

MRSPTU BCA SYLLABUS 2016 BATCH ONWARDS
(Approved in 1st MRSPTU Standing Committee of Academic Council on 20.12.2016)

BCA (1st YEAR)

Total Contact Hours = 25

Total Marks = 790

Total Credits = 21

SEMESTER 1 st		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BCAP1-101	Problem Solving using C	3	1	0	40	60	100	4
BCAP1-102	Information Technology and Office Automation	3	1	0	40	60	100	4
BCAP1-103	Digital Electronics	3	1	0	40	60	100	4
BCAP1-104	Software Lab-I (Problem Solving using C based on BCAP1-101)	0	0	4	60	40	100	2
BCAP1-105	Software Lab-II (Information Technology and Office Automation based on BCAP1-102)	0	0	4	60	40	100	2
BHUM0-101	Communicative English	2	1	0	40	60	100	3
BHUM0-103	Human Values and Professional ethics	2	0	-	40	60	100	2
Total	Theory = 5 Labs = 2	13	4	8	320	380	700	21

Total Contact Hours = 28

Total Marks = 700

Total Credits = 24

SEMESTER 2 nd		Contact Hrs			Marks			Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.	Total	
BCAP1-206	Object Oriented Programming Using C ++	3	1	0	40	60	100	4
BCAP1-207	Computer Organization and Architecture	3	1	0	40	60	100	4
BCAP1-208	Internet and its Applications	3	1	0	40	60	100	4
BCAP1-209	Multimedia and Applications	3	1	0	40	60	100	4
BCAP1-210	Software Lab-III (Object Oriented Programming Using C ++ based on BCAP1-206)	0	0	4	60	40	100	2
BCAP1-211	Software Lab-IV (Internet and its Applications based on BCAP1-208)	0	0	4	60	40	100	2
BMAT0-204	Fundamentals of Mathematics	3	1	0	40	60	100	4
Total	Theory = 5 Labs = 2	15	5	8	320	380	700	24

Overall

Semester	Marks	Credits
1 st	700	21
2 nd	700	24
Total	1400	45

PROBLEM SOLVING USING C

Subject Code: BCAP1-101

L T P C
3 1 0 4

Duration: 45 Hrs.

Course Objectives and Learning Outcomes

1. The objective of this course is to help the students in finding solutions to various real life problems and converting the solutions into computer program using C language (structured programming).
2. Students will learn to write algorithm for solutions to various real life problems and converting the algorithms into computer programs using C language.

UNIT-I (10 Hrs)

1. Problem Solving and Programming Languages

Problem Solving Aspects, Program Development Steps, Introduction to Programming Languages, Types and Categories of Programming Languages, Program Development Environments.

2. Logic development and algorithms

Types of Problems, Data Centric and Process Centric, Problem Solving Strategies, Problem analysis, formal definition of problem, Top- Down design and Bottom-Up design, Algorithms, Flow charts, Flow chart symbols, Pseudo codes, illustrative examples.

UNIT-II (11 Hrs)

3. Introduction to C Programming Language

Introduction to C Language, Evolution and Characteristics of C Language, Compilation Model, Character Set, Keywords, Identifiers, Data Types, Variables, Constants, Operators, Expressions, Type conversion and Type Casting, Overview of Pre-processors, Structure of a C Program, Input and Output Statements.

4. Control Statements

Basic Programming Constructs, Sequence, Selection Statements 'if' Statement, Conditional / Ternary/?: Operator, Switch Statement, Iteration Statements, 'for' statement, 'while' statement, 'do - while' statement, break, continue Statement.

UNIT-III (12 Hrs)

5. Arrays and Strings

Need for an Array, Memory Organization of an Array, Declaration and Initialization, Basic Operations on Arrays, Multi-dimensional Array, Strings.

6. Pointers

Introduction, Declaration and Initialization, Pointer Arithmetic, Pointers and Arrays, Dynamic Memory Allocation.

UNIT - IV (12 Hrs)

7. Functions and Storage Classes

Need for Functions, Function Prototype, Function Definition, Function Call Passing Arguments, Functions and Arrays, Functions and Pointers, Command Line Arguments, Recursive Functions, String Functions, Automatic Storage Class, Register Storage Class, Static Storage Class, External Storage Class.

