Subject Code	**15BCA101**
Subject Name	**Computer Fundamental and Operating System**
Short Name	**CFOS**
Total Lectures	**88**
Total Credits	**4**

Prerequisites :
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Objectives:

- To acquire the basic knowledge about computer system functions.
- To learn the basic knowledge about various components, capabilities and limitations of computer.
- To understand the various hardware and software components of computer.

Units	Contents	Total Lectures
I	**Computer Basics:** Definition of Computer, Few Application, uses and Characteristic of Computer, block diagram of computer, types of computer, Generation of Computer, ASCII Codes, EBCDIC Code. **Memory** : Primary Memory : RAM , ROM , PROM , EPROM.	18
II	**Input/ Output Devices:** Description of I/O units, Keyboard, Mouse, MICR, OCR, Bar coding, Monitor, Printer and its Types. **Secondary storage**: Floppy disk, Hard disk, optical disk, and other types of secondary storage devices.	18
III	**Software:** Types of software, system software, application software, utility software, assembler, compiler, Interpreter. **Operating System**: Need of Operating System, Batch operating System, Multi programming, Multitasking, Real time OS.	18
IV	**Introduction to operating system:** DOS: Booting processing, Formatting, directory structure, FAT. **Internal DOS operating Commands:** REN,CD,MD,RD,DIR,DEL,COPY,TYPE,DATE, TIME,COPYCON. **External DOS operating Commands:** FORMAT,XCOPY,CHKDSK,PATH,ATTRIB.	17
V	**Windows:** Introduction Features of windows, Customizing Desktop, Creating shortcuts, moving, deleting icons. **Windows Explorer**: Copying, renaming, moving, deleting operations on files and folders. **Standard Folders**: My computer, My documents, Control Panel, Recycle bin. **Windows Accessories**: Paint, Notepad, Calculator.	17
	Text Books : 1. V. Rajaraman, Fundamental of computer, Prentice Hall India Pvt., Limited Prentice-Hall Of India Pvt. Limited, 01-Oct-2003. 2. B. Ram, Computer Fundamental, Nas. Age Pub. 2014 3. Pradeep K. Sinha, Priti Sinha, Computer Fundamental, BPB Publications, 01-Nov-2004 4. D. M. Dhamdhere, System Software and operating system, TMH 5. Silberschatz, Galvin, Gagne, Operating System Concepts, 7th Edition , Addision Education 6. Achyut S. Godbole, Operating system, Tata McGraw-Hill Education, 2005.	
	References : 1. Roger Hunt & John Shelly, Computers and Commonsense, Prentice-Hall of India Pvt. Ltd. New Delhi 2. William Stalling, Operating Systems: Internals and Design Principles, 8th Edition. 3. Crowley, Operating System, Tata McGraw-Hill Education, 2001. 4. Peterson, Operating System concepts (2nd edition) Addison-Wesley Longman Publishing Co.1985	

Course Outcomes:

1. Gain knowledge of fundamental of computer and its memory.
2. Ability to use various input/output and secondary storage devices.
3. Gain knowledge about various types of software, translator programs and OS.
4. Able to use various DOS commands.
5. Acquire logic which helps to use and create applications in windows.

Subject Code	**15BCA102**
Subject Name	**Programming Methodology using C**
Short Name	**PMC**
Total Lectures	**88**
Total Credits	**4**

Prerequisites :

- The student should have the basic knowledge of mathematics.
- The student should be able to do computations.
  The students should pose the logical thinking ability.

Objectives:

- To build the basic skills of programming.
- To acquire the importance of C programming using various methodologies.

Units	Contents	Total Lectures
I	**Programming Concept :** Algorithm, Flowchart, Programming languages, Assembler, Interpreter, Compiler. **Programming Process:** Program design, coding, compilation, execution, testing, debugging, documentation, structured programming, Features and approaches.	18
II	**Introduction to C :** Brief history of C Language, C tokens : Character set, keywords, Identifiers, basic data types, enumerated data type, constant, variables, structure of C Program, data type modifiers, symbolic constant.	18
III	**Operators and Expressions in C :** Arithmatic, Relational, logical, assignment, increment/decrement,conditional operator, bitwise operators, comma operator, type casting. **I/O Operations in C :** Formatted I/O : Printf(), scanf(), Unformatted I/O : getchar(), putchar(), gets(), puts(), getch(), putch(), getche(), putche()	18
IV	**Control structures in C :**if, if—else, elseif ladder, nested if, switch, goto label, looping structures for, while, do-while, nesting of loops, break, continue statements.	17
V	**Arrays :** Declaration and initializations of arrays, types of arrays: one and two dimensional arrays, accessing array elements. **Pointers :** Declaration and initialization, pointer arithmetic, array of pointers.	17
	Text Books: 1. E Balgurusamy, Programming in ANSI C, fourth edition, Tata Mc Graw- Hill, New Delhi, India, (2008). 2. Yashwant Kanetkar, Let us C, 2nd edition, BPB publication, ,New Delhi, India, (1995). 3. K.R.Venugopal, S.R. Prasad, Mastering C, Tata Mc Graw- Hill ,New Delhi, India, (2008).	
	References : 1. B. S. Gottfried, Programming With C, 2nd Edition, Tata Mc Graw- Hill, New Delhi, India, (2007). 2. B.W. Kernighan, D.M. Ritchie, The C Programming Language, 2nd Edition, Dorling Kindersley (India) Pvt. Ltd, New Delhi, India,(2008). 3. D. Ravichandran, Programming in C, 1st Edition, new age international publishers, (2009).	

