NAAC 'B+' Accredition

Dr.Babasaheb Ambedkar Marathwada University

Aurangabad-431004

SYLLABUS

B.Sc.(Computer Science)

Three Year Integrated Semester Course

Dr. Babasaheb Ambedkar Marathwada University

Aurangabad-431004.

Tel.No. : 0240-2403400/431, Fax:0240-2403113

Website : www.bamu.net, http://bamua.digitaluniversity.ac.in

Dr. Babasaheb Ambedkar Marathwada University.

Appendix 'A'

A Candidate shall be admitted to the I year of the B.Sc.(Computer Science) degree course only if he/she satisfies the following condition:

1. He/ She must have passed the higher secondary (multipurpose) examination conducted by H.S.C. board Government of Maharashtra with science / technical subjects Or an Examination of any statutory University and Board recognized as equivalent thereto.

   OR

   He/She must have passed examination prescribed at the end of second year of the junior college conducted by the H.S.C. board, Government of Maharashtra with English, Second language, Physics, Chemistry, Mathematics and or Biology or one of the technical subjects prescribed at the said examination as the optional or elective subjects or an examination recognized as equivalent thereto.

   OR

   Candidate having offered prescribed vocational course (MCVC) with Computer techniques/I.T./Electronics.

   OR

   Three years Diploma Course in engineering conducted by the board of technical Education, Maharashtra State.

2. He/ She must have passed at qualifying examination.

A candidate who has passed the B.Sc.(Computer Science) examination of this university may be allowed to present himself subsequently at the degree examination in a subject or subjects other than those he has taken earlier provided that he puts in three years of attendance as a regular candidate for First, Second and Third year in the subject or subjects concerned excluding compulsory English, Second Language and remaining optional subject(s).

A candidate shall not be allowed to appear for such examination if he has passed the higher examination.

The Degree of Bachelor of Science (Computer Science) shall be conferred on candidate who has pursued a regular course of study consisting of six semesters in the relevant subject as prescribed and has appeared at the end examination and passed under the credit based system in all the examination prescribed for the Degree course in the faculty.

The pattern of the examination and the scope is indicated in the syllabus.[Annexure B]

- The Number of students in a theory class shall not exceed 60.
- Maximum number of students in a batch for practicals in first four semesters shall consist of 20 students and for fifth & sixth semester the batch shall consist of 15 students.
- The rules for admission to the subsequent (next) semesters will be the same as per the University guidelines.
- For Each course the concerned teacher will have to conduct Class tests after completion of 15 and 20 lectures. The mark list of the same is to be submitted to the university authority within 7 working days after the completion of class tests.
- Final Examination will be conducted by the University based on the complete syllabus.
- Final Practical Examination will be conducted by the university and examiners will submit the mars in the prescribed format of students for practical examination to the university.
- There will be 40% weightage internally at college level(Class test + Tutorial) and 60% for the final theory examination. The concerned teachers have to take class test in their teaching schedule. There shall not be separate timetable for the class test.
- **The Number of Teaching Staff & infra-structure required to run the course will be as follow :-**

  The graduation is very important phase in the life of our young students. The college responsibly is not only to deliver a quality syllabus based education, but also to motivate them to be a good healthy citizen. In this direction, the college must have sufficient facilities to run the course. A guideline is listed below. The College must have following minimum facilities :

  Infrastructure:

  1. One Class room to accommodate 60 students. (approximately 250 sq.ft.)
  2. A well equipped software Laboratory having a LAN system of 30 nodes and having internet connectivity with broad band. All legal software,

antivirus software, firewall be available for smooth functioning of the laboratory.

3. A hardware laboratory having twenty microprocessor kits with add on cards as per their syllabus. Staff room of 100 sq.ft. with one table and one Almeria for each faculty member.
4. One office space of 100 sq.ft. with appropriate furniture.
5. One lady room of 100 sq.ft. with attached toilet.
6. One reading room of 200 sq.ft. with seating arrangements for at least 30 people. The library may be accommodated in the library.
7. One copy of every text book among five student for each subject be available along with one copy of reference book as per the syllabus.
8. Library must subscribe for computer and scientific magazines. Appropriate general reading materials must be available for overall development of students.
9. An open space for sports activities. The college must be encouraged to have sport equipments.

Staff:

1. The head of the department in the scale of reader/Professor.
2. The minimum number of teachers must be appointed as per the work load.Per semester, the work load may be computed on the basis of theory classes, tutorials and practical class per batch. Minimum number of teachers to run the course must be five excluding the head. Teachers must be appointed by the university/UGC norms. The quality of the course is directly related to quality of teachers for the course.
3. There must be one clerk in the office to look after administrative work. The placement of all staffs must be maintained properly.
4. One qualified librarian

- An appropriate number of class IV employees.

PATTERN OF QUESTION PAPERS

A) Internal Class Test :

- A class tests is to be conducted after completion of 15-20 Lecturers.

B) THEORY :-

- Each theory paper will carry Maximum 30 marks; duration of examination of theory paper will be 1.5 hours.

C) PRACTICALS: - Total marks 50 marks

- Each Practical paper will carry Maximum 50 marks, duration of examination of each practical paper will be 1.5 hours.
- Internal Distribution of marks for each practical paper will be as follows.
    - Journal/ Record book (certified) 10 marks.
    - Oral/ viva 10 marks.
    - Practical Test 30 marks.

D) PROJECT:-

- Students of semester VI will have to perform ONE project of 150 marks. (A group of maximum 3 candidates will allow working on one project work)
- Internal Distribution of project marks will as follows.
    - Review 1 Report : 25
    - Review 2 Report : 25
    - Project work (certified) 25 marks.
    - Project work Presentation. 50marks.
    - Viva/ Oral. 25 marks.

Dr.Babasaheb Ambedkar Marathwada University, Aurangabad

Curriculum Structure and Scheme of Evaluation: B.Sc.(C.S.)

Sr. No.	Course Code	Name of the Subject	Scheme of Teaching			Scheme of Evaluation(Marks)				
			T hrs/week	P hrs/ week	Total hrs/ week	Class Tests + Tutorial	Univ. Th. Exam.	Uni. Pract. Exam.	Uni.Exam Duration (in hrs.)	Total Marks
I Semester										
1	CS301T	Computer Fundamentals	3	-	3	10+10	30	-	1.5	50
2	CS302T	Digital Electronics	3	-	3	10+10	30	-	1.5	50
3	CS303AT	8085:Microprocessor	3	-	3	10+10	30	-	1.5	50
4	CS304AT	Programming in C	3	-	3	10+10	30	-	1.5	50
5	CS305ATP	Communication Skill – I	3	-	3	10+10	30	-	1.5	50
6	CS306AT	Mathematical Foundation	3	-	3	10+10	30	-	1.5	50
7	CS301P	Office Suite	-	4	4		-	50	1.5	50
8	CS202P	Digital Electronics	-	4	4		-	50	1.5	50
9	CS203AP	8085:Microprocessor	-	4	4		-	50	1.5	50
10	CS204AP	Programming in C	-	4	4		-	50	1.5	50
II Semester										
1	CS307T	Data Structure	3	-	3	10+10	30	-	1.5	50
2	CS308AT	Operating System I	3	-	3	10+10	30	-	1.5	50
3	CS303BT	8086:Microprocessor	3	-	3	10+10	30	-		50
4	CS304BT	Adv. Programming in C	3	-	3	10+10	30	-	1.5	50
5	CS305BTP	Communication Skill - II	3	-	3	10+10	30	-	1.5	50
6	CS306BT	Numerical Computation Methods	3	-	3	10+10	30	-	1.5	50
7	CS307P	Data Structure & O.S.	-	4	4		-	50	1.5	50
8	CS203BP	8086:Microprocessor	-	4	4		-	50	1.5	50
9	CS204BP	Adv. Programming in C	-	4	4		-	50	1.5	50
10	CS206BP	Numerical Methods	-	4	4		-	50	1.5	50

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Sr. No.	Course Code	Name of the Subject	Scheme of Teaching			Scheme of Evaluation(Marks)				
			T hrs/week	P hrs/ week	Total hrs/ week	Class Test + tutorial	University Exam.	Uni. Pract. Exam.	Uni.Exam Duration (in hrs.)	Total Marks
III Semester										
1	CS309AT	Analysis of Algorithm	3	-	3	10+10	30	-	1.5	50
2	CS308BT	Operating System II	3	-	3	10+10	30	-	1.5	50
3	CS303CT	Peripheral & Interfacing	3	-	3	10+10	30	-	1.5	50
4	CS304CT / CS310AT	OOPs using C++/Java – I	3	-	3	10+10	30	-	1.5	50
5	CS312AT	DBMS – I	3	-	3	10+10	30	-	1.5	50
6	CS306CT	Statistical Method	3	-	3	10+10	30	-	1.5	50
7	CS209P	Pr. Based on 309AT	-	4	4	-	-	50	1.5	50
8	CS203CP	Pr. Based on 303CT	-	4	4		-	50	1.5	50
9	CS204CP / CS210AP	Pr. Based on 304CT/310AT	-	4	4		-	50	1.5	50
10	CS212AP	Pr. Based on 312AT	-	4	4		-	50	1.5	50
IV Semester										
1	CS313AT	S.E. –I	3	-	3	10+10	30	-	1.5	50
2	CS312BT	DBMS – II	3	-	3	10+10	30	-	1.5	50
3	CS314AT	DCN – I	3	-	3	10+10	30	-	1.5	50
4	CS304DT / CS310BT	OOPs using C^{++}/ Java –II	3	-	3	10+10	30	-	1.5	50
5*	CS315AT	Computer Graphics – I	3	-	3	10+10	30	-	1.5	50
6*	CS303DT	PC Hardware	3	-	3	10+10	30	-	1.5	50
7*	CS316AT	Web Fund – I	3	-	3	10+10	30	-	1.5	50
8*	CS317T	Linux	3	-	3	10+10	30	-	1.5	50
9	CS212BP	Pr. Based on 312BT	-	4	4		-	50	1.5	50
10	CS204DP/ CS210BP	Pr. Based on 304DT/310BT	-	4	4		-	50	1.5	50
11	CS215AP/CS203 DP/ CS216AP/ CS217P	Pr. Based on CS315AT/ CS303DT/ CS 316AT/ CS317T	-	4	4		-	50	1.5	50
12	CS215AP/CS203 DP/ CS216AP/ CS217P	Pr. Based on CS315AT/ CS303DT/ CS 316AT/ CS317T	-	4	4		-	50	1.5	50

*** Indicate optional paper (any two from Sr.No. 5/6/7/8)**

Dr.Babasaheb Ambedkar Marathwada University, Aurangabad

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Sr. No.	Course Code	Name of the Subject	Scheme of Teaching			Scheme of Evaluation(Marks)				
			T hrs/week	P hrs/ week	Total hrs/ week	Class Test	University Exam.	Uni. Pract. Exam.	Uni.Exam Duration (in hrs.)	Total Marks
SEMESTER V										
1	CS313BT	S.E – II	3	-	3	10+10	30	-	1.5	50
2	CS318T	E-Commerce	3	-	3	10+10	30	-	1.5	50
3	CS314BT	DCN-II	3	-	3	10+10	30	-	1.5	50
4	CS304ET	GUI-Programing	3	-	3	10+10	30	-	1.5	50
5*	CS315BT	Computer graphics-II	3	-	3	10+10	30	-	1.5	50
6*	CS303ET	Embedded-I	3	-	3	10+10	30	-	1.5	50
7*	CS320AT	XML	3	-	3	10+10	30	-	1.5	50
8*	CS321T	Dataware Hsg. and DM	3	-	3	10+10	30	-	1.5	50
9	CS213P	Pr. Based on 313BT	-	4	4	-	-	50	1.5	50
10	CS204EP	Pr. Based on 304ET	-	4	4	-	-	50	1.5	50
11	CS215BP/CS203EP/CS220AP/CS221AP	Pr. Based on 315BT/303ET/ 320AT/321AT	-	4	4	-	-	50	1.5	50
12	CS215BP/CS203EP/CS220AP/CS221AP	Pr. Based on 315BT/303ET/ 320AT/321AT	-	4	4	-	-	50	1.5	50
SEMESTER VI										
1	CS313CT	Soft.Test.and QA	3		3	10+10	30	-	1.5	50
2	CS322T	Theory of Computation	3		3	10+10	30	-	1.5	50
3	CS323T	Ethics and Cyber law	3		3	10+10	30	-	1.5	50
4	CS304FT	Dot Net Archi.and Prog	3		3	10+10	30	-	1.5	50
5*	CS315CT	Computer animation	3		3	10+10	30	-	1.5	50
6*	CS303FT	Embedded II	3		3	10+10	30	-	1.5	50
7*	CS320BT	Web Prog	3		3	10+10	30	-	1.5	50
8*	CS314CT	Mobile Computing	3		3	10+10	30	-	1.5	50
9**	CS740P	PROJECT WORK	-	12	12			150	3	150
10***	CS241P	SEMINAR	-	4	4			50	3	50

*** Indicate optional paper (any two from 5/6/7/8)**

** Indicates credit for review 1, review 2 and Actual Project Work. *** Indicates credit for review 1 and Actual Seminar presentation.

