortest path in graphs- Dijkstra's algorithm, Bellman Ford algorithm. Minimum Spanning Tree- definition, constructing minimum spanning tree- Kruskal's algorithm, Prim's Algorithm, Application of graphs in real world. (08Hrs)
Unit-VI	: Sorting, Searching and miscellaneous: Sorting: define, categories- comparison based, counting based, in-place, not-in-place, stable. Bubble sort, insertion sort, quick sort, heap sort. radix sort, shell sort. Comparison of sorting techniques. Searching: Linear search, binary search. Hashing- concept, examples, collision, resolving collision, applications of hashing. Indexing. Application of data structures in real world- Database and Expert Systems. (08Hrs)
Reference Books:	: 1. "Data Structures using C and C++", by Augenstein and Tenenbaum Langsam. Prentice Hall of India; Second Edition (2007) 2. "Data Structures and Program Design in C" by Robert L. Kruse, Bruce P. Leung. Prentice Hall; Second Edition (1996) 3. "Algorithms+Data Structures = Programs" by Wirth Niklaus. Prentice Hall Series in automatic computation. 4. "Data Structures through C" by Yashvant P. Kanetkar. BPB publication; Second Edition (2003). 5. "Data Structures" by Seymour Lipschutz. McGraw Hill Education; Revised First Edition (2014)
Online Material	: 1. NPTEL Course by Prof. Naveen Garg, IIT Delhi http://nptel.ac.in/courses/106102064/ 2. Programming and Data Structures material by Prof. Pallabh Das Gupta, IIT Kharagpur http://cse.iitkgp.ac.in/~pallab/pds16/pds16.htm 3. Programming and Data Structures material by Prof. Pratha Pratim Das, IIT Kharagpur http://cse.iitkgp.ac.in/~ppd/

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr.BabasahebAmbedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S.Y.B. Tech. (Computer Science and Engineering) Semester-III Code No.: CSE206 Course: Advanced C	
Teaching Scheme:02 Hours per week Class Test: 10 Theory: 02 Hours per week Theory Examination (Duration): 02 Hrs Credits:02 Theory Examination (Marks): 40	
Course Objectives	: 1. Implement structures and Union in C 2. Perform memory operations using pointers. 3. Distinguish various number systems, representations and apply bitwise operations 4. Identify storage classes in C and evaluate appropriate situation to use local, global and static variables.
Unit-I	: Structures and Union: Structures – Definition, Declaration and types, accessing elements of structure, range of signed and unsigned data types. Unions – , Declaration and types, accessing elements of unions(04 Hrs)
Unit-II	: Pointers: Accessing a Variable Through Pointer, Memory Allocation, Declaration and Initialization, Dereferencing, Pointer Increment and Scaling, Pointers and Arrays, Character Arrays using Pointers, Array of Character Pointers Memory Diagram – Array of Char Pointers Arrays as Pointers(04 Hrs)
Unit-III	: Computing Basic: Binary and Octal Systems, Decimal and Hexadecimal Systems, Signed Representations in Memory: Binary Shifts – Right and Left, Sign Bits and Bit-Shift Operations, Right Shift – Logical Vs Arithmetic Shift, ASCII Representations, Endian-ness – Little Vs Big, Operators - Bitwise Operations, Logical Operators, sizeof() operator, Operator Precedence, Operator Associativity(04 Hrs)
Unit-IV	: Storage Classes: Storage Class Specifiers Scope of a Variable Register, Auto, Static, Extern, Variables and Stack Static Variables and Functions, Local/Block/Global Scope, Nesting of Scope, Lifetime of a Variable, Linkage of a Variable.(04 Hrs)
Unit-V	: File Input/Output: Data Organization, File Operations - Opening a File, Reading from a File, Trouble in Opening a File, Closing the File. Counting Characters, Tabs, Spaces. File Opening Modes String (line) I/O in Files, Record I/O in Files Text Files and Binary Files, Record I/O Revisited Database Management(04 Hrs)
Unit-VI	: Interaction with Hardware Hardware Interaction, DOS Perspective Hardware Interaction, Windows Perspective Communication with Storage Devices, Accessing Other Storage Devices Communication with Keyboard - Dynamic Linking, Windows Hooks, Caps Locked, Mangling Keys, KeyLogger.(04 Hrs)
Reference Books:	: 1. “Let us C” by YashwantKanetkar. BPB Publications; Thirteenth Revised and updated Edition(2016) 2. “Understanding Pointers in C”, by YashwantKanetkar BPB Publications 3. “C: The Complete Reference” by Herbert Schildt. McGraw Hill Education; Fourth Edition(2000) “The C Programming Language ” by Brian W. Kernighan, Dennis Ritchie. Pearson Education India; Second Edition(2015)

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 40 marks Paper:

1. Minimum eight questions.
2. Four questions in each section.
3. Question no 1 from section A and Question no 5 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each. The Question no.1 and 5 should be of objective nature.
4. Two questions of 7 marks each from remaining questions from each section A and B be asked to solve.