Course Outcome:

1. Students get the complete knowledge of C language.
2. Students are able to develop logic which will help them to create programs, applications in C.
3. By learning the basic programming construct they can easily switch over to any other language in future.
4. Students get better opportunity in software industry.
5. Students can design, develop and test programs in C programming language to solve problems related to collecting, processing and storing data.
6. Better understanding and the ability to follow professional programming practices to align with industry expectations.

Subject Code	**15BCA103**
Subject Name	**Digital Technique**
Short Name	**DT**
Total Lectures	**88**
Total Credits	**4**

Prerequisites:

- Understanding of computer hardware circuit.
- Understanding of machine language.

Objectives:

- To introduce the binary numbers used in computer system.
- To make understand how logic circuit works inside microprocessor.
- To expose the students to the concepts of digital systems.

Units	Contents	Total Lectures
I	**Number Systems and inter conversions:** Decimal, Binary, Octal, Hexadecimal and their mutual conversion, addition and subtraction of binary numbers, addition and subtraction using 1's and 2's complement method, BCD, 8421.	18
II	**Logic gates:** OR, AND, NOT, NAND, NOR, XOR gates and their truth table, Boolean Laws, De Morgans and Duality theorems, use of NAND and NOR as universal building blocks	17
III	**Karnaugh Maps:** pair, quads, octets, minterm, max term in K Map, K-map for 2, 3, 4 variables, concept of SOP and POS, simplification of SOP and POS logic expressions using K-map	17
IV	**Combinational Logic Circuits:** Half Adder, full adder, half subtractor and full subtractor, Concept of Encoder, Concept of Decoder: BCD to seven segment converter, 4-bit Full Adder/ subtracter, Concept of multiplexer, 4:1 mux using gate, Concept of demultiplexer, 1:4 demux using gate	18
V	**Sequential Logic Circuits:** Construction, working of R-S,Clocked R-S, JK, D and T- type, JKMS Flip Flop, Concept of preset and clear terminals, Race around Condition in JK FF. Counters: Modulus of counter,4 bit Ripple counter, decade counter.	18
	Text Books: 1. R. P. Jain :Modern Digital Electronics:4Th edition Tata Mc-Graw Hill(2010) 2. A. Anand Kumar :Fundamental of Digital Circuits:2nd edition (PHI)(2003) 3. A. P. Malvino, D. P. Leach: Digital principles and applications 4th edition: McGraw Hill (1975)	
	References: 1. M.B.Matsagar,V.S.Kale: Principles of digital Electronics, Vision publication 2. Floyd,Jain : Digital fundamentals, Pearson 3. S.P.Bali, Y.N.Bapat :Electronic circuits and systems Analog and digital, Tata McGraw Hill 4. B.S.Nair :Digital electronics and logic design, Prentice hall 5. Malvino,Brown :Digital computer electronics, Tata McGraw Hill 6. C.V.Dhuley and V. M. Ghodki :Fundamentals of Digital Electronics	

Course Outcomes:

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
2. To understand and examine the structure of various number systems and its application in digital design.
3. The ability to understand, analyze and design various combinational and sequential circuits.
4. Ability to identify basic requirements for a design application and propose a cost effective solution.
5. The ability to identify and prevent various hazards and timing problems in a digital design.

Subject Code	**15BCA104**
Subject Name	**File System and Business Data Processing**
Short Name	**FSBDP**
Total Lectures	**88**
Total Credits	**4**

Prerequisite:

- Knowledge about Small scale Database like MS-ACCESS

Objectives:

- To expose the students about File Structure and Organization.
- To understand how to use Business Data Processing works.
- To expose the students to the concepts of business data processing with Databases.