B.Sc. (Computer Science)
Semester I

Course: B.Sc.(C.S.) – I Seme. **Paper Code:** CS301T

Computer Fundamentals

Objective: *To impart basic introduction to computer hardware components, computer numbering, how the CPU works, fundamental about algorithms and flowchart as well as different type of software.*

Sr. No	Topic	Ref.	No. of Lect.
UNIT – 1			**15**
1.	**Fundamentals of Computer System**		
	• Introduction.	1/1	
	• Characteristics & features of Computers.		
	• Components of Computers.		
	• Organization of Computer.		
2.	**Algorithm and Flowcharts**		
	• Algorithm	2/1	
	▪ Definition		
	▪ Characteristics		
	▪ Advantages and disadvantages		
	▪ Examples		
	• Flowchart	3/3	
	▪ Definition		
	▪ Define symbols of flowchart	3/ 4	
	▪ Advantages and disadvantages		
	▪ Examples		
3.	**Computer Generation & Classification**		
	• Generation of Computers : First to Fifth	2/12	
	• Classification of Computers		
	• Distributed & Parallel computers		
UNIT – II			**15**
4.	**Computer Languages**		
	• Types of Programming Languages	2/9	
	o Machine Languages		
	o Assembly Languages		
	o High Level Languages		
	• Assembler, Linker, Loader, Interpreter & Compiler.	2/9	
5.	**Computer Memory**		
	• Memory Cell & Organization	2/4	
	• Types of Memory (Primary And Secondary)	2/4	
	o RAM		
	o ROM		
	o PROM		
	o EPROM		
	o Secondary Storage Devices (FD, CD, HD, Pen drive, DVD, Tape Drive, DAT)		

6. I/O Devices

- Input Devices : 1/4
  - Touch screen , OMR, OBR , OCR, Light pen , Scanners
- Output Devices : 1/4
  - Digitizers, Plotters, LCD
  - Plasma Display, Printers

UNIT – III **15**

7. Processor

- Structure of Instruction 2/5
- Description of Processor
- Processor Features
- RISC & CISC

8. Operating system Concepts

- Why Operating System 2/10
- Functions of Operating System
- Types of Operating System 2/10
  - Batch O.S.
  - Multiprogramming O.S.
  - Time Sharing O.S
  - Personal Computers O.S.
  - Network O.S.

Core Reference:

1. Fundamentals of Information Technology
   By Chetan Srivastava, Kalyani Publishers
2. Fundamentals of Computers
   By V.Rajaraman, PHI Publication , IVth Edition.
3. Fundamentals of Programming
   By Raj K.Jain, S.Chand Publication

Additional Reference:

1. Computer Today
   By Suresh K. Basandra, Galgotia Publication,Updated Edition
2. Computer Fundamental
   By B.Ram, BPB Publication.

Course: B.Sc.(C.S.) – I Seme. **Paper Code:** CS302AT

Digital Electronics

Objective: *To impart basic knowledge in digital logic and circuits and to introduce basic concepts of data communications. Student will be able to learn basic concepts of digital logic and the design of basic logic circuits using commonly used combinational and sequential circuits*

Sr. No	Topic	Ref.	No. of Lect.
UNIT-I			**15**
1.	**Number Systems and Arithmetic** Decimal Number System & Binary Number System Decimal to Binary conversion(Double-dabble method only) Binary to Decimal Conversion. Binary Arithmetic : Binary addition, subtraction, multiplication & division Hexadecimal number system , Hexadecimal to binary, binary to Hexadecimal, Hexadecimal to decimal conversion Hexadecimal arithmetic: Addition, subtraction, multiplication & division Binary subtraction using 1' complement, 2's complement method.	1/1	
2.	**Boolean Algebra and Logic Gates** Postulates of Boolean Algebra Theorems of Boolean Algebra: Complementation , commutative, AND, OR, Associative,Distributive,Absorption laws , De morgan's theorems Reducing Boolean expressions Logic Gates : AND, OR, NOT, Ex-OR, Ex-NOR NAND as Universal building block Logic diagrams of Boolean expressions Boolean expressions for logic diagrams	1/3	
UNIT – II			**15**
3.	**Minimization Techniques** Introduction , Minterms and Maxterms K-Map, K-map for 2 variables K-map for 3 variables K-map for 4 variables	1/5	
4.	**Combinational and Arithmetic Logic Circuits** Half Adder & Full Adder Binary parallel Adder Half Subtractor, Full Subtractor Adder/Subtractor in 2's complement system BCD to Decimal decoder 2 : 4 demultiplexer 4 line to 1 line multiplexer	1/6	

UNIT – III **15**

5. Flip Flops 1/7

Introduction : RS FF
Clocked RS FF, D FF
Triggering, preset and clear
JK FF , T FF , Race around condition
Master slave FF

6. Counters 1/8

Introduction : Asynchronous/ ripple counter
Modulus Counter , MOD-12 counter
Synchronous counter : Synchronous serial & synch parallel counter
BCD counter
Ring counter
Johnson counter

7. Shift Registers 1/9

Introduction, Buffer register
Serial- in serial -out Serial-in parallel-out
Parallel-in serial-out, parallel-in paralle-out

Core Reference:

1. Digital Electronics and Micro-Computers – R.K.Gaur , Dhanpat Rai Publication

Additional Reference:

1. Digital Electronics and Logic Design – N.G.Palan, Technova Publication

Course: B.Sc.(C.S.) – I Seme. **Paper Code:** CS303AT

8085:Microprocessor

Objective: *To introduce 8085 assembly language and thereby familiarize the student with architecture of microprocessors.*

Sr. No	Topic	Ref.	No. of Lect.
UNIT – I			**15**
1.	**Microprocessor, Microcomputers and Assembly language** • Microprocessors • Microprocessor Instruction set and computer languages • From large Computers to Single chip microcontrollers	1/1	
2	**Building Concept of Microprocessor** • Introduction , Study of human body • Memory, input, output devices • Central processing unit	2/3	
3	**8085 Microprocessor** • Features of intel 8085 microprocessor • Pin diagram and pin functions of 8085 • 8085 CPU architecture • Functions internal blocks	2/4	
UNIT - II			**15**
4	**Introduction to 8085 Assembly Language Programming** • The 8085 programming model • Instruction Classification • Instruction and Data formats • How to write assembly and execute simple programs	1/5	
5	**8085 Instruction Set-I** • Addressing Modes • Classification of Instruction set • Data Transfer group of Instructions • Program examples for data transfer group	2/6	
6	**8085 Instruction Set-II** • Arithmetic instructions group • Program examples • Logical instruction group • Program examples	2/6	

UNIT – III **15**

7 8085 Instruction Set-III 2/6

- Conditional and unconditional Jump
- Conditional and unconditional CALL
- Conditional and unconditional RET

8 Concept of Looping 2/6

- Flowchart
- Programs using loop : Examples
- Stack and Machine control group

Core Reference:

1. Microprocessors : Architecture, programming and Applications with 8085–
   By R.S.Gaonkar.
2. 8- it Microprocessors –
   By V.J.Vibhute, P.B.borole

Course: B.Sc.(C.S.) – I Seme. **Paper Code:** CS304AT

Programming in C

Objective: *To expose students to algorithmic thinking and problem solving and impart moderate skills in programming using C Language in a industry-standard. Introduce students to learn basic features, Create, execute simple C programs using conditional statements, loops and arrays.*

Sr. No	Topic	Ref.	No. of Lect.
UNIT – I			**15**
1.	**Introduction** • An Overview of C , History of C language, • C as a Structured Language, Features of C.	2/1, 1/1,	
2.	**Basic Elements & Operators** • Character set, C Token, Identifier & Keywords, Variables • Constant and its types. Integer constant, floating point constant, character constant, string constants. • Operators: Arithmetic, Relational, Logical, Unary operators: Increment & decrement Assignment and Conditional operator. • Precedence & Associatively of Operators	2/2,3, 1/1	
3.	**Data Types** • Data Types: *int, char, float, double.* Declaration & Initialization. • Type modifier: long, short, signed & unsigned	2/2, 1/1, 1/6	
UNIT – II			**15**
4.	**C Program & I/O statements** • Structure of C Program, Compilation & Execution of C program • I/O: Introduction, Formatted Input/Output function: *scanf & printf*, Escape sequence characters. • Library functions: General & Maths.	2/4, 2/3, 1/1	
5.	**Control and Iterative Statements :** • Simple if, nested if, if-else, else if ladder • Switch-case statement • The conditional expression (? : operator) • *while* and *do-while* loop, and *for* loop • *break* & *continue* statement, *goto* statement	2/5, /6, 1/3, 1/4	

UNIT – III **15**

6. Arrays: 2/7, 2/8, 1/8, 3

- Introduction, Declaration and initialization Accessing array elements, Memory representation of array.
- One dimension and multidimensional arrays, character array, Introduction to string.

Core Reference:

1. Let us C : Y.P. Kanetkar [bpb publication]
2. Programming in C : E. Balaburuswamy [Tata macgraw hill]
3. Programming in C : Goterfried [Shaums' Series]

Additional References:

1. Spirit of "C" : Moolish Kooper.

Course: B.Sc.(C.S.) – I Seme. **Paper Code:** CS305ATP

Communication Skill

Objective: To equip students of computer science with effective speaking and listening skills in English To help them develop their soft skills and people skills, which will make the transition from college to workplace smoother and help them to excel in their jobs. & to enhance students' performance at Placement Interviews, Group Discussions and other recruitment exercises.

Sr. No	Topic	Ref.	No. of Lect.
UNIT – I			**15**
1.	**Concept of Communication**	1/1	
	• Attributes of Communication		
	• Process of Communication		
	• Feedback		
2.	**Objective of Communication**	½	
	• Upward Communication		
	• Downward Communication		
	• Horizontal Communication		
3.	**Method of Communication**	1/3	
	• Verbal , Oral , Written		
UNIT – II			**15**
4.	**Written Communication**		
	• Punctuation marks, Capitals, Abbreviations	1/11	
	• Grammar: Parts of Speech, tenses, vocabulary building, reduction of sentence length, summarization, constructing para.		
	• CS of good communication	1/12	
	• Language of business writing		
5.	**Oral Communication**		
	• Speeches and Presentation	1/29	
	• Dialogues	1/30	
UNIT – III (English Language Lab)			**15**
6.	**Listening Comprehension**		
	➢ Listening and typing – Listening and sequencing of sentences –		
	➢ Filling in the blanks – Listening and answering the questions		
7.	**Reading Comprehension and Vocabulary**		
	➢ Filling in the blanks - Cloze Exercises – Vocabulary building –		
	➢ Reading and answering questions.		
8.	**Speaking**		
	➢ **Phonetics:** Intonation – Ear Training – Correct Pronunciation – Sound recognition exercises - Common Errors in English		
	➢ **Conversations:** Face to Face Conversation - Telephone conversation –		
	➢ Role play activities (Students take on roles and engage in conversation)		

Core Books

1. Business Communication , By urmila Rai & S.M.Rai. Himalaya Pub.
2. Communication Skill for Effective Management By Dr.Anjali Ghanekar. Everest Pub. House.
3. Developing Communication Skill By Krishna Mohan, Meera Banerji. McMillan

Course: B.Sc.(C.S.) – I Seme. **Paper Code:** CS306AT

Mathematical Foundation

Objective: Main objective of this course is to introduce mathematical concepts and techniques that have applications in comp. sci. and Info. Tech.

Sr. No	Topic	Ref.	No. of Lect.
UNIT – I			**15**
1.	**Set Theory** • **Basic Definitions**: Set, Finite set, Infinite set, Singleton Set, Empty set, Subset, Proper Subset, Universal set, Power set, Venn diagram. • **Combinations of Sets**: Union of sets, Intersection of Sets, Complement of a set, Equality of two sets, Disjoint sets, Difference of two sets, Symmetric Difference, Cartesian Product; explanation of each using Venn-diagram and simple examples. • **Rules of Set Theory**. • **Algebraic Properties of Set Operations**: Statement and proof of Commutative Laws, Associative Laws, Distributive Laws, Idempotent Laws, Properties of Compliment, Properties of Universal set, Properties of Empty set, Principal of Inclusion and Exclusion	1/1,2/1	
UNIT – II			**15**
2.	**Permutation and Combination** • **Permutation**: The Multiplication Principal of Counting, Counting Methods • **Combination**: Theorems and Examples. • **Pigeonhole Principal** without proof, Examples. • **Probability**: Sample Spaces, Events, Assigning Probabilities to Events, Equally Likely Outcomes.	1/3,2/3	
UNIT – III			**15**
3.	**Relation and Function** • **Introduction**: Binary Relation, Tabular Form, Graphical Form, Ternary Relation, Quaternary Relation. • **Properties of Binary Relations**: Reflexive Relation, Symmetric Relation, Antisymmetric Relation, Transitive Relation, Transitive Closure.	2/4	
4.	**Boolean Algebra** • **Lattice:** Introduction, Sublattices , Properties of Lattices, Distributive and Complimented Lattices • **Principle of Duality.**	2/12	

Core Reference:

[1] "Discrete Mathematical Structures" by Bernard Kolman, Robert C. Busby, Sharon Cutler Ross, Pearson Education Asia.