Dr. BabasahebAmbedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S.Y. B. Tech. (Computer Science and Engineering) Semester- III Code No.: CSE221 Course: Lab Digital Electronics and Microprocessor Termwork :25 marks Practical:25 marks Total Examination (Marks): 50 Marks	
Practical: 02 Hours per week Credits:01	Practical:25 marks Total Examination (Marks): 50 Marks
Course Objectives	: 1. Demonstrate the basic logic gates and combinational logic circuits 2. Select the addressing modes and instruction set to implement different assembly language programs 3. Develop the skills to write and execute the program for microcontroller 8051
List of Practicals (Minimum ten experiments to be performed)	: 1. Implementation of Boolean expression using AND/OR/NOT and NAND/NOR logic. 2. Realization of Half and Full Adder using logic gates 3. Realization of Half and Full Subtractor using logic gates 4. To Study TASM/MASM/emu8086 5. Write an Assembly language program to print the string in 8086 6. Write an Assembly language program for 8-bit addition and 16-bit addition in 8086 7. Write an Assembly Language Program for 8-bit subtraction and 16-bit subtraction in 8086 8. Write an Assembly Language Program for 8-bit multiplication and 16-bit division in 8086 9. Write an Assembly Language Program for finding smallest number from an array 10. Write a program to create LED pattern generation/blink LED in 8051 microcontroller
List of Reference Books	: 1. R.P. Jain, Modern Digital Electronics, Tata McGraw Hill 2. A. Anand Kumar, Fundamentals of Digital Circuits” Second Edition, PHI 3. A.K. Ray and K. M. Bhurchandi, “ Advanced Microprocessors and Peripherals” , Second Edition, Tata McGraw Hill 4. MuhammasMazidi, Janice Mazidi and RolinMcKinlay, —The 8051 Microcontroller and Embedded Systems using Assembly and C, Pearson Education. 5. Douglas Hall, Microprocessor and Interfacing, McGraw Hill

The assessment of term work shall be done on the basis of the following.

- 1) Continuous assessment.
- 2) Performing the experiments in the laboratory.
- 3) Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S.Y. B. Tech. (Computer Science and Engineering) Semester- III Code No.: CSE222	
Course: Computer Graphics Lab Termwork :50 marks Practical:NA Total Examination (Marks): 50 Marks	
Practical: 02 Hours per week Credits:01	
Course Objective	: 1. Explore various functions in ‘C graphics library’ to implement graphics primitives. 2. Apply graphics programming techniques to design and create Computer Graphics scenes. 3. Implement various algorithms for generating and rendering graphical figures.
List of Practical’s (Minimum ten experiments to be performed)	: 1. Design and develop simple graphics programs using basic graphics functions defined in “graphics.h”. 2. Implement DDA and Bresenham’s line drawing algorithm in C/C++. 3. Implement Cohen Sutherland line clipping algorithm in C/C++. 4. Implement polygon filling algorithms in C/C++. 5. Design and develop OpenGL programs to implement basic graphics primitives. 6. Write C/C++ program to draw 2D object and perform translation, rotation and scaling transformations. 7. Write C/C++ program to implement any one hidden surface removal algorithm. 8. Write C/C++ program to draw any object using any curve generation technique. 9. Write C/C++ program to generate snowflake using concept of fractals. 10. Write C/C++ program to simulate any one of or similar object: <ul style="list-style-type: none"> • Chess / Ludo Board • Mickey Mouse • Moving 3D box in free space • Analog clock • Tower of Hanoi – A graphical representation 11. Case study of any graphics tool (Direct3D/Maya/Blender).
List of Reference Books	: 1. Computer Graphics with Open GL: (4th Edition) by Donald D. Hearn, M. Pauline Baker, Warren Carithers, Pearson Education. 2. Edward Angel, OpenGL : A primer 2nd edition, Addison-Wesley, 2005.

The assessment of term work shall be done on the basis of the following.

1. Continuous assessment.
2. Performing the experiments in the laboratory.
3. Oral examination conducted on the syllabus and term work mentioned above.

Dr. BabasahebAmbedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S.Y. B. Tech. (Computer Science and Engineering) Semester- III	
Code No.: CSE 223 Practical: 02 Hours per week Credits:01	Course: Data Structures (Lab) Termwork :25 marks Practical:25 marks Total Examination (Marks):50
Course Objective	: <ol style="list-style-type: none"> 1. Define the concept of data structures and discriminate usage of various data structures in approaching a problem. 2. Develop static and dynamic implementation of stacks and queues and identify their applications. 3. Apply the concept of linked list for implementing various data structures. 4. Perform insertion, deletion, search and traversal operations on a binary search tree. 5. Compare various graph traversal techniques, construct minimum cost spanning tree for a given graph and find shortest path in a graph. 6. Analyze appropriate sorting techniques to be applied in a given situation. Identify and study real world application of data structures.
List of Practicals (Minimum ten experiments to be performed)	: <ol style="list-style-type: none"> 1. “MIT Banking Application”- Students are required to create a menu driven program which provides choice of following operations: Create Account, Modify Account Details, Deposit Amount, Withdraw Amount, Account Summary, and exit. A user can perform any of these operations any number of times till he chooses to exit. Hint: <ol style="list-style-type: none"> 1. Declare the structure for AccountHolder – acc no, name, balance. 2. Create functions for – CreateAccount, ShowAccount, UpdateAccount, Withdraw, and Deposit. 3. Create an array of AccountHolder in main() 2. Static and Dynamic implementation of Stack- Students are required to create a menu driven program which provides choices to perform Stack operations- create, push, pop, peek, isempty, isfull and exit. User can perform any of these operations any number of times till he chooses to exit. You are required to create stack using array and using linked list (separate program for each, main will be same for both). 3. Static and Dynamic implementation of Queue- Students are required to create a menu driven program which provides choices to perform Queue operations- create, enqueue, dequeue, isempty, isfull, front and exit. User can perform any of these operations any number of times till he chooses to exit. You are required to create queue using array and using linked list (separate program for each, main will be same for both). 4. Linked List- Students are required to create a menu driven program which provides choices to perform operations on – singly or doubly linked list. Singly linked and doubly linked list operations include- Create, InsertFront, InsertEnd, InsertBefore, InsertAfter, DeleteFirst, DeleteLast, Deleteparticular, Traverse, Search. User can perform any of these operations any number of times till he chooses to exit. Hint: <ol style="list-style-type: none"> 1. Create two structures- SinglyLinkedList, DoublyLinkedList. 2. Create two start pointers- SinglyStart, DoublyStart 3. Create separate functions for singly linked list operations and doubly linked list

operations

4. create a two level menu- at first level choices will be 1. Singly Linked list 2. Doubly Linked List. At second level choices will be of operations on the chosen type of linked list.