Units	Contents	Total Lectures
I	**File Structure and Organization:** Introduction, Logical and Physical Files, Basic File Operations, File Organization, Types of file organization, Over View of Indexes. File Operations: Sorting, Searching and Merging.	18
II	**File Organization:** Sequential, Direct or relative Access, Index Sequential File. Hash files, Relative Files, Multi Key files, Concept of Master & Transaction files, Algorithms for searching and sorting of files, File merging & retrieval of information.	18
III	**Index implementation:** Storage Organization, Distributed files, File system evaluation, File Security issues & implementation, Future of file systems. **Data and File Structures:** Introduction, advantages & uses.	18
IV	**Data processing fundamentals:** Data Information input, processing and output. Data Concepts: Fields, Record, Files. Introduction, Development of data Processing, Data & information, Data Processing systems, Schematic diagram of information system.MIS and its characteristics	17
V	Steps and Elements of Data Processing. **LEVELS OF DATA PROCESSING:**-Manual, Mechanical, Electronic. **TYPES OF DATA PROCESSING:**-Batch, online, offline, Real-time, Multiprogramming, multiprocessing, Time Sharing, Interactive computing or Interactive processing, Transaction processing, Application area.	17
	Text Books: 1. Mary E.S.Loomis- Data Management & File Structures (Second Edition) Prentice-Hall of India Pvt. Ltd. 2. Seymour Lipschutz and Martin M. Lipschutz -Data Processing(Schaum Out Line Series) Second Edition McGraw Hill Book 3. S. Jaiswal- Fundamental of Electronic data processing First Edition 1995 Galgotia Publications Pvt.Ltd.	
	References: 1. Pradeep K.Sinha & Priti Sinha-Computer Fundamentals (sixth Edition) BPB Publication. 2. R.Jayprakash Reddy-Business data processing and Computer Applications APH 3. Cordon B. Davis-Computer Data Processing(Second Edition) (McGrawHill book) 4. C.S. French- Data Processing & Information Technology BPB publication 5. James Bradely -Files & Data Base Techniques (McGrawHill Publications)	

Course Outcomes:

1. Students get complete knowledge of file structure and its operations.
2. They get proper knowledge of file system, file organization.
3. Better understanding and get ability to Implementation of algorithm on operation of file.
4. Ability to get knowledge about Distributed file System.
5. They aware with file security issues and implementation.
6. Also they get knowledge about Management information system.
7. Also they get proper knowledge of data processing, levels and types of data processing.

Subject Code	15BCA105
Subject Name	Data Communication Network
Short Name	DCN
Total Lectures	88
Total Credits	4

Prerequisites :

- Basic Knowledge of Computer fundamentals is required.

Objectives:

- To acquire the basic knowledge about Data Communication Networks, network types, devices and various media.
- To acquire the knowledge about various modulation types and switching techniques.
- To understand the various levels of OSI model and about Internet history and its application.

Units	Contents	Total Hrs.
I	**Introduction to Computer Network**, Advantages of computer network, Types of computer networks: LAN, MAN, WAN **Introduction to Transmission Media**- Bounded media: Twisted pair cable, Coaxial cable, Fiber optic cable. Unbounded Media: Microwave, Satellite, Infrared.	18
II	**Communication:** Communication system and its components. **Mode of Transmission:** Simplex, Half duplex, full duplex. Asynchronous and Synchronous transmission of data, Digital signal, Analog Signal , bit rate, baud rate **Network Topology:** Bus, Ring, Star, Mesh	18
III	**Modulation:** Amplitude modulation, Frequency Modulation, Phase Modulation. **Multiplexing:** Multiplexers, Frequency Division Multiplexing, Time Division Multiplexing **Switching Techniques:** Switching Concept, Circuit switching, packet switching, Message switching	18
IV	PBX (Private Branch Exchange) **Network Devices:** NIC, Hub, Bridges, Router, Switches, Gateways, modem and modem types **Internet:** History, applications of Internet- WWW, E-mail, FTP, Telnet, Voice chat, Video conferencing.	17
V	**Network Protocols:** OSI Model, X.25 Protocol, Transmission Control Protocol/Internet Protocol (TCP/IP), Ethernet, Token Ring, Datagram . Broadband ISDN, Fascimile(FAX)	17
	Text Books: 1. Jerry FitzGerald, Alan Dennis, Fundamentals of Business Data Communications, Tenth Edition, Wisley India Pvt Ltd. New Delhi, India(2009) 2. Michael A. Miller, Introduction to digital and data Communications, JAICO Publishing House, Mumbai,India(2006)	
	References: 1. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, Fifth Edition, Pearson Publications, New Delhi, India(2011) 2. Pradeep K Sinha, Priti Sinha ,Computer Fundamentals ,Sixth Edition, BPB Publications,New Delhi, , India, (2011) 3. Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition, Tata Mc Graw- Hill ,New Delhi, India, (2008). 4. Uyless D. Black, data Communications and Distributed Networks, Third Edition, PHI Learning private Limited, New Delhi, , India, (2009)	

Course Outcomes:

1. Describe the components and infrastructure that form the basis for most computer network.
2. Students get complete knowledge of computer network.
3. Describe the technical aspects of data communication on the internet.
4. Propose network designs based on case studies in college or other institutes.