[2] "Elements of Discrete Mathematics" by C.L. Liu, Tata McGraw-Hill

[3] "Discrete Mathematics" by Dr. Bembalkar.

Course: B.Sc.(C.S.) – I Seme. **Paper Code:** CS301P

Office Lab

Objective: To impart the student hands on practice so that students should be able to: *Create, Save, Copy, Delete, Organize various types of files and manage the desk top in general, use a standard word and spread-sheet processing package exploiting popular features.*

- **GUI Operating System :** Mouse Practice, Starting, Login, Shutdown, Exploring Directories, Resizing, Moving, Minimizing, closing of software windows, familiarization with file icons, Launching Applications, Deleting, Renaming files, Managing Directories, Searching for files, Using Accessories.
- **Web Browser:** Basic Browsing, Buttons: forward, backward, home, adding to favorites, stop, save, save as, Saving an Image from the Web, printing, Specifying a Home Page, **Browsing**: Using Web URLs, Anatomy of a URL, Membership Websites: Signing up for email service, **Searching:** Academic Search on the web**.**
- **Word Processing Tool**: Menus, Shortcut menus, Toolbars, Customizing toolbars, Creating and opening documents, Saving documents, Renaming documents, Working on multiple documents, Close a document ; **Working With Text** :Typing and inserting text, Selecting text, Deleting text, Undo, Formatting toolbar, Format Painter, Formatting Paragraphs: Paragraph attributes, Moving, copying, and pasting text, The clipboard, Columns, Drop caps; **Styles** : Apply a style, Apply a style from the style dialog box, Create a new styles from a model, Create a simple style from the style dialog box, Modify or rename a style, Delete a style; **Lists** : Bulleted and numbered lists, Nested lists, Formatting lists **Tables** :Insert Table button, Draw a table, Inserting rows and columns, Moving and resizing a table, Tables and Borders toolbar, Table properties **Graphics** :Adding clip art, Add an image from a file, Editing a graphic, AutoShapes; **Spelling and Grammar**: AutoCorrect, Spelling and grammar check, Synonyms, Thesaurus; **Page Formatting**: Page margins, Page size and orientation, Headers and footers, Page numbers, Print preview and printing.
- **Spreadsheet Basics**: Screen elements, Adding and renaming worksheets, The standard toolbar - opening, closing, saving, and more; **Modifying A Worksheet**, Moving through cells, Adding worksheets, rows, and columns, Resizing rows and columns, Selecting cells, Moving and copying cells,, Freeze panes; **Formatting Cells:** Formatting toolbar, Format Cells dialog box, Dates and times; **Formulas and Functions:** Formulas, Linking worksheets, Relative, absolute, and mixed referencing, Basic functions, Function Wizard, Autosum, **Sorting and Filling:** Basic ascending and descending sorts, Complex sorts, Autofill; Alternating text and numbers with Autofill, Autofilling functions; Graphics; Adding clip art; Add an image from a file; Editing a graphics; AutoShapes; **Charts:** Chart Wizard; Resizing a chart; Moving a chart, Chart formatting toolbar; **Page Properties and Printing:** Page breaks, Page orientation, Margins, Headers, footers, and page numbers, Print Preview, Print; Keyboard Shortcuts.

- **Presentation Tool**: AutoContent Wizard, Create a presentation from a template, Create a blank presentation, Open an existing presentation, AutoLayout, Presentation Screen: Screen layout, Views, Working with Slides: Insert a new slide, Applying a design template, Changing slide layouts, Reordering slides, Hide slides, Create a custom slide show, Edit a custom slide show Adding Content: Resizing a text box, Text box properties, Delete a text box, Bulleted lists, Numbered lists, Adding notes, Video and Audio Working with Text: Adding text, Editing options, Formatting text, Replace fonts, Line spacing, Change case Spelling check Color & Background: Color schemes, Backgrounds, Graphics, Adding clip art, Adding an image from a file, Editing a graphic, AutoShapes, WordArt Slide Effects: Action buttons, Slide animation, Animation preview, Slide transitions, Slide show options, Master Slides, Slide master, Header and footer, Slide numbers, Date and time Saving and Printing, Save as a web page, Page setup, Print

- **Integrating Programs** Word, spreadsheet and Presentation.

Note:

The above practical is to be conducted using the either Microsoft-Office or OpenOffice.

Course: B.Sc.(C.S.) – I Seme. **Paper Code:** CS202P

Digital Electronics Lab

Objective: *To provide hands-on practice of the basic knowledge in digital logic and circuits and to provide hands-on practice in some commonly used combinational and sequential circuits*

Instruction: The Laboratory work will have to be performed during the semester consisting of any of the 8 experiments from the given list below***:***

List of Experiments:

1. Study and Testing of measuring instruments: Digital and Analog multimeters, CROs and Signal Generators – measurement of AC & DC voltages, measurement of frequency.
2. Study of Components: Identification and testing of resistors, capacitors, inductors, diodes, LEDs & transistors
3. Study of Logic Gates: Study of truth table of basic gates, realization of Boolean functions
4. Study of Half adder and Full Adder
5. Study of Half Subtractor and Full Subtractor
6. Study of Implementation of a 3:8 decoder,
7. Study of 4-line to 16 bit decoder
8. Study of BCD to 7-segment decoder
9. Study of Generating a Boolean expression with a multiplexer
10. Study of Clocked JK Flip Flop
11. Study of 4-bit ripple counter
12. Study of Parallel-in, serial-out, 4-bit shift register

Course: B.Sc.(C.S.) – I Seme. **Paper Code:** CS203AP

Lab: 8085: Microprocessor

Instruction: Any ten experiments from the list given below are to be performed on the 8085 Microprocessor Kit:

1. Addition and subtraction of two 8-bit numbers with programs based on different Addressing modes of 8085.
2. Addition and subtraction of two 16-bit numbers. (Using 2's complement method, also programs which access numbers from specified memory locations)
3. Multiplication of two 8-bit numbers using the method of successive addition and Shift & add.
4. Division of two 8-bit numbers using the method of successive subtraction and shift & subtract.
5. Block transfer and block exchange of data bytes.
6. Finding the smallest and largest element in a block of data.
7. Arranging the elements of a block of data in ascending and descending order.
8. Generating delays of different time intervals using delay subroutines and
9. measurement of delay period on CRO using SOD pin of 8085.
10. Program for Summation of First n Number.
11. Program for Factorial of n.
12. Program for Addition of Array elements.
13. Program for Reversing the Array elements.

Course: B.Sc.(C.S.) – I Seme. **Paper Code:** CS204AP

Lab: Programming in 'C'

List of Experiments:

1. Find Area, Perimeter of Triangle & Rectangle.
2. Find maximum amongst 3 numbers.
3. Program for nested loops.
4. Program to Calculate x^y
5. Program to check Prime Number, Program reverse of digit.
6. Program to find Armstrong Number.
7. Program to print the Fibonacci Series
8. Searching and element from array.
9. Transpose of matrices
10. Multiplication of matrices
11. Sorting array using bubble sort technique
12. Program for factorial.

Note : Any other five program of faculty's interest.

B.Sc. (Computer Science)
Semester II

Course: B.Sc.(C.S.) – II Seme. **Paper Code:** CS307T

Introduction to Data Structure

Objective: *This course provides students an opportunity to develop and refine their programming skills. In particular, the emphasis of this course is on the organization of information, the implementation of linear data structures such as arrays, lists, stacks, queues, and techniques of data abstraction, including searching and sorting.*

Sr. No	Topic	Ref	No. of Lect.
UNIT – I			**15**

1. **Introduction to Data Structure:**
   - Introduction
   - Basic Terminology : Data item, Fields, Records, Files, Entity, Attributes
   - Data Organization and Data Structure
2. **Arrays**
   - Representation of Linear Arrays
   - Traversing, Insertion and Deletions
   - Sorting & Searching Algorithms
   - Multidimensional Arrays : 2D & M-D Concept
   - Record: Record Structures, Representation in Memory

UNIT – II **15**

3. **Linked List**
   - Concept of Linked List
   - Representation of linked List in memory
   - Traversing a linked list
   - Searching a linked list : sorted and unsorted
   - Insertion & Deletion in Linked List
   - Header Linked List & Two way List

UNIT – III **15**

4. **Stacks, Queues , Recursion**
   - Stack: Operation , Array Representation of Stack, linked representation of stack, Arithmetic Expression POLISH & POSTFIX,
   - Application of stacks: Quicksort, Recursion.
   - Queue: Representation of queues & link.
   - Types of Queues : Deques & Priority Queues

Core References:

1. Data Structures : By Seymour Lipschutz, Tata Mcgraw- Hill Publication.

Advance Reference:

1. Fundamentals of Data structures, by Horowitz and Sahani (Galgotia publications).
2. An introduction to data structures and application, by Jean Paul Tremblay & Pal G. Sorenson (McGraw Hill).
3. Data Structures, by Tannenbaum, (PHI).

Course: B.Sc.(C.S.) – II Seme. **Paper Code:** CS308AT

Operating Systems

Objectives: To introduce students the basic functioning *of operating systems as resource manager and its Salient features. Also to study about process states, scheduling, Memory and I/O Management techniques.*

Sr. No	Topic	Ref	No. of Lect.
UNIT – I			**15**
	1. Introduction to Software:		
	• **Software:** Definition, classification of software, operating system as the main component of system software;		
	2. Operating System Fundamental	2/1	
	• **Operating Systems**: OS as a resource manager, Structure of OS, Evolution of OS, OS functions, Characteristics of modern OS.		
	• **Types of O.S.:** Early systems, simple batch systems, multi-programmed batch systems, Time sharing system, Personal Computer systems, Parallel systems, Distributed systems, Real time systems		
	• **OS Structures:** Components of OS: Process management, Memory management, Storage management, File management, I/O management.		
UNIT – II			**15**
	3. Process Management	1/2	
	• **Concept of Process**: Process State, Operation on Processes, thread.		
	• **CPU Scheduling** : Types of Schedulers, Criteria for scheduling, Scheduling Algorithms.		
	• **Process Synchronization:** Need for synchronization, Critical Section, Hardware Synchronization, Semaphores, Monitors, Problem of synchronization.		
	• **Deadlocks:** Concept of Deadlock, Deadlock Modeling, Methods for Handling Deadlock		
UNIT – III			**15**
	4. Storage Management	1/3	
	• **Memory Management**: Address Binding, Logical Vs. Physical Address space, Memory Allocation, Paging, Segmentation, Segmentation and paging of Intel Pentium.		
	• **Virtual Memory:** Demand Paging, Page replacement Algorithms (FIFO, Optimal, LRU), Virtual Memory in windowsXp.		
	• **File System Interface**: Files, File Access, Directory Structure, Protection		
	• Implementation of File System: Allocation Methods, Free space Management		

Core References:

1. "Operating System", By S.R.Sathe & Anil S.Mokhade , MacMillan Publication.

2. "Operating System", By Stuart E.Madnick, John J.Donovan.

Additional References:

1. Operating System Concepts- A. Silberzchaz & P.B. Galvin, Addison – Wesley Publishing Company.

Course: B.Sc.(C.S.) – II Seme. **Paper Code:** CS303BT

8086: Microprocessor

Objectives: *Make the student aware about the functional organization of physical components and architecture of a 8086 Microprocessor Kit. Also give the brief about instruction set of 8086.*

Sr. No	Topic	Ref	No. of Lect.
UNIT – I			**15**
1.	**1. Introduction to Microprocessor and Microcomputer** • Historical background • Microprocessor based personal computer system • Computer data formats	**1/1**	
2	**2. 8086 Hardware specification** • Microcomputer structure and operation • 8086 internal architecture • Introduction to programming 8086 : Prog.lang.		
UNIT – II			**15**
3	**3. Addressing Modes** • Data addressing modes • Program memory addressing modes • Stack memory addressing modes	1/3	
4	**4. Data Movement Instructions (Inst.related with 8086 only)** • MOV revisited: Machine language,the op-code, MOD field, resister assignment,R/M memory addressing,special addr.mode • PUSH/POP, initializing stack • Miscellaneous data transfer instructions: XCHG, LAHF & SAHF	1/4	
UNIT – III			**15**
5	**5. Arithmetic instructions** o Addition, subtraction and comparison o Multiplication and division o BCD and ASCII arithmetic		
6	**6. Logic instructions** o Basic logic Instructions o Shift and rotate		
7	**7. Program control Instructions** o The JUMP group o LOOP o CALL & RET		

Core Reference:

1. The Intel Microprocessors: Architecture, programming and interfacing – By Barry B. Brey
2. Microprocessors and Interfacing : Douglas Hall.