5. Binary Search Tree - Students are required to create a menu driven program which provides choices to perform operations on a Binary Search Tree- CreateTree, InsertNode, DeleteNode, SearchNode, Traverse- in-rder, pre-order, post-order and exit. User can perform any of these operations any number of times till he choses to exit.

6. Graph Traversals- Given the adjacency matrix representation of a graph, students are required to create a menu driven program which provides choices to perform the traversal of the given graph in – Breadth First Search , Depth First Search. The output will be displayed for chosen traversal method. User can perform any of these operations any number of times till he choses to exit, every time you can enter different graph.

Hint:

1. Declare an adjacency matrix to represent graph.
2. Create separate functions for - BreadthFirstSearch andDepthFirstSearch.
3. Create menu in main()

7. Shortest Path Algorithm- You own a goods transport firm, the company is facing losses as they mostly end up choosing an inefficient path between pair of cities. Students are required to provide an optimum shortest path between two cities so that the distance is minimum. You will be given cost of traveling from one city to another (if they connect directly) otherwise zero. Assume set of n cities.

Hint:

1. Declare an adjacency matrix to represent the weighted graph of path between n cities
2. Create a function with computes shortest path between source and destination using Dijkstra's Algorithm.

8. Sorting- MIT Library has n books; each book has a serial number. Students are required to write program to sort the serial numbers in ascending order using Bubble Sort. (array of serial number is input)

9. Sorting- A recruitment drive is to be conducted at MIT; the recruiter wants the list of students to be sorted in ascending order of their average percentage. Students are required to sort the list by using Quick Sort. (array of average percentage is input)

10. Searching- CSE Students have a unique enrollment number, given a list of these enrollment numbers you are required to search for a particular number(to be input by user) and display its position in array and display failure if the number is not present in the list. Use (a) Linear Search (b) Binary Search . Select search technique as per user's choice. Assume the list to be random (perform sorting first in case of binary search)

11. Programs for sorting- Insertion sort, Heap sort, Radix sort.

		12. Programs for creating Minimum Spanning Tree- Kruskal's Algorithm.
List of Reference Books	:	<ol style="list-style-type: none"> 1. "Data Structures using C and C++", by AugensteinandTenenbaumLangsam. Prentice Hall of India; Second Edition (2007) 2. "Data Structures through C" by Yashvant P. Kanetkar. BPB publication; Second Edition (2003). 3. "Data Structures" by Seymour Lipschutz. McGraw Hill Education; Revised First Edition(2014) 4. "Data Structures using C" by E. Balagurusamy. McGraw Hill Education; First Edition(2013)
Online Material	:	<ol style="list-style-type: none"> 1. NPTEL Course by Prof. Naveen Garg, IIT Delhi http://nptel.ac.in/courses/106102064/ 2. Programming and Data Structures material by Prof. PallabhDasGupta, IIT Kharagpurhttp://cse.iitkgp.ac.in/~pallab/pds16/pds16.htm 3. Programming and Data Structures material by Prof. PrathaPratim Das, IIT Kharagpurhttp://cse.iitkgp.ac.in/~ppd/

The assessment of term work shall be done on the basis of the following.

- 1) Continuous assessment.
- 2) Performing the experiments in the laboratory.
- 3) Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S.Y. B. Tech. (Computer Science and Engineering) Semester- III Code No.: CSE224 Course: Computer Laboratory- I (Advanced C) Term-work :25 marks Practical:02 Hours per week Credits:01 Practical:25 marks Total Examination (Marks): 50 Marks	
Course Objectives	: After completing this course the student will be able to: 1) Apply basic elements of C programming including primitive, non-primitive data types in programs. 2) Perform memory manipulation using pointers. 3) Distinguish various number systems, representations and apply bitwise operations 4) Identify storage classes in C and evaluate appropriate situation to use local, global and static variables.
List of Practical's (Minimum ten experiments to be performed)	: <ol style="list-style-type: none"> 1. Program to implement basic operations on a "Student Information Portal" using Structure, Arrays, Functions. 2. Program to implement basic operations on Union. 3. Program to demonstrate- (a) Pointer operations (b) Passing Pointer to function (c) function 4. 4. 4. Returning Pointers (d) Character array using Pointers. 5. Program for Dynamic memory allocation- Operations on Singly Linked List. 6. Program to demonstrate- (a) Bit wise Operators (b) logical Operators. 7. Program for Decimal to Binary Conversion. 8. Program to Demonstrate (a) Storage Classes in C (b) Macros. 9. Perform Read and write operations on text file and print its contents on Console. 10. Program to copy a binary file to another. 11. Program to count number of words, lines, characters in a file. 12. Program do demonstrate hardware interaction with (a) Storage Device (b) Keyboard
List of Reference Books	: <ol style="list-style-type: none"> 1. "Let us C" by Yashwant Kanetkar. BPB Publications; Thirteenth Revised and updated Edition (2016) 2. "Understanding Pointers in C", by Yashwant Kanetkar BPB Publications 3. "C: The Complete Reference" by Herbert Schildt. McGraw Hill Education; Fourth Edition(2000) 4. "The C Programming Language" by Brian W. Kernighan, Dennis Ritchie. Pearson Education India; Second Edition(2015)

The assessment of term work shall be done on the basis of the following.