Subject Code	**15BCA106**
Subject Name	**Communication Skill-I**
Short Name	**CS-I**
Total Lectures	**88**
Total Credits	**4**

Prerequisites:

- Students should have the basic knowledge of English language.
- They should know the competencies of English.

Objectives:

- To make the student competent in English language.
- To polish the reading and writing skills. To aim at enhancing the communication skill to face the requirements in future employability.
- The Communicative English course aims at training the would-be graduates in various levels of communication in English speech skills, oral skills and other related skills.

Sr. No.	Contents	Total Hrs.
1	**Grammar and Preposition** – 04 1.1 Articles and Preposition -04 1.2 Appropriate forms of verbs -02 1.3 Synonyms and Antonyms -04 1.4 Error Detection -02	18
2	**Language Proficiency** -12 2.1 Types of Sentences -02 2.2 Clauses -03 2.3 Do as directed -07	18
3	**Forms of Written Communication** -12 3.1 Job Application Letter -06 3.2 Preparing Curriculum Vitae or Resume -06	18
4	**Creative Writing** -12 4.1 Drafting Memorandum, E-mail -06 4.2 Composing Notices, Invitations, Telegrams -06	17
5	**Business Communication**-12 5.1: Introduction to Business Communication -04 5.2: Communication in Organizations -04 5.3: Email Communication, Non-verbal Communication-04	17
	Text Books: 1. Mac Millans, English Grammar 2. M. Raman, S. Sharma, Technical communication: Principles and practice, first edition, Oxford University Press(2004).	
	References: 1. Z.N.Patil, B.S.Valke, English for Practical Purposes. 2. M.A.Pink, S.E.Thomas ,English Grammar Composition and Effective Business Communication, S.Chand.	

Course Outcomes:

1. Able to reach out to a wider audience.
2. Skill in developing a scientific approach in writing e-mail, speech-communication, effective presentation techniques, and writing technical and business reports.
3. Enable to take up all writing tasks with ease and confidence.

Subject Code	15BCA107
Subject Name	Lab-I: C Language
Short Name	Lab-I
Total Teaching	88
Total Credits	4

Sr. No.	Contents	Total
1	Practical Based on structure of C program.	
2	Practical Based on use of logical and relational operators.	
3	Practical Based on use of conditional operators.	
4	Practical Based on the use of if, if-else statement.	
5	Practical Based on the use of nested- if statement.	
6	Practical Based on the use of switch-case statement.	
7	Practical Based on the use of break, continue statement.	
8	Practical Based on the use of while, do-while statement.	
9	Practical Based on the use of for statement.	
10	Practical Based on the use of nested loop.	
11	Practical Based on the use of data input and output statement.	
12	Practical Based on reversing a number.	
13	Practical Based on the use of one dimensional array.	
14	Practical Based on the use of two dimensional array.	
15	Practical Based on the matrix manipulation	

Subject Code	15BCA108
Subject Name	Lab-II : DT
Short Name	Lab-II
Total Teaching	88
Total Credits	4

Sr. No.	Contents	Total
1	To study basic logic gate	6
2	To study universal logic gates	6
3	To study half adder and 3 bit full adder	6
4	To study 4 bit binary parallel adder	6
5	To study 4 bit binary parallel adder/subtractor	6
6	To verify demorgan's theorem	6
7	To study flip-flops	16
8	Study of shift register	12
9	Study of ring counter	6
10	Study of 4 bit ripple counter	6
11	Study of decade counter	6
12	Study of 4 bit synchronous counter	6

Subject Code	**15BCA109**
Subject Name	**Advanced C**
Short Name	**AC**
Total Lectures	**88**
Total Credits	**4**

Prerequisites :

- The student should have the basic knowledge of mathematics and computations.
- This subject should have the basic skills of C programming.

Objectives:

- To develop the advanced skills of programming.
- To learn the advance concepts of programming like structure, string handling, file handling & graphics.