Course: B.Sc.(C.S.) – II Seme. **Paper Code:** CS304BT

Advance Programming in C

Objective: After working through this paper the students should be able to

1) Learn some advance features of C language.
2) Write programs using pointers, file handling.
3) Aware of graphics functions of C.

Sr. No	Topic	References	No. of Lectures
UNIT – I			**15**
1	**Functions** • Introduction, types of functions. Defining functions, Arguments, Function prototype, actual parameters and formal parameters, Calling function, Returning function results, Call by value, Recursion.	2/9, 1/5, 3	
2.	**Structure & Union** • Structure: Introduction, Declaration and initializing structure, Accessing structure members, Nested structures, Arrays of structure, *typedef* statement. • Unions: Declaration, Difference between structure and union	2/10, 1/10,	
UNIT - II			**15**
3.	**Pointers:** • Introduction, Memory organization. Declaration and initialization of pointers. The pointer operator * and &, De-referencing, Pointer expression and pointer arithmetic, Pointer to pointer.	2/11, 1/5	
4.	**Storage Class & Library Functions:** • Storage classes, Scope, visibility and lifetime of variable, block and file scope, auto, extern, static and register storage classes. • **String handling functions**: strcpy(), strcmp(), strcat(), strlen(), strupr(), strlwr(), gets(), puts() • **Data conversion functions from stdlib.h**: atoi(), atol(), atof(), itoa(), ltoa(), random(), calloc(),malloc(),exit(), abs(), toupper(), tolower()	2	
5.	**Preprocessor Directives:** • File inclusion and conditional compiler directives, Macro substitution, #define, #if, #ifdef, #else, #elif, #endif,	2/14, 1/7	

6. Miscellaneous Features: 2/App-I, 1/15,

- Bitwise Operators: Introduction, Masking, Internal representation of data, Bit fields, Enumerated data types, Type casting.

UNIT - III **15**

7. File Handling 2/12, 1/12,13

- **File handling**: Introduction, Opening & closing a file, Input/Output operations on files, text and binary files, getc(), putc() function. File copy program, fprintf() and fscanf(). fread() and fwrite() function. Writing and reading records from binary file, Appending, modifying and deleting a record from file, Random access functions fseek(), rewind(), flushall(), remove(), rename().
- **Command line arguments**: use of argc and argv.

8. Graphics in C: 4

- Introduction: initgraph() and detectgraph() function, Drawing object in C, Line, Circle, Rectangle, Ellipse, Changing foreground & background colors, Filling object by color, outtextx() function.

Core Reference:

1. Let us C Solutions : Y.P. Kanetkar [bpb publication]
2. Programming in C : E. Balagurusamy. [Tata macgraw hill]
3. Programming in C : Goterfried [Shaums Series]
4. Graphics Under C : Y. Kanetkar

Additional References:

1. Spirit of "C" : Moolish Kooper.
2. Test your Skills in C : Y.Kanetkar

Course: B.Sc.(C.S.) – II Seme. **Paper Code:** CS305BTP

Communication Skill- II

Objective: To introduce advance topics to self-assess various components of communication skills as well as to improve listening, reading, writing, and speaking and presentation skills through practice.

Sr. No	Topic	Ref.	No. of Lect.
UNIT – I			**15**
1.	**Communication with Media** • Written media of Communication: Letters, Notices, Minutes, Manual, Leaflet, Complaints & Suggestion, Job Application. • Visual Media of communication: slide presentation, Pictures & Photographs, Posters & Advertisement. • Non-Verbal Media of Communication	2/5	
2.	**Written Communication: Reports** • Types of Report, characteristics of Good Report , Essential Requisites of Good Report-Writing, Planning the Report, Outlining Issues for Analysis, Writing the Reports.	2/8	
UNIT – II			**15**
3.	**Group Communication** • Problem of Group Communication- Meeting - types of meeting, Advantages & Disadvantages of Meeting, - Preparation for Meeting – conduct of a Meeting – Responsibility of participants.	1/8	
4.	**Interview** • Purpose, Types of interviews – promotion, appraisal, exit, telephone. • Employment or selection Interview : Candidate's preparation, Question commonly asked in interview, role of interviewer, Interviewer's preparation.	1/9	
UNIT – III			**15**
5.	**Listening Comprehension** • Cassettes: "*Tiger's Eye*" Series.(vol. 1 & 2) , "*Twist in the Tail*" • The Listening drill is to be given and question should be framed.		
6.	**Reading Comprehension and Vocabulary** Reading with proper pronunciation and ideal reading is to be recorded.		
7.	**Speaking:** **CIEFL**' Spoken English exercises part one and two. Drilling : Proper Pronunciation of word and sentences		

Core Books

1. Business Communication,By urmila Rai & S.M.Rai. Himalaya Pub.(Tenth Ed.)
2. Communication Skill for Effective Management By Dr.Anjali Ghanekar. Everest Pub. House.

Note : 1. Teacher should demonstrate various format of concerned contents.
2. For Report writing practice demonstrate IEEE paper Format.(http:// www.ieee.org/portal/cms_docs/pubs/confpubcenter/pdfs/samplems.pdf , http://www.ieee.org/portal/cms_docs_iportals/iportals/publications/journmag/transactions/TRANS-JOUR.doc)

Course: B.Sc.(C.S.) – II Seme. **Paper Code:** CS306BT

Numerical Computational Methods

Sr. No	Topic	Ref.	No. of Lect.
UNIT – I			**15**
1	**Error in Calculation** • Significant Error , Absolute, Percentage, Relative Error • Chopping off and Rounding off Error. • Truncation Error, Propagation Error.	1/1	
2	**Matrices and Determinants.** • Definitions, Matrix Operations • Determinant of Square Matrix, Cofactor • Adjoint of Matrix, Inverse of Matrix, Rank of Matrix	3/2	
3	**Numerical Solutions of Transcendental Equations** • Concept of Iterative Methods, Search Method for Initial Guess. • Bisection Method • False Position Method • Newton-Raphson Method	1/2	
UNIT – II			**15**
4	**Elimination Methods for Solving Simultaneous Equations** • Introduction and Matrix Notation of set of Equations • Gauss Elimination Method • Matrix Inverse Method	1/3	
5	**Interpolation** • Introduction and Polynomial Interpolation • Newton-Gregory Forward Difference Interpolation Formula • Newton-Gregory Backward Difference Interpolation Formula	1/6	
UNIT – III			**15**
6	**Interpolation - II** • Central Difference Formula • Newton's divided Difference Interpolation • Lagrange's Interpolation		
7	**Least Square Curve Fitting** • Best Fit and Criteria for Best Fit and Least Square Fit. • Linear Regression. • Polynomial Regression.	1/7	

Core Reference Books:

1. "Numerical Computational Methods" - Dr. P.B.Patil, Narosa Publication Hous.

Advance Reference Books:

1. Numerical methods -S.C.Chapra, R.P.Canale-McGraw Hill
2. Numerical methods-E.Balguruswamy

Lab: Data Structure & Operating System

Assignments: Write the Program using C (if applicable) :

Data Structure:

1. Write a program using DIV(J,K) which reads a positive integer N>10 and determines whether or not N is a prime number.
2. Write a program which counts the number of particular character/word in the String.
3. Write a program which reads words WORD1 and WORD2 and then replaces each occurrence of word1 in text by word2
4. Write the programs for traversing of n item using the array.
5. Write the programs for insertion and deletion of n item using the array.
6. Implement Linear and binary search algorithm using C.
7. Implement Bubble sort using C.
8. Write the programs for traversing of n item from the linked list.
9. Write the programs for push and pop operation using the stacks.
10. Write the programs for insertion and deletion of n item from the queues.

Operating System:

1. Study of Unix/Linux Command.

2. Write a program to implement the FCFS Scheduling Algoithms.
3. Write a program to implement the SJF Scheduling Algoithms.
4. Write a program to implement the Priority Scheduling Algoithms.
5. Write a program to implement the Round Robin Scheduling Algoithms.

Lab : 8086: Microprocessor

Any ten experiments from the list given below:

1. Addition and subtraction of two 8-bit numbers with programs based on different Addressing modes of 8086.
2. Addition and subtraction of two 16-bit numbers. (Using 2's complement method, also programs which access numbers from specified memory locations)
3. Multiplication of two 8-bit numbers using the method of successive addition and Shift & add.
4. Division of two 8-bit numbers using the method of successive subtraction and shift & subtract.
5. Block transfer and block exchange of data bytes.
6. Finding the smallest and largest element in a block of data.
7. Arranging the elements of a block of data in ascending and descending order.
8. Generating delays of different time intervals using delay subroutines and measurement of delay period on CRO using SOD pin of 8086.
9. Program for Summation of First n Number.
10. Program for Factorial of n.
11. Program for Addition of Array elements.
12. Program for Reversing the Array elements.

Course: B.Sc.(C.S.) – II Seme. **Paper Code:** CS204BP

Lab: Advance Programming in C

1. Swapping of numbers by using call by reference
2. Program to pass array to function.
3. Program for passing structure pointer to function.
4. String manipulation function e.g. string copy, concatenation, compare, string length, reverse
5. Program for reading/writing text file.
6. Program for reading/writing binary file
7. File copy program.
8. Program to modify a record from binary file
9. Program to delete a record from binary file
10. Program on conditional compiling
11. Program on macro substitution.
12. Program for data conversion
13. Program to draw simple pictures (human face, clock, hut, etc.) using graphics functions.
14. Program using command line arguments.
15. Program to demonstrate the storage class.
16. Program to sort names.

Course: B.Sc.(C.S.) – II Seme. **Paper Code:** CS206P

Implementation of Numerical Computational Methods Using C.

1. Program in C for representation of, Inverse of Matrix
2. Program in C for representation of, Bisection Method
3. Program in C for representation of, False Position Method
4. Program in C for representation of, Newton-Raphson Method
5. Program in C for representation of, Gauss Elimination Method
6. Program in C for representation of, Matrix Inverse Method
7. Program in C for representation of, Newton-Gregory Forward Difference Interpolation Formula
8. Program in C for representation of, Newton-Gregory Backward Difference Interpolation Formula
9. Program in C for representation of, Central Difference Formula
10. Program in C for representation of, Newton's divided Difference Interpolation
11. Program in C for representation of, Lagrange's Interpolation
12. Program in C for representation of, Spline Interpolation

B.Sc. (Computer Science)
Semester III

Course :	B.Sc.(C.S.)	Sem:III	Hours/week :	3
Code :	CS309AT		Pre-requisite :	

Analysis Of Algorithm

Sr.No.	Topics in Details	No. of Lect.
Unit I	**Binary Trees**: Representing Binary, Trees in Memory, Traversing Binary Trees, Traversal Algorithms using Stacks, Header Nodes; Threads, Binary Search Trees Searching and Inserting in Binary Search Trees, Deleting in Binary Search Tree, AVL Search Trees, Insertion in an AVL Search Tree, Deletion in an AVL Search Tree, *m*-way Search Trees, Searching, Insertion and Deletion in an *m*-way Search Tree, B Trees, Searching, Insertion and Deletion in a B-tree, Heap; Heapsort Path Lengths; Huffman's Algorithm.	**15**
Unit II	**Graph Theory:** Terminology, Sequential Representation of Graphs; Adjacency matrix, Path Matrix, Warshall's Algorithm, Shortest Paths, Linked Representation of a Graph, Operations on Graphs, Traversing a Graph, Posets; Topological Sorting.	**15**
Unit III	**Searching & Sorting**: Introduction, Sorting, Insertion sort, Selection sort, Merging, Merge-Sort, Radix Sort, Searching and Data Modification, Hashing. Assignment: Question to be Solved from supplementary problems from the book recommended above are: 7.1 , 7.2, 7.3, 7.4, 7.9, 8.1, 8.5, 8.6.	**15**

Core References:

1. Data Structures : By Seymour Lipschutz, Tata Mcgraw- Hill Publication.

Advance Reference:

1. Fundamentals of Data structures, by Horowitz and Sahani (Galgotia publications).
2. An introduction to data structures and application, by Jean Paul Tremblay & Pal G. Sorenson (McGraw Hill).

Data Structures, by Tannenbaum, (PHI).

Course :	B.Sc.(C.S.)	Sem:III	Hours/week :	3
Code :	CS308BT		Pre-requisite :	

Operating Systems II

Sr.No.	Topics in Details	No. of Lect.
Unit I	**I/O System**	15

- I/O System Components : I/O Devices , I/O Hardware , Application I/O interface
- Secondary Storage Structure : Disk fundamental, Disk Scheduling , Disk Management

Device Management

- Introduction : Dedicated Devices, shared devices and virtual devices
- Generalized strategies

Unit II — **Device Characteristics** — **15**

- Input and Output devices
- Storage devices
- Device allocations

Concept of I/O Traffic controller

- I/O scheduler
- Introduction to Virtual Devices

Unit III — **Information Management** — **15**

- Concept of File system
- Symbolic file system
- Access control verification
- Logical and physical file system

Case study

- IBM system : Memory , processor, Device and Information Management.