8. Structures

Declaration and Initialization, Structures and Arrays, Structures and Pointers, Structures and Functions, Introduction to Unions, Enumeration, Typedef Statement.

9. Files

Introduction, File Operations, Character I/O, String I/O, Numeric I/O, Formatted I/O, Block I/O.

Recommended Books

1. Shubhnandan Jamwal, 'Programming in C', 6th Edn., Pearson, **2010**.
2. E. Balagurusamy, 'Programming in ANSI C', Tata McGraw Hill, 8th Edn., **2008**.
3. Brian Kernighan and Dennis Ritchie, 'C Programming Language', 2nd Edn., PHI, **1988**.
4. Byron Gottfried, 'Programming with C', Tata McGraw Hill, 3rd Edn., **2006**.
5. ISRD Group, 'Programming and Problem Solving Using C', 3rd Edn., Tata McGraw Hill, **2008**.
6. Yashvant P. Kanetkar, 'Let us C', BPB Publications, 8th Edn., **2008**.
7. R.S. Salaria, 'Application Programming in C', 3rd Edn., Khanna Book Publishing, **2008**.

INFORMATION TECHNOLOGY AND OFFICE AUTOMATION

Subject Code: BCAP1-102

L T P C
3 1 0 4

Duration: 45 Hrs.

Course Objectives and Learning Outcomes

1. This course will enable the student to gain and understanding of the core concepts and technologies which constitute Information Technology.
2. The intention is for the student to be able to articulate and demonstrate a basic understanding of the fundamental concepts of Information Technology and Office Tools.

UNIT-I (11 Hrs)

1. Computer Fundamentals

Block diagram of a computer, Characteristics of Computers, Hardware, Software, Machine Language, Assembly Language and Assembler, High Level Language and Compiler v/s Interpreter.

2. Input Devices

Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Speech Recognition Devices, Optical Recognition devices – OMR, OBR, OCR.

3. Output Devices

Monitors, Impact Printers - Dot matrix, Character and Line printer, Non-Impact Printers – Desk Jet and Laser printing, Plotter.

4. Memories

Main Memories - RAM, ROM and Secondary Storage Devices - Hard Disk, Compact Disk and DVD.

UNIT-II (10 Hrs)

5. Windows

Installing Windows with set-up, Starting and Quitting windows, Basic Elements of Windows, working with menus dialogue boxes, Window Applications, Program Manager, File Manager, Print Manager, Control Panel, Write, Paint Brush, Accessories including Calculator, Calendar, Clock, Card file, Note pad, Recorder etc.

UNIT-III (12 Hrs)

6. Word Processing Tool

Salient features of Word Processing, File, Edit, View, Insert, Format, Tools, Tables, Window, help options and all of their features, Options and Sub Options etc., Transfer of files between Word Processors and Software Packages.

7. Presentation Tool

Making Presentations, Inserting objects, and Narration.

UNIT-IV (12 Hrs)

8. Spreadsheet Tool

Excel Worksheet, Data Entry, Editing, Cell Addressing ranges, Commands, Menus, Copying & Moving cell content, Inserting and Deleting rows and column, Column formats, Cell Protection, Printing, Creating, Displaying and Printing Graphs, Statistical Functions.

9. Introduction to Internet

Evolution of Internet, Internet Applications, WWW, E-mail, FTP, TELNET, Web Browsers.

Recommended Books

1. V. Rajaraman, 'Fundamentals of Computers', 5th Edn., PHI, 2010.
2. Satish Jain, 'Information Technology Concepts', 4th Edn., BPB Publications, 2006.
3. Turban, Mclean and Wetherbe, 'Information Technology for Management', 4th Edn., John Wiley & Sons, 2006.
4. G. Courter, 'Mastering MS Office 2000 Professional', 3rd Edn., BPB Publication, 2006.
5. Steve Sagman, 'MS- Office 2000 For Windows', 3rd Edn., Addison Wesley, 2008.
6. Indian Institute of Banking and Finance (IIBF), 'Information Technology, Data Communication and Electronic Banking', 2nd Edn., Macmillan India Ltd., 2007.