- 1) Continuous assessment.
- 2) Performing the experiments in the laboratory.
- 3) Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science & Technology)

Syllabus of S. Y. B. Tech all Semester-III**Code No.: BSH225****Course: Lab V: Development of Skills-II****Teaching Scheme: 2 hrs/week****Termwork: 50 marks****Practical : -2 hrs/week****Credits:1**

Course Objectives	1.Students will be able to apply communicative English Grammar in communication. 2.Students will be able to enhance the level of English vocabulary. 3.Students will be able to pronounce and articulate words as well as sentences accurately. 4.Students will be able to understand and apply correct body language eventually. 5.Students will be able to develop life skills. 6.Students will be able to develop placeability skills and business correspondence.			
List of Practical	Sr. No.	Section	Contents	
	1	English Communicative Grammar	Structure of sentences, types of sentences, clauses, grammatical common errors in English(04 Hrs)	
	2	Vocabulary Building	Usage of words in sentences, common errors in spelling of words, synonyms, antonyms, phrases and idioms(02 hrs)	
	3	Phonetics	Syllables, Stress, intonation, pronunciation of words, phonetic transcription - conversion of words to phonetic symbols and from phonetic symbols to words, British and American English (basic difference in vocabulary, spelling, pronunciation and structure), non-verbal language.(04 hrs)	
	4	Non-verbal Communication (Body language)	Posture, gesture, eye contact, facial expression, proxemics, chronemics, appearance and symbols. (02 hrs)	
	5	Soft Skills	Personality development, self analysis through SWOT, Johari window, interpersonal skills, perception and attitude, values and ethics, career planning. (02 hrs)	
	6	Placeability Skills	Job application, resume writing, analytical and reasoning test, debate, group discussion, demo presentation and interview skills.(04 hrs)	
	7	Business Correspondence	Letter writing at work place (hard copy and soft copy), telephone and Email etiquette, report writing. (02 hrs)	
List of Reference Books	Sr. No.	Title	Author	Publication
	1	The Essence of Effective Communication	Adrian Budday, Ron Ludlow and Fergus' Panton	Prentice Hall of India-Private Ltd.
	2	Communicating in Style	Yateendra Joshi	The energy Resource Institute
	3	Effective Technical Communication	Anne Eisenberge	McGraw Hill International Editors
	4	Professional Communication Skills	A. K. Jain, Pravin, S. R. Bhatia, A. M. Sheikh	S. Chand & Company Ltd.
	5	Business Communication	Urmila Rai, S. M. Rai	Himalya Publishing House

6	Developing Communication Skills	Krishna Mohan and Meera Banerjee	Macmillan India Limited
7	Better English Pronunciation	J.D.O'Connor.	Cambridge Publication
8	Professional Communication Skill	Pravil S.R. Bhatia, S.Bhatia	S. Chand & Co
9	Living English Structure	Allan Walter	Pearson Education India
10	Communication Techniques & Skill	R.K. Chadha	
11	Technical Communication- Principles and Practice	Meenakshi Raman & Sangeeta Sharma	Oxford University Press
12	A course in Phonetics & Spoken English	J.Sethi, P.V.Dharmatma	PHI publication
13	Communication Skills for Engineers	Sunita Mishra, C. Murli Krishna	Pearson Education
14	Communication Skills	Leena Sen	PHI
15	Technical Communication A Reader Centered Approach	Paul V. Anderson	Thomson Publication
16	Grammar of Spoken and Written English	Dauglas Biber, Geoffrey Leech	Longman
17	A Practical English Grammar	A.J. Thomson & A.V. Martinet	Oxford University Press
18	Oxford English Grammar	Sydney Greenbaum	Oxford University Press
19	Developing Graduate Employability Skills: Your Pathway to Employment	Mercy V. Chaita	Universal Publishers

The assessment of term work shall be done on the basis of the following.

- 1) Continuous assessment.
- 2) Performing the experiments in the laboratory
- 3) Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Engineering & Technology)

Syllabus of S.Y.B. Tech. (Computer Science and Engineering) Semester-IV

Course Code: BSH251B

Credits: 04

Course: Engineering Mathematics -IV

Class Test: 20 marks

Teaching Scheme: 04 Hrs/week

Theory Examination (Duration): 03 Hrs

Theory: 03 Hrs/week

Theory Examination (Marks): 80

Tutorial: 01 Hr/week

Objectives	:	1) To develop the mathematical skills of the student related to function of complex variable and Vectors. 2) To study and apply various types of transforms. 3) To provide Numerical techniques for solving the practical problem in engineering and technology.
Unit-I	:	Function of complex variable : Introduction , Analytic function ,Cauchy-Riemann equation in Cartesian and polar coordinates ,Harmonic function, orthogonal system, Integration in complex plane: Line integral, Contour integral, Cauchy's integral theorem, Cauchy's integral formula, Extension of Cauchy's theorem on multiply connected region, Singularities, Residues, Cauchy's residue theorem. (12 Hrs)
Unit-II	:	Application of Complex Variable: Evaluation of real integrals: Integration along unit circle and along the upper half semi-circle, Conformal Transformation, Bilinear transformation. (5 Hrs)
Unit-III	:	Vector Integration: Line integral, Surface integral, Gauss divergent theorem, Stoke's theorem, Green's theorem. (7 Hrs)
Unit-IV	:	Numerical Method: Solution of algebraic and transcendental equation, Newton Raphson method, Lagrange's interpolation, Solution of linear simultaneous equation by Gauss Elimination method, Gauss-Seidel method, Solution of ordinary differential equations: Taylor series method, Fourth order Runge-Kutta method. (10 Hrs)
Unit-V	:	Probability Introduction, Probability Distribution: Binomial Distribution, Poisson Distribution, Normal Distribution. (6 Hrs)
Unit-VI	:	Z- transform : Definition, Z-transform of elementary function, properties of Z-transform, Inverse Z-transform: Partial fraction method, inversion integral method (Residue method), Solution of Difference equation by using Z-transform. (8 Hrs)