Assignments

- 5-2 from "Operating System", By Stuart E.Madnick, John J.Donovan.
- 5-5 from "Operating System", By Stuart E.Madnick, John J.Donovan.
- 5-7 from "Operating System", By Stuart E.Madnick, John J.Donovan.
- 6-1 from "Operating System", By Stuart E.Madnick, John J.Donovan.
- 6-5 from "Operating System", By Stuart E.Madnick, John J.Donovan.
- 6-9 from "Operating System", By Stuart E.Madnick, John J.Donovan.

Prepare a short report on the case study given in the syllabus.

Core Reference:

1. "Operating System", By S.R.Sathe & Anil S.Mokhade , MacMillan Publication.
2. "Operating System", By Stuart E.Madnick, John J.Donovan.

Books Recommended:

- Operating System Concepts- A. Silberzchaz & P.B. Galvin, Addison – Wesley Publishing Company.

Course :	B.Sc.(C.S.)	Sem:III	Hours/week :	3
Code :	CS303CT		Pre-requisite :	

Peripheral and Interfacing

Sr.No.	Topics in Details	No. of Lect.
Unit I	**8086 Hardware Specification** Power supply requirements, DC characteristics, 8086 Pin-out: minimum mode pins and maximum mode pins., 8284A Clock generator: pin-out, Internal Block diagram and it's operation. (includes Ready and wait state operation), Bus buffering and latching: Demultiplexing of buses, 8086 demultiplexing, fully buffered 8086. Bus Timing: basic bus operation, Read bus cycle, write bus cycle.	15
Unit II	**Memory Interfacing** Memory Pin Connections: Address Connections, Data connections, selection connections and Control connections. Address Decoding : Why Address decoding, Simple NAND Gate Decoder, 3:8 Line Decoder, PLD Programmable Decoder. 8086 Memory Interface(16-bit) : 16-Bit Bus Control, separate bank Decoder. 80386 and 80486 Memory Interface: Memory Banks, 32-Bit Memory Interface. Dynamic RAM: Introduction, EDO Memory, SDRAM, DDR, DRAM Controllers	15
Unit III	**I/O Interfacing:** Introduction to I/O Interface: I/O Instructions, Isolated I/O, Memory Mapped I/O. Basic Input Interface and Basic Output Interface, Handshaking. I/O Port Address Decoding: 8-Bit and 16-Bit 8255 PPI : Basic Description of the 8255a, Programming the 8255. 8254 Programmable Interval Timer: Function Description,Pin-out..	15

Core Reference:

1. The Intel Microprocessors By Barry B. Brey, PHI Publishers
2. Microprocessors and Interfacing : Douglas Hall.

Course :	B.Sc.(C.S.)	Semester :	III	Hours/week :	3
Code :	CS304CT			Pre-requisite :	

Object Oriented Programming Using C++- I

Sr.No.	Topics in Details	No. of Lect.
Unit I		**15**
1	**Introduction of OOP** Procedural Vs Object Oriented Programming, Basic concepts of Object Oriented Programming, Class, Object, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing. Benefits and applications of OOP, History and overview of C++, C++ program structure. Reference variables, Scope resolution operator, Member de-referencing operators, new and delete, cin and cout, The endl and setw manipulator	
2	**Functions in C++:** Function prototype, Call by reference (using reference variable), Return by reference, Inline function, Default arguments, Const arguments.	
Unit II		**15**
1	**Function overloading:** Different numbers and different kinds of arguments,	
2	**Objects and Classes:** Specifying a class, private and public, Defining member functions, Nesting of member function, Object as data types, Memory allocation for objects, static data members and member functions. Array of objects, Objects as function argument, returning objects, Friend function and its characteristics.	
Unit III		**15**
1	**Constructors and Destructors:** Introduction, default and parameterized constructors, Multiple constructors in a class, Copy Constructor, Destructors	
2	**Operator Overloading:** Overloading unary operators, Rules for operator overloading, Overloading without friend function and using friend function, Overloading binary operators such as arithmetic and relational operators, Concatenating Strings, Comparison operators.	

Reference Books:

1.Object Oriented Programming with C++ E. Balagurusamy, Tata McGraw-Hill Publishing
2.Object Oriented Programming In C + + Robert Lafore, Galgotia
3..Let us C++ Yeshwant Kanetkar; bpb publication

Course :	B.Sc.(C.S.)	Semester :	III	Hours/week :	3
Code :	CS310AT			Prerequisite :	

Object Oriented Programming Using Java–I

Sr. No.	Topics in Details	No. of Lect.
UNIT I		**15**
1	**Object oriented paradigm** Basic concepts of Object oriented programming: class & object, data abstraction and encapsulation, inheritance, polymorphism, dynamic binding, message communication. Benefits and applications of OOP. History and features of Java. Java Vs. C++. Java and Internet, Java and www. Java environment. Structure of java program, symbolic constants. Data types of java in brief.	
2	**Arrays, Classes and Objects** Declaration and initialization, one and multidimensional arrays Defining a class, adding variables and methods, creating objects, static fields and static methods. Method overloading, Constructors: types and multiple constructors in class. Command line arguments.	
UNIT II		**15**
1	**Inheritance** Super and sub class, defining a subclass. Single inheritance, multilevel inheritance and hierarchical inheritance. Subclass constructors. super keyword, Visibility controls, Method overriding, Dynamic method dispatch, Abstract methods and class.	
2	**Interfaces & String Class** Defining interfaces, implementing interfaces, extending interfaces, accessing interface variables. String class and its methods, Vectors	
UNIT III		**15**
1	**Packages** Introduction, Java API packages, Naming conventions, creating and accessing user defined package, using a package, adding a class to a package, importing classes from package.	
2	**Exception handling and Multithreading** Exceptions, syntax of exception handling code, multiple catch statements, throw: throwing own exceptions, throws and finally Introduction to multithreading, creating threads by extending the Thread class and by implementing Runnable interface, implementing the run() method, Life cycle of a thread, Thread methods and thread priority.	

Reference Books:

1.Prgramming with JAVA: E. Balagurusamy, Tata Mc-Graw Publishing Company Ltd.
2. The Complete Reference J2SE: Herbert Schildt, Tata Mc-Graw Publishing Company Ltd.
3. Core Java-2 Vol-I & Vol-II - Cray S. Horstmann, Gray Corneel; Pearson Education, Low Price edition

Course :	**B.Sc.(C.S.)**	**Semester :**	**III**	**Hours/week :**	**3**
Code :	**CS312 AT**			**Prerequisite :**	-

Database Management System

Sr. No.	Topics in Details	No. of Lect.
Unit–I		**15**
1.	**Introduction to Basic Concepts of DBMS:** Database System Application,Purpose of Database System Database Architecture : 3-Level architecture, Database Users & Administrators Responsibilities, Functional Components of Database system : Storage & Query Processor, Transaction Management.	
Unit-II		**15**
2.	**Data Modeling & Design:** Type of Data Model : Relation Data Model, E-R Data Model, Object Based Data Model Semi-Structured Data Model, Hierarchical & Network Data Model E-R Data Model: Entity, Entity set, Entity types, Attributes, Types of Attributes, E-R diagram. Mapping Cardinalities , Data Association Constraints : Integrity constraints I & II, Database Design : Overview of Design Process, Designing Phase, Normalization(1NF,2NF,3 NF)	
Unit-III		**15**
3.	**Relational Data Model** Basic Structure ,Database Schema ,Integrity Rules, E.F.Codds Rules Relational Algebra : Union , Intersection , Difference, Cartesian Product, Selection , Projection, Join : Natural & Outer Join, Division	

Reference:

1. **Database System concepts :** Korth, Siberschatz , Fifth Edition
2. **An Introduction to Database System :** B.Desai, Revised Edition

Course :	**B.Sc.(C.S.)**	**Semester :**	**III**	**Hours/week :**	**3**
Code :	**CS306CT**			**Prerequisite :**	-

Statistical Methods

Sr. No.	Topics in Details	No. of Lect.
Unit–I		**15**
1.	**Introduction and basic concepts of Statistics** Definition of Statistics, Scope and importance of Statistics. Primary and Secondary data, Types of data : qualitative, quantitative, discrete, continuous, cross-section, time series, failure, industrial, directional data. Graphical presentation: Histogram, frequency polygon, frequency curves Diagrammatic presentation: Bar diagrams, Pie diagram, scatter diagram. Classification of data: Discrete and continuous frequency distributions, inclusive and exclusive methods of classification, relative and cumulative frequency distributions.	
Unit-II		**15**
2.	**Measures of Central Tendency** Concept of central tendency. For group and Ungroup data Arithmetic mean (A.M.) simple and weighted Merits and demerits of A.M.,Mode: Computation for frequency and non-frequency data. Computation of mode, Merits and demerits of mode. Median: Computation for frequency and non-frequency data, computation.Merits & demerits of median. Geometric mean (G.M.) computation for G M ,Merits demerits and applications of G.M.Harmonic Mean (H M) computation for frequency, non-frequency data, merits, demerits.	
Unit-III		**15**
3.	**Measures of Dispersions** Dispersion and measures of Dispersion , Range (definitions and problems) Quartile Deviation (definitions and problems) Mean Deviation (definitions and problems) Standard Deviation (definitions and problems) Variance, different formulae for calculating Variance.	

Reference:

1. Core Reference: 1. By S.C.Gupta and V.K. Kapoor

Course :	**B.Sc.(C.S.)**	**Semester :**	**III**	**Hours/week :**	**4**
Code :	**CS209P**			**Pre-requisite :**	

Analysis of Algorithm

7.1 Write a program which prints the nodes of T in (a) preorder (b) inorder (c) postorder.
7.2 Write a program which prints the terminal nodes of T in (a) preorder (b) inorder (c) postorder. (note: all three lists should be the same).
7.4 Translate heapsort into a subprogram HEAPSORT (A, N) which sorts the array A with N elements. Test the program using
44,33,11,55,77,90,40,60,99,22,88,66
7.5 Write a program which prints the list of employee records in alphabetical order (Hint: print the records in inorder)
9.1 Write a subprogram RANDOM (DATA, N, K) which assigns N random integers between 1 and K to the array DATA
9.2 Translate insertion sort into a subprogram INSERTSORT (A, N) which sorts the array A with N elements. Test the program using:
(a) 44,33,11,55,77,90,40,60,99,22,88,66
9.8 Translate selection sort into a subprogram SELECTSORT (A, N) which sorts the array with N elements. Test the program using:
(a) 44,33,11,55,77,90,40,60,99,22,88,66

Course :	**B.Sc.(C.S.)**	**Semester :**	**III**	
Code :	**CS203CP**			**Pre-requisite :**

Peripheral and Interfacing Practical

1. To Study different operating modes of 8255A PPI (setting Control Word Register).
2. Set data on various memory locations and see contents of various memory locations.
3. Program to interface 8-bit LED panel to 8086 Microprocessor and glow as per the data input through a Memory Location
4. Program to interface 8-switches to 8086 Microprocessor, store the state of the switches.
5. Program to show the states of switches on LED Panel
6. Program to interface 7 segment display without multiplexing.
7. Program to interface 7 segment display with multiplexing.
8. Interfacing DAC to 8086, to generate wave forms.
9. Interfacing ADC to 8086, to read digital values from ADC .
10. Program to interfacing Stepper motor.

Course :	**B.Sc.(C.S.)**	**Semester :**	**III**
Code :	CS204CP		**Pre-requisite :**

OOP using C++

1. Program using reference variable.
2. Program for inline function.
3. Program to demonstrate default argument
4. Program for function overloading.
5. Object oriented program to demonstrate class & object and member functions..
6. Object oriented program for returning object from function.
7. Object oriented program to illustrate the use of static data members and static member function
8. Object oriented program for friend function.
9. Object oriented program for constructor
10. Object oriented program for multiple constructors in a class.
11. Object oriented program to demonstrate the use of destructor
12. Object oriented program for unary operator overloading.
13. Object oriented program for arithmetic operator overloading
14. Object oriented program for relational operator overloading.

Course :	**B.Sc.(C.S.)**	**Semester :**	**III**
Code :	CS210AP		**Pre-requisite :**

OOP Using Java - I

1. Program for one dimensional array. (sum and average of elements/finding maximum 10 number from array)
2. Program for static fields and static methods.
3. Program for method overloading
4. Program using constructor
5. Program to demonstrate the use of command line argument.
6. Program for single inheritance.
7. Program for multilevel inheritance.
8. Program to demonstrate the subclass constructor (use of super keyword)
9. Program for method overriding
10. Program for abstract class and methods.
11. Program for implementing interfaces.
12. Program for creating and importing user defined packages.
13. Program for exception handling. (try/catch block)
14. Program using throw and throws clause.
15. Program for create thread using extends Thread and implements Runnable.