Units	Contents	Total Lectures
I	**Functions in C:** Definition, Function Prototype, Function Calling, call by value, call by pointers, return values & their types, Functions with Arrays, Pointer to functions, Recursion Function	17
II	**Structure & Union:** Definition of Structure, Declaration & Initialization of Structure, Array of Structure, Pointer to Structure, Self Referential Structure. **Union**: Definition of Union, Declaration & Initialization, Comparison of Union with Structure.	18
III	**String Handling:** Definition of String, Declaration & Initialization of String variables, Array of Pointers to Strings, String Handling functions: gets(), strcpy(), strcat(), strlen(), strcmp(), strcpy(), strlwr(), strupr(), strrev(), strset().	18
IV	**File Handling in C:** Introduction to Streams and Files in C, defining & opening a file, closing a file, different file opening modes, Operations on file by using: fof(), fscanf(), fprintf(), getw(), putw(), fgetc(), fputc(), fgets(), fputs(), fread(), fwrite(), feof(), ferror().	18
V	**Graphics in C:** Introduction , Drawing Objects in C-Line, Circle, Rectangle, Ellipse, Changing Foreground & Background, Filling Objects by Colors.	17
	Text Books: 1. E. Balagurusamy, Programming in ANSI C, Second Edition, Tata McGraw- Hill Publication, New Delhi, 1992. 2. Yeshwant Kanetkar, Let Us C, Third Edition, BPB Publication Limited, New Delhi, 1999. 3. Yeshwant Kanetkar, Graphics Under C, Third Edition, BPB Publication Limited, New Delhi, 2008.	
	References: 1. Byron Gottfried, Programming with C, Second Edition,McGraw- Hill Publication, New Delhi, 1996. 2. D. Ravichandran, Programming with C, First Edition,New Age Inetrnational Publication Limited, New Delhi, 2006. 3. Sudhir Dawra, Mastering Graphics Programming in C, First Edition,Firewall Media- Laxmi Publications Private Limited, New Delhi, 2004. 4. H.M.Deitel, P.J.Deitel, C How to Program, Seventh Edition, 2011, Pearson Publication Limited, New Delhi, 2011.	

Course Outcome:

1. Students get the knowledge of some advance concepts of C language.
2. Students are able to develop graphics programming, strings and files.
3. Students are able to develop logic which will help them to create programs, applications in C.
4. Students get better opportunity in software industry.
5. Students can design, develop and test programs in C programming language to solve problems related to collecting, processing and storing data.
6. Better understanding and the ability to follow professional programming practices to align with industry expectations.

Subject Code	15BCA110
Subject Name	Discrete Mathematical Structures
Short Name	DMS
Total Teaching periods	88
Total Credits	4

Prerequisites :

- Students should be familiar with sequences and series.
- Basic concepts of mathematics required.

Objectives :

- To be able to explain and apply basic methods of discrete mathematics in computer science.
- To use methods in subsequent courses in design and analysis of algorithms, in software engineering.

Units	Contents	Total Hrs.
I	**Set Theory:** Basic concepts, Types of sets, Operations on set, Examples, Principle of Inclusion–Exclusion. **Combinatorics:** Permutation and Combination, Pigeonhole principle.	18
II	**Relations:** Definition, Types of Relation, Operations on Relation, Composition of Relation, Properties. Functions: Representation of Function, Types of Function, Composition, Inverse of Function.	18
III	**Generating Functions:** Ordinary and Exponential Generating function, Ferrer's Diagram, Conjugate or Dual of Ferrer's diagram, Probability Generating Functions.	18
IV	**Recurrence Relations:** Linear Recurrence Relation, Homogenous solution, Particular Solution, Total solution. Lattice: Definition and properties.	17
V	**Graph Theory:** Introduction to Graph, Types, Matrix Representation of graph: Adjacency and Incidence Matrix. **Trees:** Properties of Trees, Rooted and Binary tree.	17
	Text Books: 1. T.VEERARJAN, Discrete Mathematics with Graph Theory and Combinatorics,2nd edition,Tata McGraw-Hill,(2008). 2. Narsingh Deo, Graph Theory with applications to engineering and computer science, 1st edition, PHI,(2008). 3. A.P.Hillmon,C.L.Alexanerson and R.M.Grassl,Discrete and Combinatorial Mathematics, 4th edition,San Francisco, Dellen (Macmillan), (1987).	
	References: 1. C. L. Liu ,Elements of Discrete Mathematics, 2nd edition, Tata McGraw-Hill,(2006). 2. K.D.Joshi, Foundations of Discrete Mathematics,2nd edition, New Age International Publishers, (2007). 3. Medelson, Boolean Algebra and Switching circuits, Tata McGraw Hill Publication Co-Ltd,4/12 Asaf Ali Road, New Delhi.	