Reference Books:	: 1. A Text Book of Applied Mathematics Volume-III BY P.N. Wartikar J.N.Wartikar, Pune VidyarthiGrihaPrakashan. 2. Advanced Engineering Mathematics BY H. K. Dass, S. Chand and Co. Ltd. 3. Higher Engineering Mathematics BY Dr. B. S. Grewal, Khanna Publishers. 4. Higher Engineering Mathematics BY B. V. Ramana, Tata McGraw-Hill Publishing Co. Ltd. 5. Solution to Higher Engineering Mathematics Volume –III BY C. P. Gandhi
-------------------------	--

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

<p style="text-align: center;">BabasahebAmbedkar Marathwada University, Aurangabad (Faculty of Science and Technology)</p> <p style="text-align: center;">Syllabus of S.Y.B. Tech. (Computer Science and Engineering) Semester-IV</p> <p>Code No.: CSE 252 Course: Object Oriented Programming Paradigm</p> <p>Teaching Scheme:04 Hours per week Class Test: 20</p> <p>Theory: 04 Hours per week Theory Examination (Duration): 03 Hrs</p> <p>Tutorial: NA Theory Examination (Marks): 80</p> <p>Credits:04</p>	
Course Objectives	<ol style="list-style-type: none"> 1. To Explore the Principles of Object Oriented Programming (OOP). 2. To Understand Object-Oriented Concepts such as Data Abstraction, Encapsulation, Inheritance and Polymorphism. 3. To Use the Object-Oriented Paradigm in Program Design. 4. To Lay a Foundation for Advanced Programming.
Unit-I	<p>: Introduction To Object Oriented Programming: History and Features: Need Of Object-Oriented Programming (OOP), Procedure Oriented Programming (POP) Versus Object Oriented Programming (OOP), Features of Object Oriented Paradigm– Merits and Demerits of OO Methodology. Beginning With C++: Keywords, Variables, Constants, Basic Data Types, Scope Resolution Operator, Memory Management Operators, Operator and Control Statements, Input and Output Statements in C++, Structure of C++ Program. (08 Hrs)</p>
Unit-II	<p>: Classes and Objects: Introduction, Class Specification, Member Function Specification, Access Specifiers, Creating Objects, Memory Allocations for Objects. Array of Objects, Object as Function Arguments. Static Data Members, Static Member Function, Friend Function, Constructors and Destructors.(08 Hrs)</p>
Unit-III	<p>: Inheritance: Extending Classes : Introduction, Defining a Derived Class, Visibility Modes and Effects. Public And Private Inheritance. Types Of Inheritance: Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Class, AbstractClass. (08 Hrs)</p>
Unit-IV	<p>: Polymorphism: Introduction, Types Of Polymorphism: Compile Time, Run Time. Compile Time Polymorphism: Function Overloading, Operator Overloading: Overloading Unary Operators and Binary Operators, Rules for Operator Overloading. Run Time Polymorphism: Virtual Functions, Rules For Virtual Functions, Pure VirtualFunction. (08 Hrs)</p>
Unit-V	<p>: Pointers and Templates: Pointers in C++: Pointer Declaration, Pointer Operator, Address Operator, Pointer Arithmetic. Dynamic Memory Allocation / Deallocation operators:-new and delete. Pointers and Arrays, Pointer to Object: Pointer to Object, this Pointer, Pointer to Derived Class. Templates:Introduction to Class Templates, Function Templates, Member FunctionTemplates. (08 Hrs)</p>
Unit-VI	<p>: File Processing and Exception Handling: Stream And Files, Stream Classes, The istream and Ostream Classes, Opening and Closing a File, Reading and Writing Character From a File, Detecting End Of File, File Modes, File Pointers. Exception Handling:Basics of Exception Handling, Types of exceptions,</p>

	Exception Handling Mechanism, Throwing and Catching Mechanism, Rethrowing an Exception.(08Hrs)
Reference Books:	<ol style="list-style-type: none"> 1. Herbert Schildt, C++ The Complete Reference, 4Th Edition, Tata Mcgraw Hill, 2004 2. E Balagurusamy, Object Oriented Programming With C++, 5Th Edition, Tata Mcgraw Hill. 3. Robert Lafore, Object Oriented Programming In C++, 4Th Edition, Pearson Education 4. B. Stroustrup, C++ Programming Language, 3rd Edition, Pearson Education, 1997, ISBN 0 – 201 – 32755 – 4. 5. SauravSahay, Object Oriented Programming With C++, 3Rd Edition, , Oxford 6. Coohoon and Davidson, C++ Program Design: An introduction to Programming and Object- Oriented Design (3rd edition), Tata McGraw Hill, New Delhi, 2003.

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions.
2. Five questions in each section.
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

	<p>2002, ISBN 81-7808-861-4</p> <p>5. Date C., "An Introduction to Database Systems", 7th Edition, Pearson Education, 2002, ISBN 81 -7808-231- 4.</p> <p>6. Ramkrishna R., Gehrke J., "Database Management Systems", 3rd Edition, McGraw-Hill, 2003, ISBN 0-07- 123151 –X</p> <p>7. AtulKahate, "Introduction to Database Management System", 3rd Edition, Pearson Education 2009, ISBN 978-81-317-0078-5.</p> <p>8. "SQL Complete Reference", By James R Groff, Paul N. Weinberg and Andy Opperl, 3rdEdition, McGraw Hill Publishers, ISBN: 9781259003882</p>
--	--

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions.
2. Five questions in each section.
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