Course : B.Sc.(C.S.) Semester : III
Code : CS212AP Prerequisite : -

DBMS Lab

1. **Student should select any five applications and as per the guidance of the concerned teacher should prepare the E-R diagram for the applications.**
2. **Student should make the necessary Relational databases using the normalization for any two applications. Also they should solve at least twenty Queries using relational algebra based on relations drawn by them.**

B.Sc. (Computer Science)
Semester IV

Course :	B.Sc.(C.S.)	Semester :	IV	Hours/week :	3
Code :	CS313AT			Prerequisite :	312AT

Software Engineering I

Sr.No.	Topics in Details	No. of Lect.
Unit I	Introduction to software engineering, Software Development Life Cycle, Requirements Analysis, Software Design, Coding, Testing, Maintenance.	**15**
Unit II	Software Requirement Specification, Waterfall Model, Prototyping Model, Iterative Enhancement Model, Spiral Model, Role of Management in Software Development, Role of Metrics and Measurement, Problem Analysis, Requirement Specification, Validation, Metrics, Monitoring and Control	**15**
Unit III	System Design, Problem Partitioning, Abstraction, Top-down and bottom-up design, Structured Approach, Functional v/s Object-Oriented Approach, Design specification & verification, metrics, Monitoring & Control	**15**

Core Reference:

1. Roger S. Pressman - Software Engineering A Practitioner's Approach - 5th edition, McGraw
2. An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa

Course :	B.Sc.(C.S.)	Semester :	IV	Hours/week :	3
Code :	CS312 BT			Prerequisite :	312AT

Advance Database Management System

Sr.No.	Topics in Details	No. of Lect.
Unit–I		**15**
1.	**Structured Query Language**	
	1. SQL: Characteristics of SQL, Advantage of SQL, SQL data types and literals. Types of SQL commands. SQL operators and their precedence. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL.	
Unit-II		**15**
2.	**Transaction Management :**	
	Transactions Processing Transaction Concept, Transaction State, Implementation of Atomicity and durability, Concurrent Executions, Serializabilty, Recoverability, Implementation of isolation, Testing for Serialization, **Concurrency Control Techniques** : lock-Based Protocols Timestamp-Based Protocols Deadlock Handling	
Unit-III		**15**
3.	**Database System Architecture & Data Storage**	
	Database System Architecture Centralized and Client-Server Architecture, Server System Architecture, Parallel System, Distributed Systems, Network Types. **Data Storage :** Overview of Physical Storage Media, Magnetic Disk, RAID, Tertiary Storage, Storage Access,	

Reference:

1. **Database System concepts :** Korth, Siberschatz , Fifth Edition
2. **An Introduction to Database System :** B.Desai, Revised Edition

Course :	B.Sc.(C.S.)	Semester :	IV	Hours/week :	3
Code :	CS314AT			Prerequisite :	

Data Communication and Networking - I

Sr.No.	Topics in Details	No. of Lect.
UNIT-I		**15**
1	**Introduction** Communication System, Components of communication system, Computer network Advantages and applications of computer n/w. point-to-point and multipoint line configuration, LAN, MAN and WAN. Analog and Digital signals, Data Transmission: Parallel and Serial, Synchronous and Asynchronous transmission, Transmission Mode: Simplex, half-duplex and full-duplex.	
2	**Network Topologies** Mesh, Star, Tree, Bus and Ring and Hybrid Topology (Advantages and disadvantages of each)	
UNIT-II		**15**
1	**Transmission media** Guided and unguided media, Twisted-pair, UTP and STP cable, coaxial cable, Optical Fiber cable, Radio waves, Microwaves, Satellite Communication (*Transmission characteristics and advantages of each type*)	
2	**Modulation** Concept of modulation and demodulation, Digital-to-analog conversion, Amplitude Shift Keying (ASK)/AM, Frequency Shift Keying (FSK)/FM, Phase Shift keying (PSK)/PM. Quadrature PSK, differential PSK.	
UNIT-III		**15**
1	**Multi channel Data Communication** Channels and Concept of multi channeling, Baseband and Broadband, Multiplexing: FDM and TDM (Synchronous and asynchronous TDM),	
2	**Data Networks and Protocols** Switching**,** Circuit Switching, Packet Switching and Message Switching. Network Protocol: syntax, semantics and timings, The OSI model, 7-layers of n/w model., Functions of each layer	

Reference Books:

1. Introduction to Digital and Data Communications, Michal A Miller, JAICO, publishing.
2. Data Communication and Networking: C.S.V. Murthy, Himalaya Publishing House
3. Data Communication and Networking :: Behrouz A. Forouzan; Mc-Graw Hill Pub.

Course :	B.Sc.(C.S.)	Semester :	IV	Hours/week :	3
Code :	CS304DT			Pre-requisite :	304CT

Object Oriented Programming Using C++- II

Sr.No.	Topics in Details	No. of Lect.
Unit I		**15**
1	**Inheritance:** Derived and base class, Specifying the derived class, Accessing base class members, public and private Inheritance, Single Inheritance, The protected access specifier, Derived class constructors, Multilevel and Hierarchical Inheritance, Multiple Inheritance, Ambiguity in multiple Inheritance, virtual base classes, Abstract base classes.	
2	**Virtual function & Polymorphism** Introduction, Pointer to object, Pointer to derived class, Overriding member functions, Virtual function, Rules for virtual functions, Pure virtual function.	
UNIT II		**15**
1	**Streams** The Stream class hierarchy, Stream Classes and header files, Unformatted and formatted I/O operation, Managing output with manipulators	
2	**Working with Files** Introduction, Classes for file Stream Operation, Opening & closing files, Detection of end of file, file modes, File pointer & manipulator, Sequential input & output operations, Updating a file: Random access, Writing an object to disk, Reading an object from disk, Binary Vs. Character files, The Fstream class, File pointers, Specifying the position, Specifying the offset The tellg() function, Disk I/O with member functions.	
UNIT III		**15**
1	**Templates** Introduction, Class templates, class templates with multiple parameters, function templates, function templates with multiple parameters, Overloading of template functions, member function templates. Introduction to Standard Template Library- STL Components of STL, Containers, Algorithms, Iterators, Applications of Container Classes.	
2	**Exception handling** Exception Handling Mechanism, The try block, the catch exception handler The throw statement The try/throw/catch sequence Exception Specifying exceptions.	

Reference Books:

1. Object oriented Programming with C++ - E. Balagurusamy; Tata Mc-Graw Hill Pub.
2. Object oriented Programming in C++ - Robert Lafore, Galgotia Pub.
3..Let us C++ Yeshwant Kanetkar; bpb publication

Course :	B.Sc.(C.S.)	Semester :	IV	Hours/week :	3
Code :	CS310BT			Prerequisite :	310AT

Object Oriented Programming Using Java–II

Sr. No.	Topics in Details	No. of Lect.
UNIT I		**14**
1	**Input/Output** Introduction, Byte Stream and Character stream classes, Methods of InputStream and OutputStream classes, Constructors and methods of FileInputStream and FileOutputStream classs, Methods of DataInputStream and DataOutputStream class. Reading input (numeric, character and string data) from console/keyboard. Handling primitive data types. Character Stream Classes. Reader and Writer class, File class.(in brief)	
2	**Applet Programming** Types of applets, Developing and testing applets, Life cycle of applet, creating executable applet. <APPLET> tag and its attributes. Passing parameters to applet.	
UNIT II		**14**
1	**Event Handling** Event handling mechanism, Java's event delegation model: event sources and event listener,. Event classes, Event Listener Interfaces, Adapter classes.	
2	**AWT & Graphics** AWT Classes, Windows fundamentals, Frame Windows, Creating windowed program, displaying information within a window. Drawing method of the Graphics class such as drawLine(), drawRect() drawOval(), drawArc(), fillRect(), fillOval(), fillArc(), getColor(), setColor(), getFont(), setFont(), Managing text output using FontMetrics	
UNIT III		**17**
1	**AWT Controls** AWT Controls: Control fundamentals: Adding and removing controls, responding a controls, Labels, Button, ChechBox & ChechboxGroup, Choice, Lists, TextField, TextArea. Layout Managers	
2	**Network Programming** Networking basics, Socket Overview, Client/Server, Internet addressing, Domain Naming Service (DNS). Methods of InetAddress class. Socket and ServerSocket class, URL class. Datagrams: DatagramPacket and DatagramSocket class.	

Reference Books:

1. Prgramming with JAVA: E. Balagurusamy, Tata Mc-Graw Publishing Company Ltd.
2. The Complete Reference J2SE: Herbert Schildt, Tata Mc-Graw Publishing Company Ltd.
3. Core Java-2 Vol-I & Vol-II - Cray S. Horstmann, Gray Corneel; Pearson Education, Low Price edition

Course :	**B.Sc.(C.S.)**	**Semester :**	**IV**	**Hours/week :**	**3**
Code :	**CS315 AT**			**Prerequisite :**	-

Computer Graphics-I

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
1.	**Introduction to** Computer Graphics Application Overview of Display Devices : CRT , Flat panel Display, LCD Overview of Input devices for Interactive graphics. Image Acquisition and Storage Storage and file format for pictures Image acquisition with a digital camera. Programmers model of interactive graphics system.(Demonstrate use of graphics using C/Any other higher Level Prog. Lang.)	
Unit-II		**15**
2.	**2-D Transformation** Representation of points. Transformation & Matrics Representation Transformation of Point Transformation of Straight Line Midpoint Transformation, Rotation,Reflection,Scaling,Combined Transformation	
Unit-III		**15**
3.	**Composite Transformation & Clipping** Line Drawing Algrithms D.D.A.,Bresenhems ,Circle Generation Clipping : 2D clipping , Mid-point Sub-division algorithms	

Reference:

1. **Procedural Elements for Computer Graphics :** D.F.Rogers
2. **Mathematical Elements for Computer Graphics:** D.F.Rogers and J.A.Adams

Course : B.Sc.(C.S.)	Semester : IV	Hours/week : 3
Code : CS303DT		Prerequisite : -

PC Hardware

Sr.No.	Topics in Details	No. of Lect.
Unit-I		
1.	**Understanding and Working with Personal Computers** Understanding How PCs Work. The Four Main Functions of Computing. PC Hardware Components. How PCs Work. Working with PCs PC Workspaces and Tools Preventive Maintenance Environmental and Safety Concerns Electricity and the PC	
Unit-II	**Motherboards & Central Processing Units** Identifying Motherboards Types of Motherboards Motherboard Form Factors Mother Board Components : Central Processing Unit (CPU) and Processor Socket or Slot, Motherboard Buses, Chipsets, Expansion Slots, Memory Slots, Connectors, BIOS Chip, CMOS Battery, Jumpers and DIP Switches, Firmware, Cache Memory	**15**
Unit-III	**Understanding System Resources** Mother Board Components. Input/Output (I/O) Addresses. Interrupt Requests. DMA Channels. Memory Addresses. Working with Expansion Cards. Portable Systems. Examining Laptop Components. Power Sources, Displays, Keyboards and Pointing Devices, Internal Components, Upgrading Laptop Components.	**15**

Core Reference:

1. Wiley Pathways PC Hardware Essentials Project Manual by Groth, David ; Gilster, Ron, Liberty Lake, Washington ; Polo, Russel

For Book visit the website:
http://www.coursesmart.com/9780470114117/chap01#X2ludGVybmFsX1BGUmVhZGVyP3htbGlkPTk3ODA0NzAxMTQxMTcvNzg=

Course : B.Sc.(C.S.)	Semester : IV	Hours/week : 3
Code : CS316AT		Prerequisite : -

Web Fundamentals-I

Sr.No.	Topics in Details	No. of Lect.
Unit-I	**Basic concepts** Internet, Internet Domains world wide web, Protocols definition, Overview of TCP/IP, Telnet. Web page, Web site , web browser , Web server ,web client Communication between browser and web server Web site architecture	**15**
Unit-II	**Introduction to HTML** Structure of HTML program HTML paired tags,Text formatting: paragraph, line break, headings , drawing lines.Text styles: Bold, italics, underline. Lists: types of lists viz. unordered, ordered, definition lists Adding graphics: image, background, border, using width and height attributes.Tables : creation and setting attributes of table. Linking documents (Links) : External document references, internal document references. Introduction to frames: frameset and frame tag.	**15**
Unit-III	**Introduction to DHTML** Overview of dynamic HTML. Cascading Style Sheets, font ,color ,background, Text, border. Introduction to javascript. Working with java script style sheets. Adding form and controls ,Event handling. Decision making statements, loops. Built-in functions, user defined functions.	**15**

Core Reference:

1. Web Enabled commercial Application Development Using HTML, DHTML, JavaScript by -Ivon Bayross.
2. Complete reference HTML

Course :	B.Sc.(C.S.)	Semester :	IV	Hours/week :	3
Code :	CS317 T			Prerequisite :	-

Linux

Sr.No.	Topics in Details	No. of Lect.
Unit-I	**Introduction to Linux :**	**15**
1.	What is Linux, Linux's & Unix , Features of Linux, Advantage of Linux, Open Source and the Philosphy of Linux ,Version of Linux, What is Red Hat Linux, Why Red Hat Linux. Getting Started with Desktop : Logging in to Red Hat Linux, Getting started with Desktop, Using GNOME and KDE Desktop Environment	
Unit-II	**Using Linux :**	**15**
2.	Linux Commands : Understanding Red hat Linux Shell, Using the shell , Working with the Red Hat Linux file System, Using Vi text editor Accessing and Running Application: Running X Windows Application, Starting application from a menu, starting application from a run program window, starting application from a Terminal Window, Running remote X Application. Tools for using the Internet and Web: Understanding Internet tools, browsing the web, communicating via e-mails.	
Unit-III	**Administrating Linux :**	**15**
3.	Understanding System Administrator : Using the Root login, Becoming the Super User, Role of Linux System Administrator, Configuring Hardware, Managing File System and Disk Space, Mounting file systems Creating User Account, Setting user defaults, Creating portable desktops, Deleting user accounts Setting up a LAN : wired and wireless LAN Connecting to the internet.	