Course Outcomes:

1. Analyze the statements presented in DNF and determine their validity.
2. Apply sets, relation and digraphs to solve the problems.
3. Understand the basic concepts of graph theory and some related theoretical problems.
4. Examine the validity of arguments by using propositional and predicate calculus.

Subject Code	**15BCA111**
Subject Name	**Relational DBMS**
Short Name	**RDBMS**
Total Lectures	**88**
Total Credits	**4**

Prerequisites :

- The student should have the basic knowledge of database management system.
- The student should be able to use database management system.

Objectives:

- To develop Problem Solving abilities using relational database management system
- To learn basic principles of relational database management system
- To develop skills for project development & frame work activity using relational database management system.

Units	Contents	Total Lectures
I	**Basic Concept:** Traditional File based System, Database Management system, Roles in database environment, Architecture of DBMS, Components of DBMS, Advantages and Disadvantages, DBA and its role, Database Languages. **Database Models:** Relational, Hierarchical, Network with its Advantages and Disadvantages.	18
II	**Relational Model :** Relation, Domain & Attributes, Keys, Relational Algebra and Calculus, Entity Relationship model, E-R diagram, Functional dependency **Normalization:** Introduction, 1NF, 2NF, 3NF, BCNF.	18
III	**SQL:** Introduction, Basic Structure of SQL Query, Components of SQL, Data types, Operators. **DDL Commands :** CREATE,ALTER,DROP, DESCRIBE,TRUNCATE **DML Commands :**SELECT, INSERT, DELETE,UPDATE ORDER By Clause, Group By Clause, Having Clause, View and Operation on View.	18
IV	**Functions: Numeric Function:** ABS, MOD, FLOOR, CEIL,TRUNC,SQRT,SIGN,COS, LOG, EXP, LEAST, GREATEST. **Group Function:** AVG, MAX, MIN, SUM, COUNT. **Character Function:** LENGTH, LOWER, UPPER, INITCAP, INSTR, SUSSTR, LPAD, RPAD, LTRIM, RTRIM, DECODE, SOUNDEX. **Conversion Function :** To-Number, To-Char.	17
V	**PL/SQL:** Introduction, Features, Block structure, Constants and Variables, data types, Control structure. **Programming Cursor:** Implicit Cursor, Explicit Cursor, their attributes, declaring, opening, fetching cursor.	17
	Text Books : 1. C.J. Date, an Introduction to Database Systems, Addison-Wesley Publishing Company, (8th Edition),1981. 2. Mujumdar & Bhattacharya, Database Management Systems, Published by Tata McGraw-Hill Education Pvt. Ltd., 2004 3. IVAN BAYROSS, Sql,PL/SqL the Programming Language Of Oracle, BPB Publications,2010 4. Ivon Bayross, Database Concepts and Systems for Students. Published by Shroff Publishers & amp. dstributors Pvt. Ltd. 2009. 5. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database system concepts, Fifth Edition, McGrawHill Publication. 6. Thomas, Connolly, Carolyn Begg, Database systems, A practical approach to Design, Implementation and management –Fourth Edition, Pearson Education.	
	References : 1. Ramakrishnan, Gehrke, Database management systems Third Edition, McGrawHill Publicaion. 2. RamezElmastri, Shamkant B. Navathe, Fundamentals of Database systems Fifth edition, Pearson Education. 3. Kevin Loney, George Koch, Oracle 9i.The complete Reference, Forth Edition, McGrawHill Publication.Fifth edition, Pearson Education.	

Course Outcomes:

1. Students get the thorough knowledge of Database and Relational Database Management

Subject Code	**15BCA112**
Subject Name	**System Analysis and Design & Management Information System**
Short Name	**SAD & MIS**
Total Lectures	**88**
Total Credits	**4**

Prerequisites:

- Knowledge about Small scale Database like MS-ACCESS

Objectives:

- To develop Problem Solving abilities using computers.
- To teach basic principles of development.
- To develop skills for project development & frame work activity.