DIGITAL ELECTRONICS

Subject Code: BCAP1-103

L T P C
3 1 0 4

Duration: 45 Hrs.

Course Objectives and Learning Outcomes

1. Digital circuits, which are the basic building blocks of a computer, are introduced in this module to let the students know what activities it does behind the computing environment.
2. This course portrays excellent ideas of the logic gates available and data processing to make students understand the concept better with the analog and digital signals while computing.

UNIT-I (11 Hrs)

1. Number System & Logic Gates

Decimal, Binary, Octal and Hexadecimal number system and conversion, Codes: Straight Binary code, BCD Code, Excess-3 Code, Grey Code, ASCII, Integer and Floating point representation, Binary Arithmetic, 1's Complement and 2's Complement, Overflow and Underflow, Logic gates, Universal Gates.

UNIT-II (12 Hrs)

2. Boolean Algebra

Boolean Algebra Theorems, Truth-Table, Realization of switching functions using AND, OR, NOT logic gates, SOP and POS forms, 2-Variable, 3-Variable, 4-Variable, Karnaugh maps, Simplification of expressions.

UNIT-III (12 Hrs)

3. Combinational Circuits

Design of Binary Adder, Full Subtractor, Multiplexer, Demultiplexer, Decoder, Encoder.

4. Sequential Circuits

R-S, J-K, D and T Flip-flops, Clocks and Timers, Registers, Counters.

UNIT-IV (10 Hrs)

5. Semiconductor Memories

Introduction, Static and Dynamic devices, read only & Random access memory chips, PROMS and EPROMS, Address selection logic, Read and write control timing diagrams for ICs.

Recommended Books

1. R.P. Jain, 'Modern Digital Electronics', 4th Edn., Tata Mcgraw-Hill, **2003**.
2. M. Morris Mano, 'Digital Logic and Computer Design', 10th Edn., Pearson, **2008**.
3. Albert Malvino, 'Digital Computer Electronics', 3rd Edn., Tata Mcgraw-Hill, **2008**.
4. William H. Gothmann, 'Digital Electronics: An Introduction to Theory and Practice', 2nd Edn., Prentice Hall, **1992**.
5. Anil K. Maini, 'Digital Electronics: Principles and Integrated Circuit', Wiley, 1st Edn., **2007**.
6. T.C. Bartee, 'Digital Computer Fundamentals', 3rd Edn., Tata Mcgraw-Hill, **1972**.

PROBLEM SOLVING USING C LAB
(SOFTWARE LAB – I)

Subject Code: BCAP1-104

L T P C
0 0 4 2

Duration: 20 Hrs.

Implement the following concepts in C Programming:

- 1. Keywords and Identifiers:** Introduction, Purpose
- 2. Variables and constants:** Data Types, Initialization, Declaration, Scope, Memory limits
- 3. Input-output statements:** Formatted and Non-Formatted statements
- 4. Operators:** Arithmetic, Logical, Conditional, Assignment, Bitwise, Increment/Decrement operators
- 5. Decision Making:** Switch, if-else, nested if, else-if ladder, Break, Continue, Goto
- 6. Loops:** While, Do-while, For
- 7. Functions:** Definition, Declaration, Variable Scope, Parameterized Functions, Return statement, Call by value, Call by reference, Recursive functions
- 8. Pre-processor Directives:** Pre-processor directives like INCLUDE, IFDEF, DEFINE, etc
- 9. Header Files:** STDIO.H, MATH.H, STRING.H, PROCESS.H etc
- 10. Arrays:** Array declarations, Single and Multi-dimensional, Memory limits, Strings and String functions
- 11. Pointers:** Pointer declarations, Pointer to Function, Pointer to Array/String
- 12. Files:** Creation and Editing of various types of files, closing a file (using functions and without functions).

INFORMATION TECHNOLOGY AND OFFICE AUTOMATION LAB
(SOFTWARE LAB – II)

Subject Code: BCAP1-105

L T P C
0 0 4 2

Duration: 20 Hrs.