<p style="text-align: center;">Dr.BabasahebAmbedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S.Y.B. Tech. (Computer Science and Engineering) Semester-IV Code No.: CSE291</p> <p style="text-align: center;">Course: Elective-I(Multimedia Techniques) Class Test: 20 Teaching Scheme:04 Hours per week Theory: 04 Hours per week Credits:04</p> <p style="text-align: center;">Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80</p>	
Course Objectives	<ol style="list-style-type: none"> 1. To introduce the students the characteristics and design methodologies of multimedia. 2. To focus on content creation for the web and multimedia. 3. To expose students to theoretical and fundamental concept of multimedia, its application and the techniques involved. 4. To help student learn the issues involved in capturing, processing, manipulating, storing and retrieving various kinds of continuous media. 5. To learn different data compression techniques. 6. To understand multimedia networking concepts.
Unit-I	<p>Unit-I : Multimedia An Overview: Introduction to multimedia, Multimedia presentation and production, Characteristics of multimedia presentation, Hardware and Software requirement, Uses of multimedia, steps for creating multimedia presentation, Analog Representation and Digitization, Visual display system: CRT, Plasma display panel, LED. (08 Hrs)</p>
Unit-II	<p>Unit-II : Text, Images : Text: Types of text, font, text compression, text file formats: txt, doc, docx, ps, and pdf , File Headers Images: Image data representation, Image Acquisition – Flat bed Scanner and Digital Camera, Image processing overview, Color Management Systems- RGB and CMYK , Image File Formats- bmp, jpeg, tiff and png, File Headers. (08 Hrs)</p>
Unit-III	<p>Unit-III : Audio And Video Technology: Audio Technology : Audio Acoustics, Nature of Sound Waves, Types and properties of sounds- music, Noise, Tone, and Rhythm, Musical Note and Pitch, Components of Audio System- Microphone, Amplifier, Loudspeaker and Audio Mixer, MIDI and their connections, Audio file format-WAV, MID, AU, MP3 and WMA. Audio File Headers Video Technology: Concepts of Video, Analog Video Camera, Television Broadcasting Standards, Video File Formats- AVI, MOV, WMV, File Headers (08 Hrs)</p>
Unit-IV	<p>Unit-IV : Data Compression: Types of compression, Lossless Compression Techniques- Run-length Coding, Huffman Coding, Lossy Compression Techniques- JPEG, MPEG-1 Video. (08 Hrs)</p>
Unit-V	<p>Unit-V : Animation: Uses of Animation, Keyframes and Tweening, Principles of animation, Flipbook animation, 2D animation, 3D animation, Camera animation, Cel animation, Path animation, and Animation file formats. (08 Hrs)</p>
Unit-VI	<p>Unit-VI : Multimedia Network Communication : Multimedia Network Communication, Networks and Network Services, Multimedia Sources, Source and Destination Terminals, Application-Video Streaming to multiple users, Video Conferencing, Media-on-Demand- Interactive TV(ITV) and Set-Top Box(STB), Multimedia over Wireless Networks, Trends in Wireless Interactive Multimedia ,Voice Over IP. (08 Hrs)</p>
Reference Books:	<ol style="list-style-type: none"> 1) Ranjan Parekh, “Principles of Multimedia”, Tata McGraw Hill, Second Edition. 2) Halshall, “Multimedia communications”, Pearson education. 5th edition

		<p>2011.</p> <p>3) Ralf Steinmetz and KlaraNahrstedt, “Multimedia Fundamentals: Media Coding and Content Processing”, Vol. 1, Pearson Education</p> <p>4) Jerry D. Gibson, “Multimedia Communication, Directions and Innovations”, Academic Press, Hardcourt India.2001</p> <p>5) Ze-nian, Mark S. Drew, “Fundamentals of Multimedia”, PHI</p> <p>6) K.R.Rao , D.Milovanovic, “Multimedia communication systems: Techniques, standards and networks”, Pearson Education 2002</p>
--	--	--

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions.
2. Five questions in each section.
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

Dr.BabasahebAmbedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S.Y.B. Tech. (Computer Science and Engineering) Semester-IV Code No.: CSE292 Teaching Scheme:04 Hours per week Theory: 04 Hours per week Tutorial: NA Credits:04	
Course: Elective-I (Human Computer Interface) Class Test: 20 Theory Examination (Duration): 03 Hrs Theory Examination (Marks): 80	
Course Objectives	After successfully completion of this course, students should be able to : 1. Understand the importance of good interface design for human computer interaction 2. Understand users and their interaction with the computers. 3. Understand and apply design principles, models and evaluation techniques to user interface design. 4. Identify features of groupware and different computing environments Develop a real application to demonstrate the knowledge of design, research and development issues related to HCI
Unit-I	: Introduction: The human, The computer, The interaction, Paradigms, Usability of Interactive Systems, Guidelines, Principles, and Theories, Importance of good design Examples how designs failed a product Identifying good vs bad design (08 Hrs)
Unit-II	: Design Process: Interaction design basics, HCI in the software process, Design rules, Implementation support, Evaluation techniques, Universal design, User support, User centred Design: What, Why, When to use, Examples, (08 Hrs)
Unit-III	: Models and Theories: Cognitive models, Socio-organizational issues and stakeholder requirements, Communication and collaboration models, Task analysis, Dialogue notations and design, Models of the system, Modeling rich interaction (08 Hrs)
Unit-IV	: Interaction Styles: Direct Manipulation and Virtual Environments, Menu Selection, Form Filling and Dialog Boxes, Command and Natural Languages, Interaction Devices, Collaboration and Social Media Participation (08 Hrs)
Unit-V	: Design Issues: Quality of Service, Balancing Function and Fashion, User Documentation and Online Help, Information Search, Information Visualization (08 Hrs)
Unit-VI	: Outside the Box: Group ware, Ubiquitous computing and augmented realities, Hypertext, multimedia, and the world wide web (08 Hrs)
Reference Books:	: 1,“Human Computer Interaction” by Alan Dix, Janet Finlay , ISBN :9788131717035, Pearson Education (2004) Third Edition. 2.“Designing the User Interface - Strategies for Effective Human Computer Interaction”, by Ben Shneiderman ISBN : 9788131732557, Pearson Education (2010) Fifth Edition 3.”Interaction Design: beyond Human Computer Interaction”byhelen sharp, rogers, preece, wiley publications. Third Edition.