Units	Contents	Total Lectures
I	**System development life cycle: -** Goals, system, computer base business system, personal traits of analyst, System life cycle, working with technology, Preliminary System Analysis, Goals and Review, fact finding and reviews, working with peoples.	18
II	**Detailed analysis:** review and assignment, feasibility study. **Modeling tools for system analyst:** Goals, role of data in business, modeling with DFD, DFD's With CASE. **Structural methodology:** Need relevant CASE technology, other specification Tools.	18
III	**Prototyping System analysis:** 3Gls, 4Gls, object oriented analysis. **System design:** guidelines for output design, formatting and designing report, data entry process, input design and data collection, file design, database design. **Software design:** program definition, module design.	18
IV	**Overview of implementation**: Scheduling and assigning a task, testing and training, system maintenance, management issue, System Testing and Quality assurance.	17
V	**MIS Introduction:** System Implementation, MIS frame work, importance concepts, management, information system Definition, Nature & Scope: Characteristics, function, structure Decision making. **MIS:** Types, level, utility Management of Information System: Implementation, Planning, organization & development, user training, testing.	17
	Text Books: 1.D.P. Goyal, " Management information systems", Macmillan India Ltd. System Analysis & Design by Igon-H-PHI 2.Robert G. Murdick & Joel E. Ross & James R. Claggett, "Information Systems for Modern Management" PHI. 3.J. Kanter, "Management/Information Systems", PHI.	
	Reference Books: 1.Bentley,"System Analysis and Design", TMH 2.A. Ziya Aktas, "Structured Analysis & Design of Information System", PHI. 3. V. Rajaraman, "Analysis & Design of Information Systems", PHI.	

Course Outcomes:

1. Gather data to analyze and specify the requirement of a system
2. Design system components and environments
3. Ability to demonstrate an understanding of and apply various models and techniques that provide a basis for the SDLC.
4. Ability to learned different categories of software requirements.
5. Demonstrate an ability to use the techniques and tools
6. Learned about the importance of project management including cost estimation.

Subject Code	**15BCA113**
Subject Name	**Microprocessor**
Short Name	**µp**
Total Lectures	**88**
Total Credits	**4**

Prerequisite:

- Interaction with hardware by using assembly language.
- Understanding execution under hardware.
- Understanding of assembler.

Objectives:

- To expose the students about microprocessor used in computer system.
- To understand how microprocessor works inside computer system.
- To expose the students to the concepts of assembly language programming.

Units	Contents	Total Lectures
I	**Introduction of Microprocessor:** Evolution of Microprocessor, Internal block diagram of 8086 Microprocessor, Software Model or Programming Model or register organization of 8086, Flag register of 8086.	18
II	**Addressing modes and instruction Set:** Data Transfer instruction, Arithmetic instruction, Logical instruction, Bit Manipulation instruction.	18
III	**Assembler directives and Programming:** Program transfer and flag manipulation instruction, Assembler Directives, Program based on above instructions, Search for big number, small number, occurrences of given number.	18
IV	**8086 Hardware Specification:** Pin configuration, Function of each pin, interrupts: hardware and software interrupts, interrupt vector table, interrupt processing	17
V	**Introduction to advance Microprocessor and microcontroller :** Important feature of Pentium Microprocessor (Functional Block Diagram not expected),Super scalar pipeline architecture, Cache memory, concept of RISC and CISC processor **Microcontroller:** The important features of 8051 microcontroller, advantages of microcontroller over microprocessor.RAM organization of 8051 microcontroller, application of microcontroller.	17
	Text Books: 1. B .Ram: Fundamental of Microprocessor and Microcomputer 6th edition:Dhanpatrai Publication(2006) 2. Atul P.Godse /Mrs.Deepali A.Godse-Microprocessor and Interfacing 1st edition :Techinal publication pune (2009) 3. James L.Antonakos,The Pentium Microprocessor 1st edition:Prentice hall(1997)	
	References: 1. Barry B. Brey: The Intel Microprocessors 6Th edition:Prentice hall(2007) 2. Douglus V Hall: Microprocessor and Interfacing 2nd edition :Glencoe(1992) 3. K.M.Bhurchundi and A.K.Ray:Advanced Microprocessors & Peripherals 3rd edition:Tata Mcgraw hill(2013)	

Course Outcomes:

1. Explain the architecture, pin configuration of microprocessor 8086/microcontroller and Interfacing ICs.
2. Identify various addressing modes of microprocessor8086/microcontroller
3. Perform various microprocessor/microcontroller based programs.
4. Apply the concepts of 8086 programming like interfacing, interrupts, stacks & subroutines.
5. Demonstrate programming proficiency using the various addressing modes and data transfer instructions of the microprocessor/microcontroller.
6. Solve basic binary math operations using the microprocessor/microcontroller.

Subject Code	**15BCA114**
Subject Name	**Communication Skill -II**
Short Name	**CS-II**
Total Lectures	**88**
Total Credits	**4**

Prerequisites:

- Students should have the basic knowledge of English language.
- They should know the competencies of English.

Objectives:

- To make the student competent in English language.
- To polish the reading and writing skills.
- To aim at enhancing the communication skill to face the requirements in future employability.
- The Communicative English course aims at training the would-be graduates in various levels of communication in English speech skills, oral skills and other related skills.