Reference:

1. *Red Hat Linux 9 Bible*: Christopher Negus, Wiley dreamtech Pub.
2. *Learning Red Hat Linux :* Bill McCarty, O'Reilly Media Publication
3. *Running Linux :* Matt Welsh; Matthias Kalle Dalheimer; O'Reilly Media Publication.

Note : Red Hat linux new version is known as Fedora. Currently Fedora 14 version is available and can be easily download from internet.

Course : B.Sc.(C.S.) Semester : IV
Code : CS212 BP Prerequisite : CS312AT

DBMS – II Lab

The Queries to be implemented based on Previous Semester Study of DBMS by using SQL.

1. Write the queries for Data Definition and Data Manipulation language.
2. Write SQL queries using Logical operators (=,<,>,etc.).
3. Write SQL queries using SQL operators (Between…. AND, IN(List), Like, ISNULL and also with negating expressions).
4. Write SQL query using character, number, date.
5. Write SQL query using group functions.
6. Write SQL queries for Relational Algebra (UNION, INTERSECT, and MINUS, etc.).
7. Write SQL queries for extracting data from more than one table (Equi-Join, Non-Equi-Join , Outer Join)
8. Write SQL queries for sub queries , nested queries.
9. Write programs by the use of PL/SQL.
10. Concepts for ROLL BACK, COMMIT & CHECK POINTS.

***** Students are advised to use **Oracle/MySql** version or other latest version for above listed experiments. However depending upon the availability of software's, students may use **SQL SERVER**. Mini Project may also be planned & carried out throughout the semester to understand the important various concepts of Database.

Course : B.Sc.(C.S.) Semester : IV
Code : CS204DP Prerequisite : CS304DT

OOP using C++-II

1. Object oriented program for single inheritance
2. Object oriented program for hierarchical inheritance
3. Object oriented program for derived class constructors.
4. Object oriented program for multiple inheritance
5. Object oriented program for virtual base class.
6. Object oriented program for virtual function.
7. Object oriented program for reading the contents of text file
8. Object oriented program to write text onto file.
9. Object oriented program to writing object onto file.
10. Object oriented program for reading object from file.
11. Object oriented program using I/O on random access file
12. Object oriented program to demonstrate the function template
13. Object oriented program to demonstrate the class template
14. Object oriented program for exception handling using try/catch clause.
15. Object oriented program to demonstrate the use of throw clause.

Course :	**B.Sc.(C.S.)**	**Semester :**	**IV**
Code :	**CS210BP**	**Prerequisite :**	**CS310BT**

OOP Using Java – II

1. Program to read the contents from file.
2. Program to write characters in file.
3. File copy program
4. Program to accept the input from keyboard (numeric and non-numeric data) & display on the screen.
5. Program for applet creation.
6. Banner applet program
7. Program to demonstrate the parameter passing in applet
8. Program to draw simple shapes (use of colors/fonts) using Graphics class methods
9. Program to create window (use of Window class methods)
10. Program to draw Frame
11. Program for event handling (3 to 4 event handlers)
12. Program to create form using AWT controls.
13. Program using InetAddress and URL class
14. Program using Socket and ServerSocket class
15. Program using: DatagramPacket and DatagramSocket class. .

Course :	**B.Sc.(C.S.)**	**Semester :**	**IV**
Code :	**CS215P**	**Prerequisite :**	-

Computer Graphics : Lab

Using C/C++/Java / Any other high level programming language implement the program for the following Computer Graphics Concepts :

1. Representation of points , Transformation & Matrics Representation
2. Transformation of Point
3. Transformation of Straight Line
4. Midpoint Transformation
5. Rotation of Line
6. Reflection of Line
7. Scaling of Line
8. Combined Transformation
9. Line Drawing Algorithms
10. D.D.A.
11. Bresenhems
12. Circle Generation
13. Clipping : 2D clipping
14. Mid-point Sub-division algorithms

Course : B.Sc.(C.S.) Semester : IV
Code : CS203P Prerequisite : -

PC Hardware Practical

5 Practical Each based on Unit 1, Unit 2 and Unit 3.

Course : B.Sc.(C.S.) Semester : IV
Code : CS216P Prerequisite :

Web Fundamentals-I Practical

1. Design a web page which gives information of your college and course. (Use various effects like alignment font heading etc).
2. Design a web page using 3 image files give various effects on each. 3.. to 14
3. Create a web page giving following details of students using table and use
   a. cell padding to present following data with clarity.
   b. Roll number, Name, Date of birth, Blood group, Mobile, E-mail address
   c. Give proper title to the data and the web page
4. Design a web page which give links to various mailing sites(viz. Gmail,
   a. Yahoo, Rediff etc.)
5. Refer hand on exercise of reference book * page no. 155
6. Refer hand on exercise 1 of reference book * page no. 182
7. Refer hand on exercise 2 of reference book * page no. 182
8. Refer hand on exercise 1,2,3 of reference book * page no. 335
9. Refer hand on exercise 1 of reference book * page no. 537
10. Refer hand on exercise 2 of reference book * page no. 538

* **Reference Book** : Web Enabled commercial Application Development Using HTML, DHTML, JavaScript by -Ivon Bayross.

Course : B.Sc.(C.S.) Semester : IV
Code : CS217P Prerequisite : -

LINUX Practical

10 Practical Each based on Unit 1, Unit 2 and Unit 3.

B.Sc. (Computer Science)
Semester V

Course :	**B.Sc.(C.S)**	**Semester :**	**V**	**Hours/week :**	**3**
Code :	**CS313BT**			**Prerequisite :**	

Software Engineering II

Sr.No.	Topics in Details	No. of Lect.
Unit-I	Coding, Top-down & Bottom-up, Structured Programming, Information Hiding, Programming Style, Internal Documentation, Verification, Metrics, monitoring & control	**15**
Unit-II	Testing, Levels of Testing- Functional Testing, Structural Testing, Test Plan, Test Cases Specification, Reliability assessment	**15**
Unit-III	Software Project Management,Cost Estimation , Project Scheduling, Software Configuration Management, Quality Assurance, Project Monitoring, Risk Management	**15**

Text Book:

1. Software Engineering- A Practitioners Approach, R. Pressman, McGraw Hill
2. An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa

Course : B.Sc.(C.S) Semester : V
Code : CS318T

E- Commerce

Sr.No.	Topics in Details
Unit-I	Introduction, IT and business, E-commerce: Concepts Electronic Communication, PCs and Networking, E-mail, Internet and intranets. EDI to E-commerce, EDI, UN/EDIFACT
Unit-II	Concerns for E-commerce Growth, Internet bandwidth, Technical issues, Security issues. India E-commerce Readiness, Legal issues, Getting started. Security Technologies: Cryptography, Public Key Algorithms, Private Key Algorithms, Hashing techniques, Certification and key Distribution, Cryptographic
Unit-III	Applications, Encryption, Digital Signature Protocols for Transactions. SSL-Secure Socket Layer, SET-Secure Electronic Transaction, Credit Card Business Electronic Commerce providers. CyberCash, Digicash, VeriSign Software Package: PGP e-mail encryption software

Textbook:

1. E-Commerce: The Cutting Edge of Business, Kamlesh K. Bajaj & Debjani Nag, Tata McGraw Hill

Reference Books:

1. e- Commerce Strategy , Technologies and Applications, David Whiteley, McGraw Hill International
2. E- Security, Electronic Authentication and Information Systems Security Sundeep Oberoi, TMG

Course : B.Sc.(C.S)	Semester : V	Hours/week : 3
Code : CS314BT		Prerequisite :

Data communication Networks –II

Sr.No.	Topics in Details	No. of Lect.
Unit-I	**Data Link Layer:** Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link protocols, Sliding Window Protocols, Protocol Performance, Protocol Specification and verification **Network Layer :** Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Internetworking.	**15**
Unit-II	**Transport layer:** Transport layer design issues, Connection management, A Simple transport on Top of X.25. **Session Layer:** Session layer design issues, Remote procedure call	**15**
Unit-III	**Presentation layer:** Presentation layer design issues, Abstract syntax notation1(ASN.1), Data compression techniques, Cryptography. **Application Layer:** Application layer design issues, File Transfer, access and management, Electronic mail, Virtual Terminals.	

Text Book:

1. Computer Networks by A.S Tannenbaum.
2. Data Communication and Networking :: Behrouz A. Forouzan; Mc-Graw Hill Pub.
3. Introduction to Digital and Data Communications, Michal A Miller, JAICO, publishing.
4. Data Communication and Networking: C.S.V. Murthy, Himalaya Publishing House

Course :	**B.Sc.(C.S)**	**V**	**Hours/week :**	**3**
Code :	**CS304ET**		**Prerequisite :**	

GUI-Programming

Sr.No.	Topics in Details	No. of Lect.
Unit-I	**Introduction:** Introduction to .NET and .NET Framework, Difference between CUI & GUI, Event Driven Programming, the VB IDE, Operators, Conditional statements and looping statements. Sub Procedure, functions and exception handling	**15**
Unit-II	**Windows Forms :** General Properties, Events handling events like mouse, keyboard, Types of forms MDI, adding removing controls at run time **Controls** : The control class, Text Box, Rich Text Box, Label, Buttons, Checkbox, Radio Button, Panels, Group Boxes, List Box, Combo Box, Picture Box, Scroll Bars, Splitters, Track Bars, Pickers, Timer.	**15**
Unit-III	**Object-Oriented Programming :** Class and Object, Class Vs. Object Members, Creating Classes, Objects, Structures, Modules, Constructors, Data Members, Methods, Properties, Event	**15**

Text Book:

1. "Visual Basic .NET Programming Black Book" by Steven Holzner, Dreamtech Press
2. Mastering in Visual Basic .NET" by Evangelos Petroutsos, Sybex Publication.

Course :	B.Sc.(C.S)	Semester :	V	Hours/week :	3
Code :	CS315BT			Prerequisite :	-

Computer Graphics II

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
1.	**3-D Transformation**	
	1. Scaling	
	2. Shearing	
	3. Rotation	
	4. Reflection	
	5. Translation	
	6. Multiple Transformation	
2.	**Projection**	
	1. Perspective Projection	
	2. Parallel Projection	
	3. Types of Parallel & Perspective Projection	
	4. Vanishing Points	
Unit-II		**15**
2.	**Curves**	
	1. Curve Representation	
	2. Representation of Parametric & Non-Parametric Curves	
	3. Parametric Representation of Circle & Ellipse	
	4. Bezier curves	
Unit-III		**15**
3.	**Character Generation & Color Model**	
	1. Character Generation: Introduction	
	2. Types of Character Generation :	
	a. Stroke Method	
	b. Starbust Method	
	c. Bitmap Method	
	3. Color Primary Systems	
	4. Color Matching Experiments	
	5. Color models: RGB, CMY and HSV.	

Reference:

1. **Procedural Elements for Computer Graphics :** D.F.Rogers
2. **Mathematical Elements for Computer Graphics:** D.F.Rogers and J.A.Adams
3. **Computer Graphics** : A.P.Godse. (IIIrd Edition), Technical Publications Pune.

Course :	**B.Sc.(C.S)**	**Semester :**	**V**	**Hours/week :**	**3**
Code :	**CS303ET**			**Prerequisite :**	-

Embedded System- I

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
1.	**Introduction to Microcontrollers** Introduction, Microcontrollers and microprocessors, history of microcontrollers, embedded versus external memory devices, 8-bit and 16-bit microcontrollers, CISC and RISC - processors, Harvard and Von Neumann architecture, commercial microcontroller devices	
2.	**8051 Microcontroller** Introduction, MCS-51 architecture, registers in MCS_5 pin description, 8051 connections, 8051 parallel I/o ports, Memory organization, Interrupts, interrupts in MCS-51, timers and counters, serial communication.	
Unit-II		**15**
	MCS 8051 addressing modes, MCS	
Unit-III		**15**
3.	**Applications of MCS-51** Overview of 89CXX and 89C20XX Atmel microcontrollers, pin description of 89C51 and 89C2051, using flash memory, square wave generation, rectangular wave generation, pulse generation, stair case ramp generation, sine wave generation, pulse width measurement, frequency counter.	