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions.
2. Five questions in each section.
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

	<p>4/e, Pearson Education, 2000.</p> <p>[2] D. P. Friedman, M Wand, Essentials of Programming Languages, 3/e, MIT Press, 2008.</p> <p>[3] R. W. Sebesta, Concepts of Programming Languages, 8/e, Addison Wesley, 2008.</p> <p>[4] Carlo Ghezzi, Mehdi Jazayeri, Programming Language Concepts, 3rd Ed, Wiley Publication ISBN : 978-81-265-1861-6.</p>
--	--

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions.
2. Five questions in each section.
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve

Reference Books:	: 1. PHP and MySQL for dynamic Web Sites: Visual Quickpro Guide, Second Edition by Larry. Programming PHP By RasmusLerdorf, Kevin Tatroe, PeterMacIntyre. 2. The Complete Reference PHP By Steven Holzner
Text Books :-	1. Begging PHP 5 by Wrox. 2. Julie C. Meloni, PHP MySQL and Apache, SAMS Teach Yourself, Pearson Education.

Section A: Includes Unit I, II and III; **Section B:** Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 40 marks Paper:

1. Minimum eight questions.
2. Four questions in each section.
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each. The Question no.1 and 5 should be of objective nature.
4. Two questions of 7 marks each from remaining questions from each section A and B be asked to solve.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S.Y. B. Tech. (Computer Science and Engineering) Semester- IV Code No.: CSE271	
Course: Lab I: Object Oriented Programming Paradigm Termwork :25 marks Practical:25 marks Total Examination (Marks): 50 marks	
Practical: 02 Hours per week Credits:01	
Course Objectives	: 1. The aim of this course is to teach the principles underlying Object Oriented Programming through C++. 2. To increase reusability in programming. 3. To reduce the costs of developing and adapting software to meet new requirement
List of Practical s (Minimum ten experiments to be performed)	: 1. Develop a program to declare a class 'person' having data members name, age and salary. Accept and display this data for one object. 2. Write a program to declare a class 'employee' having data members name and age. Accept and display the data for three objects. 3. Programs to Understand Friend Function and Friend Class. a. Friend Function b. Friend class <ul style="list-style-type: none"> • Write a program to accept five different numbers by creating a class called friendfunc1 and friendfunc2 taking 2 and 3 arg respectively and calculate the average of these numbers by passing object of the class to friend function. • Write a program to accept the student detail such as name and 3 different marks by get_data() method and display the name and average of marks using display() method. Define a friend class for calculating the average of marks using the method mark_avg(). 4. Write a program to demonstrate how an object can be made an argument of a function. 5. Constructors and Destructors. <ul style="list-style-type: none"> • Create a class for counting the number of objects created and destroyed within various block using constructor and destructors. 6. Programs to Understand Storage Specifiers. <ul style="list-style-type: none"> • Write a C++ program to demonstrate the static and non static variable usage defining them within a function. 7. Programs to Overload Unary and Binary Operators as Member Function and Non Member Function. a. Unary operator as member function b. Binary operator as non member function <ul style="list-style-type: none"> • Write a C++ program to count the number of persons inside a bank, by increasing count whenever a person enters a bank, using an increment (++) operator overloading function, and decrease the count whenever a person leaves the bank using a decrement(--) operator overloading function inside a class. • Write a C++ program to create two objects of a class called company and add their data members using an operator overloaded function for '+' operator and '-' operator. 8..Program for different types of inheritance (Simple, Multiple, Hierarchical, Multilevel)

	<p>9. Write a program to display the output using virtual function.</p> <p>10. Write a program for abstract class.</p> <p>11. Use of “this” Pointer. Using class</p> <ul style="list-style-type: none"> ▪ Write a C++ program to create three objects for a class named pntn_obj with data members such as roll_no and name. Create a member function set_data() for setting the data values and print() member function to print which object has invoked it using ‘this’ pointer. <p>12. Write a program to evaluate the largest number of an array using pointer</p> <p>13. Show the Implementation of exception handling.</p> <p>14. Programs on Class Templates</p> <ul style="list-style-type: none"> • Write a program to explain class template by creating a template T for a class named pair having two data members of type T which are inputted by a constructor and a member function get-max() return the greatest of two numbers to main. Note: the value of T depends upon the data type specified during object creation. <p>15. Program for creating, opening, closing, reading and writing a file.</p>
<p>List of Reference Books</p>	<p>:</p> <ol style="list-style-type: none"> 1. Herbert Schildt, C++ The Complete Reference, 4Th Edition, Tata Mcgraw Hill, 2004 2. E. Balagurusamy, Object Oriented Programming With C++, 5Th Edition, Tata Mcgraw Hill. 3. Robert Lafore, Object Oriented Programming In C++, 4Th Edition, Pearson Education 4. B. Stroustrup, C++ Programming Language, 3rd Edition, Pearson Education, 1997, ISBN 0 – 201 – 32755 – 4. 5. Saurav Sahay, Object Oriented Programming With C++, 3Rd Edition, , Oxford 6. Coohoon and Davidson, C++ Program Design: An introduction to Programming and Object- Oriented Design (3rd edition), Tata McGraw Hill, New Delhi, 2003.