Sr. No.	Contents	Total
1	**Comprehension Skill** -12 1.1 Generating Ideas with quick response -06 1.2 Attempting Precise -06	18
2	**Command Over Language** -12 2.1 Using other forms of verbs. -03 2.2 Voice -02 2.3 Do as Directed -07	18
3	**Written Communication Skills**-12 Course Content: 3.1. Notices-03 3.2. Agendas-03 3.3. Minutes-03 3.4. Fax Messages-03	18
4	**Drafting Language** -12 4.1 Business Letter -06 4.2 Drafting Reports -06	17
5	**General Awareness** -12 5.1 Short Notes -07 (Audio-visual aids, Interview, Barriers of Communication, Verbal/Non Verbal Communication) 5.2 Personal Response in 100 words -05 (Pollution, Current Affairs, Education)	17
	Text Books : 1. Mac Millans, English Grammar 2. M. Raman, S. Sharma, Technical communication: Principles and practice, first edition, Oxford University Press(2004).	
	References : 1. Z.N.Patil, B.S.Valke, English for Practical Purposes. 2. M.A.Pink, S.E.Thomas ,English Grammar Composition and Effective Business Communication , S.Chand.	

Course Outcomes:

1. Skills in speaking in official and formal situations and in writing letters, notices, fax messages and reports.
2. Enable to face the challenges in communication primarily in a technical milieu as communicating formal and technical messages.
3. Focus on enhancing competence and confidence in making use of the English language.

Subject Code	15BCA115
Subject Name	Lab-I : Advanced C
Short Name	Lab-I
Total Lectures	88
Total Credits	4

Sr. No.	Contents	Total Lectures
1	Write a program for swapping of two integer numbers using third by using concept of Function Prototype.	5
2	Write a program to calculate Factorial of n number by using Recursion Function.	6
3	Write a program to sort an array of integers by using Functions.	6
4	Write a program to demonstrate the concept of passing Array to a Function.	6
5	Write a program to read the information for one person from keyboard and print the same on the screen by using Structure.	5
6	Write a program to demonstrate the concept of Self Referential Structure.	6
7	Write a program for Union containing your own personal information.	6
8	Write a program for printing sequence of characters on screen by using 'for' loop.	6
9	Write a program for concatenation of two strings.	6
10	Write a program for comparison of two strings.	6
11	Write a program to sort a list of names in alphabetical order.	6
12	Write a program to display an entered string in reverse order.	6
13	Write a program to read data from one file and write into another by using file handling.	6
14	Write a program for drawing a circle inside rectangle.	6
15	Write a program for drawing two straight parallel lines.	6

Subject Code	15BCA115
Subject Name	Lab-I : µP
Short Name	Lab-I
Total Teaching	88
Total Credits	4

Sr. No.	Contents	Total Lectures
1	Write an assembly language program for addition of two 8 bit numbers.	6
2	Write an assembly language program for addition of two 16 bit numbers	6
3	Write an assembly language program for subtraction of two 8 bit numbers	6
4	Write an assembly language program for subtraction of two 16 bit numbers.	6
5	Write an assembly language program for multiplication of two numbers	6
6	Write an assembly language program for signed multiplication of two numbers	6
7	Write an assembly language program for division of 16 bit number by 8 bit number	6
8	Write an assembly language program for signed division of 16 bit number by 8 bit number	6
9	Write an assembly language program for find factorial of given number	6
10	Write an assembly language program for find sum of all numbers form array of 8 bit numbers	6
11	Write an assembly language program for sum of all even numbers form array of 8 bit numbers	6
12	Write an assembly language program for sum of all odd numbers form array of 8 bit numbers	6
13	Write an assembly language program for search big (largest) number form array of 8 bit numbers	6
14	Write an assembly language program for search small (smallest) number form array of 8 bit numbers	6
15	Write an assembly language program for search given number form array of 8 bit numbers	4

Subject Code	**15BCA116**
Subject Name	**Lab-II : SQL SERVER**
Short Name	**Lab-II**
Total Teaching	**88**
Total Credits	**4**

Sr. No.	Contents	Total
1.	Practical based on basic DDL commands	
2.	Practical based on basic DML commands	
3.	Practical based on Clauses[ORDER BY,GROUP BY,HAVING]	
4.	Practical based on Operators	
5.	Practical based on Views and Operations on Views	
6.	Practical based on Numeric functions	
7.	Practical based on Group functions	
8.	Practical based on Character functions	
9.	Practical based on Conversion functions	
10.	Write a program to display simple message in PL/SQL	
11.	Write a program greatest among two numbers in PL/SQL	
12.	Write a program to read a given number is even or odd in PL/SQL	
13.	Write a program for addition of two numbers in PL/SQL	
14.	Write a program for calculating simple interest in PL/SQL	
15.	Write a program to find area and circumference of circle in PL/SQL	