Text Book :

1. Microcontrollers : Theory and Applications - Ajay Deshmukh -TMH

Course : B.Sc.(C.S)	Semester : V	Hours/week : 3
Code : CS320AT		Prerequisite : -

eXtended Markup Language

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
	Introduction to XML, XML Syntax, the state of XML, XML data modeling, DTD : document structure, elements of DTD, attributes of DTD, XML Schema: Schema Elements, data types, Element Type element, group element, attribute type, Schema data types, Converting DTD to Schemas	
Unit-II		**15**
	Formatting XML Document: style sheet basics, Understanding XSL, Understanding CSS, Comparing XSL and CSS. CSS: Introduction, CSS style properties, Creating CSS style sheet. XSL : Processing an XSL style sheet, architecture of XSL, XSL templates and patterns	
Unit-III		**15**
	Introduction to AJAX, Java script for AJAX, AJAX Frame Work, ASP.NET and AJAX	

Reference Books:

1. "XML Unleashed" by Michael Morrison, Techmedia Publication.
2. "AJAX Black Book" by KOGENT SOLUTION

Course :	**B.Sc.(C.S.)**	**Semester :**	**V**	**Hours/week :**	**3**
Code :	**CS321 AT**			**Prerequisite :**	**312AT**

Data Warehousing & Data mining

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
1.	**Introduction : Data Mining as a subject**	
2.	**Data Mining :** Introduction , What is Data Mining?, Definition, DBMS Vs Data Mining, DM Techniques, Issues and Challenges in DM, DM Application Areas, DM Applications-Case Studies	
Unit-II		**15**
3.	**Data Warehousing :** Introduction , What is Data Warehousing?, Definition, Multidimensional Data Model, OLAP Operation, Warehouse Schema, Data Warehousing Architecture, Warehouse Server, Metadata, OLAP Engine, Data Warehouse Backend Process, Data Warehouse Usage.	
Unit-III		
3.	**An Application : Web Mining** Introduction, Web Mining, Web content Mining, Web Structure Mining: Page Rank, Social Network, Transverse and Intrinsic Links, Reference Nodes and Index Nodes, Web Usage mining	**15**

Reference Books:

1. **Data Mining Techniques :** Arun K. Pujari ,
2. **Data Mining Introductory and Adv. Topics:** Margaret H. Dunham
3. **Database Management System : Navathe**

Course :	B.Sc.(C.S.)	Semester :	V	Hours/week :	3
Code :	CS213BP			Prerequisite :	313AT

Practical based on CS313BT (S.E.)

Case Study based on Theory units.

Course :	B.Sc.(C.S.)	Semester :	V	Hours/week :	3
Code :	CS204EP			Prerequisite :	

Practical based on 304ET(GUI Prog.)

Any 10 Practical Related to GUI Programing

Course :	B.Sc.(C.S.)	Semester :	V	Hours/week :	3
Code :	CS215Bp			Prerequisite :	

Practical based on 315BT (C.G.)

Any 10 Practical Related to Computer graphics II

Course :	B.Sc.(C.S.)	Semester :	V	Hours/week :	3
Code :	CS203EP			Prerequisite :	

Practical based on 303ET(Embedded)

Any 10 Practical Related to Embedded

Course :	B.Sc.(C.S.)	Semester :	V	Hours/week :	3
Code :	CS220P			Prerequisite :	

Practical based on 320T (XML)

Any 10 Practical Related to XML Programming

Course :	B.Sc.(C.S.)	Semester :	V	Hours/week :	3
Code :	CS221P			Prerequisite :	

Practical based on 321T

Any 10 Practical Related to DM & DW

B.Sc. (Computer Science)
Semester VI

Course :	**B.Sc.(C.S.)**	**Semester :**	**VI**	**Hours/week :**	**3**
Code :	**CS313CT**			**Prerequisite :**	

Software Testing and Quality Assurance

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
1.	**Introduction:** Software Quality, Role of testing, verification and validation, objectives and issues of testing, Testing activities and levels, Sources of Information for Test Case Selection, White	
Unit-II		**15**
2.	**Unit Testing:** Concept of Unit Testing , Static Unit Testing ,Dynamic Unit Testing , Outline of Control Flow Testing, Overview of Dynamic Data Flow Testing, Data Flow Graph, Data Flow Terms, Data Flow Testing Criteria, Comparison of Data Flow Test Selection Criteria, Feasible Paths and Test Selection Criteria, Comparison of Testing Techniques.	
Unit-III		**15**
3.	**System Integration Testing:** Concept of Integration Testing, Different Types of Interfaces and Interface Errors, Test Plan for System Integration, System Test Categories: Basic Tests, Functionality Tests, Robustness Tests, Interoperability Tests, Performance Tests, Reliability Tests, and Documentation Tests.	

Text books:

1. "Effective methods for Software Testing "William Perry, Wiley.
2. "Software Testing and Quality Assurance: Theory and Practice", Sagar Naik, University of Waterloo, Piyu Tripathy, Wiley , 2008

Reference Books:

1. "Software Testing - A Craftsman's Approach", Paul C. Jorgensen, CRC Press, 1995.
2. "The Art of Creative Destruction", Rajnikant Puranik, SPD.
3. "Software Testing", Srinivasan Desikan and Gopalaswamy Ramesh - Pearson Education 2006.

Course :	**B.Sc.(C.S)**	**Semester :**	**VI**	**Hours/week :**	**3**
Code :	**CS322T**			**Prerequisite :**	

Theory of Computation

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
	Regular expressions, FA and regular expression, pumping lemma for regular sets, applications of pumping lemma, closure properties of regular sets, regular sets and grammar, types of grammar (type 0, type 1, type 2, type 3)	
Unit-II		**15**
	Sets, relations, functions, graphs, trees, mathematical induction, finite automata, definition, transition systems, acceptability of strings, NFA, DFA, equivalence of DFA and NFA, melay moore model, minimization of automaton, Applications.	
Unit-III		**15**
	Formal Languages, Chomsky classification of languages, languages, their relation and automaton.	

Reference Books

1. J E Hopcroft, R Motwani and J D Ullman, Introduction to Automata theory, Languages and Computation, Pearson Education Asia, 2003.
2. Daniel A Cohen, Introduction to Computer Theory, Hardcover (1990) by. John Wiley & Sons
3. K. L P Mishra, N Chandrashekharan, Theory of Computer Science, PHI 2001
4. Martin John C, Introduction to Language ad Theory of computations (TMH) 2004.

Course : B.Sc.(C.S)	Semester : VI	Hours/week : 3
Code : CS323T		Prerequisite :

Ethics and Cyber Law

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
	Basic Concepts of Technology and Law , Understanding the Technology of Internet, Scope of Cyber Laws , Cyber Jurisprudence	
Unit-II		**15**
	Law of Digital Contracts The Essence of Digital Contracts The System of Digital Signatures The Role and Function of Certifying Authorities The Science of Cryptography E-Governance Cyber Crimes and Cyber Laws.	
Unit-III		**15**
	Information Technology Act 2000 Cyber Law Issues in E-Business Management Major issues in Cyber Evidence Management Cyber Law Compliancy Audit, The Ethics of Computer Security	

Text books:

1. Godbole," Information Systems Security", Willey
2. Merkov, Breithaupt," Information Security", Pearson Education
3. Yadav, "Foundations of Information Technology", New Age, Delhi
4. Schou, Shoemaker, " Information Assurance for the Enterprise", Tata McGraw Hill
5. Sood,"Cyber Laws Simplified", Mc Graw Hill
6. Furnell, "Computer Insecurity", Springer

Course : B.Sc.(C.S)	Semester : VI	Hours/week : 3
Code : CS304FT		Prerequisite :

VB.Net & Architecture and Programming

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
	Application Architecture for .NET : Distributed Application Designing **Designing the components of an Application or Service**: General designing recommendation for Application and services	
Unit-II		**15**
	ADO.NET: Overview of ADO.NET object, architecture of ADO.NET, structure of DataSet creating DataSet, data binding, DataAdapter objects, Command objects, DataReader objects, binding data to various controls, simple data binding and complex data binding.	
Unit-III		**15**
	Graphics : Using Graphics Class, using Pen class, using Brush class, **File Handling :**Using FileStream Class, FileMode Enumeration, FileAccess Enumeration, FileShare Enumeration, StreamWriter Class, StreamReader Class, BinaryWriter Class, BinaryReader Class, File and Directory Class.	

Text books:

1. Visual Basic .NET Programming Black Book" by Steven Holzner, Dreamtech Press
2. "Mastering in Visual Basic .NET" by Evangelos Petroutsos, Sybex Publication.

Course : B.Sc.(C.S)	Semester : VI	Hours/week : 3
Code : CS315CT		Prerequisite :

Computer Animation

Sr.No. **No. of Lect.**

Unit-I **15**

1. **Fundamental of Animation**
   What is mean by Animation – Why we need Animation – History of Animation – Uses of Animation – Design step of Animation- Types of Animation – Principles of Animation – Some Techniques of Animation – Animation on the WEB – 3D Animation – Special Effects -Creating Animation.

Unit-II **15**

2. **Introduction to anima8or software**:
   1. Basics,
   2. Object Editor - Basics and Object/Edit Mode,
   3. Object Editor - Object/Point Mode,
   4. Figure Editor

Unit-III **15**

   5. Sequence Editor,
   6. Scene Editor,
   7. Animation,
   8. Materials,
   9. Scripts.

Text book:

1. **PRINCIPLES OF MULTIMEDIA –** Ranjan Parekh, 2007, TMH.

2. **Manual of Anim8or Software: Free download Manual & Software from the website :** http://www.anim8or.com/main/index.html

Course : B.Sc.(C.S)	Semester : VI	Hours/week : 3
Code : CS303FT		Prerequisite :

Embedded System II

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
	PIC Microcontrollers PIC microcontroller overview and features, PIC 16C6X/7x: ALU, CPU registers, pin diagram, PIC reset actions, PIC oscillator connections, PIC memory organization.	
Unit-II		**15**
	Instructions and Interfacing PIC 16C6X/7X instructions, Addressing modes, I/O ports LED, push buttons, relays and latch connections.	
Unit-III		**15**
	Interfacing and Industrial applications of Microcontroller Keyboard interfacing, interfacing of 7 segment display, LCD interfacing, ADC and DAC interfacing.	

Text Book :

1. Microcontrollers : Theory and Applications - Ajay Deshmukh -TMH

Reference Books :

2. The 8051 Microcontroller and Embedded systems- M. A. Mazadi, J. G. Mazadi & R. D. McKinlay pearson PHI.
3. The 8051 Microcontroller - K. J. Ayala - Thomson

Course : B.Sc.(C.S)	Semester : VI	Hours/week : 3
Code : CS320BT		Prerequisite :

Web Programming

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
	Introduction to PHP, PHP Language Basics, The building Block of PHP	
Unit-II		**15**
	Decision and loops, Arrays in PHP, Objects in PHP, functions in PHP types of functions	
Unit-III		**15**
	Working with String, Date and Time, handling Forms (HTML).	

Reference Books:

1. "BEGINNING PHP 5.3" by MATT DOYLE WROX publication
2. "PHP, MySQL and Apache All in One" by Juliea C. Meloni, SAMS series

Course :	**B.Sc.(C.S)**	**Semester :**	**VI**	**Hours/week :**	**3**
Code :	**CS314CT**			**Prerequisite :**	-

Mobile computing

Sr.No.	Topics in Details	No. of Lect.
Unit-I		**15**
1.	**Introduction to Mobile Computing**: Mobile devices, wired network, Wireless Networks, Ad-Hoc Networks, limitations of mobile environment, Mobile Application	
Unit-II		**15**
	Radio communication: Basics, Radio frequency bands, propagation mechanism, Data communication using switching modes (circuit, packet switching), modulation (Analog – Amplitude, Frequency, Phase, Digital Modulation-PCM), Cellular networks, Advantages of Cellular network, Handoff.	
Unit-III		**15**
	Wireless Communication: Wireless LAN, MAC Structure, Mobile IP, Mobile Agents, Advantages of Mobile Agents, GSM, Technical Details of GSM, GSM Cells, GSM Network Structure, Components and Functions	

Reference:

1. Asoke K Talukder, Roopa Yavagal, Mobile Computing, TMH, 2006

Course :	**B.Sc.(C.S)**	**Semester :**	**VI**	**Hours/week :**	**3**
Code :	**CS740P**			**Prerequisite :**	-

Project Work

Review-I

Review –II

Final

Course :	**B.Sc.(C.S)**	**Semester :**	**VI**	**Hours/week :**	**3**
Code :	**CS214P**			**Prerequisite :**	-

Seminar

Review - 1

Final Seminar/Presentation