The assessment of term work shall be done on the basis of the following.

- Continuous assessment.
- Performing the experiments in the laboratory.
- Oral examination conducted on the syllabus and term work mentioned above.

Dr.BabasahebAmbedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S. Y. B. Tech. (Computer Science andEngineering) Semester-IV Code No.: CSE272 Practical: 02Hrs/week Credits:01	
Course: Database Management System Term Work: 25 Marks Practical: 25 Marks Total Examination Marks: 50	
Course Objectives	: <ol style="list-style-type: none"> 1. To get familiar with the concept of SQL. 2. To understand data definition language. 3. To have knowledge of data manipulation language. 4. To learn and understand the concept of views.
List of Practical's (Minimum ten experiments to be performed)	: <ol style="list-style-type: none"> 1. Creation of Database from ER Model 2. Retrieving data using SQL select statement 3. Restricting and sorting data 4. Reporting aggregated data using the group functions 5. Displaying data from multiple tables using Joins 6. Using sub queries to solve queries 7. Using set operators 8. Manipulating data 9. Using DDL statements to create and manage tables 10. Restrict user access using DCL Statements 11. Implementation of Views
Reference Books	: <ol style="list-style-type: none"> 1. "Database System Concepts", BY Silberschatz A., Korth H., Sudarshan S., 5th Edition, McGraw Hill Publishers, 2002, ISBN 0-07-120413-X. 2. "Fundamentals of Database Systems", BY Elmasri R., Navathe S., 4th Edition, Pearson Education, 2003, ISBN 8129702282. 3. "SQL Complete Reference",By James R Groff, Paul N. Weinberg and Andy Opperl, 3rd Edition, McGraw Hill Publishers, ISBN: 9781259003882

The assessment of term work shall be done on the basis of the following.

1. Continuous assessment.
2. Performing the experiments in the laboratory.
3. Oral examination conducted on the syllabus and term work mentioned above.

Dr. BabasahebAmbedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S.Y. B. Tech. (Computer Science and Engineering) Semester- IV Code No.: CSE273 Practical: 02 Hours per week	
Course: Computer Laboratory II (Python Programming) Term work :25 marks Practical:25 marks Total Examination (Marks): 50 marks	
Credits:01	
Course Objective	: 1.Learn core Python scripting elements such as variables and flow control structures 2. Discover how to work with lists and sequence data 3. Write Python functions to facilitate code reuse 4. Use Python to read and write files
List of Practical s (Minimum ten experiments to be performed)	: 1. Write a simple program based on Python Keywords and Identifier, Statements and Comments, Python Datatypes,Python Operators. 2. Python Flow Control (Python if...else, Python for Loop, Python while Loop, Python break and continue, Python Pass) 3. Write a Python Program to Make a Simple Calculator using functions. 4. Write a program for Python Tuple and learn methods 5. Write a Python Program to Add Two Matrices using Python List 6. Write a Python Program to Display Calendar 7. Write a program to create, access, add and remove elements from python dictionary 8. Write a Python Program to Illustrate Different Set Operations 9. Write a Python Program to Sort Words in Alphabetic Order 10. Write a program exception handling in Python applications for error handling. 11. Write a program in python to use class inheritance in Python for reusability. 12. Write a program to Search text using regular expressions
List of Reference Books	* Programming with Python : A Users Book” by Dawson Michael 2. “Python: The Complete Reference” by <u>Martin C. Brown</u> 3. Core Python Programming Wesley J. Chun

The assessment of term work shall be done on the basis of the following.

1. Continuous assessment.
2. Performing the experiments in the laboratory.
3. Oral examination conducted on the syllabus and term work mentioned above.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of S.Y. B. Tech. (Computer Science and Engineering) Semester- IV	
Code No.: CSE 274 Practical: 02 Hours per week Credits:01	Course: Web Programming Termwork :50 marks Practical:NA Total Examination (Marks):50
Course Objectives	: 1. To successfully build interactive, data-driven web pages. 2. Using PHP to manipulate files 3. Using the phpMyAdmin utility to administer the MySQL database
List of Practical s (Minimum ten experiments to be performed)	: 1) Create a simple HTML form and accept the user name and display the name through PHP echo statement. 2) Develop a program on PHP conditional statements 3) Develop Program on PHP Looping . 4) Develop program using PHP Arrays (All Types) 5) Develop Program on PHP String and PHP Functions . 6) a) Create a PHP Form, use PHP \$_GET and PHP \$_POST method to accept data b) Form Validation in PHP: Validate contents in above form: 7) Develop program for file handling (opening , reading and writing into files) 8) Develop a PHP program to store current date-time in a COOKIE and display the 'Last visited on' date-time on the web page upon reopening of the same page. 9) Develop a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page. 10) Write a PHP script to insert a string at the specified position in a given string. Go to the editor Original String : 'The brown fox' Insert 'quick' between 'The' and 'brown'. Expected Output : 'The quick brown fox' 11) Introduction to MySQL, PHP - SQL Database connectivity, small example. 12) Using PHP and MySQL, develop a program to accept book information. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.
List of Reference Books	: 1) PHP and MySQL for dynamic Web Sites: Visual Quickpro Guide, Second Edition by Larry. 2) Programming PHP By Rasmus Lerdorf, Kevin Tatroe, Peter MacIntyre. 3) The Complete Reference PHP By Steven Holzner 4) Begging PHP 5 by Wrox. 5) Julie C. Meloni, PHP MySQL and Apache, SAMS Teach Yourself, Pearson Education.

The assessment of term work shall be done on the basis of the following.

1. Continuous assessment.
2. Performing the experiments in the laboratory.
3. Oral examination conducted on the syllabus and term work mentioned above.