1. WINDOWS OPERATING SYSTEM

Installing WINDOWS with set-up, Starting and Quitting WINDOWS, Basic Elements of WINDOWS, working with menus dialogue boxes, Window Applications, Windows Explorer, My Computer, Recycle bin, Programs, Favorites, My Documents.

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Settings- Control Panel, Printers, Taskbar and Start menu, Folder Options, Active Desktop, Find, Help, Run.

Accessories – Entertainment, Games, System tools, Internet Tools, Calculator, Calendar, Clock, Card file, Note pad, Write pad, Recorder etc.

2. WORD PROCESSING & PRESENTATION TOOL

Salient Features of Word, Installation of Word, Starting and Quitting of Word, File, Edit, View, Insert, Format, Tools, Tables, Window, Help options and all of their features, Options and Sub Options etc. Transfer of files between Word Processors and Software Packages.

Salient Features of Power Point, Installation, Starting and Quitting, File, Edit, View, Insert, Format, Tools, Slide Show, Window, Help options and all of their features, Options and Sub Options etc. Transfer of files between Presentation Tool and Software Packages.

3. SPREADSHEET TOOL

Spread Sheet. Getting started with Excel worksheet, entering data into Work Sheet, editing cell addressing, Ranges and range names, Commands, Menus, Copying and Moving cell contents, Inserting and Deleting rows and columns, Column width control, Cell protection, Printing reports, Creating and Displaying Graphs, Statistical functions.

4. INTERNET

Internet Applications, WWW, compose an E-mail, Draft an E-mail, FTP, TELNET, Web Browsers.

COMMUNICATIVE ENGLISH

Subject Code: BHUM0-101

L T P C
2 1 0 3

Duration: 45 Hours

Course Objectives and Learning Outcomes

1. To expose the students to effective communication strategies and different modes of communication.
2. To enable the students to analyze his/her communication behavior and that of others.
3. To enable student to apply effective communication skills professionally and socially.

UNIT-I (12 Hrs)

Communication: Meaning, its types, Significance, Process, Channels, Barriers to Communication, Making Communication Effective, Role in Society.

Business Correspondence: Elements of Business Writing, Business Letters: Components and Kinds, Memorandum, Purchase Order, Quotation and Tenders, Job Application Letters, Resume Writing etc.

UNIT-II (10 Hrs)

Discussion Meeting and Telephonic Skills: Group Discussion, Conducting a Meeting, Telephone Etiquettes, Oral Presentation: Role of Body Language and Audio Visual Aids.

Grammar: Transformation of Sentences, Words used as Different Parts of Speech One Word Substitution, Abbreviations, Technical Terms etc.

UNIT-III (11 Hrs)

Reading Skills: Process of reading, Reading Purposes, Models, Strategies, Methodologies, Reading Activities.

Writing Skills: Elements of Effective Writing, Writing Style, Technical Writing: Report Writing.

UNIT-IV (12 Hrs)

Listening Skills: The process of Listening, Barriers to Listening, Effective Listening Skills and Feedback Skills.

Speaking Skills: Speech Mechanism, Organs of Speech, Production and Classification of Speech Sound, Phonetic Transcription, Skills of Effective Speaking, Components of Effective Talk.

Learning Outcomes

The students after undertaking this course will be able to:

- i) Understand and appreciate the need of communication training.
- ii) Use different strategies of effective communication and select the most appropriate mode of communication for a given situation.
- iii) Speak effectively and assertively
- iv) Correspond effectively through different modes of written communication.
- v) Present himself/herself professionally through effective resumes and interviews.

Recommended Books

1. M.V. Rodrigues, 'Effective Business Communication', Concept Publishing Company New Delhi, 1992, reprint 2000.
2. Adhikari Sethi, 'Business Communication', McGraw Hill.
3. Indrajit Bhattacharya, 'An Approach to Communication Skills', Dhanpat Rai Co., (Pvt.) Ltd. New Delhi.
4. Chrissie Wright, 'Handbook of Practical Communication Skills', Jaico Publishing House, Mumbai.
5. L. Gartside, 'Modern Business Correspondence', Pitman Publishing, London.
6. Rizvi M. Ashraf, 'Effective Technical Communication', McGraw Hill.

HUMAN VALUES & PROFESSIONAL ETHICS

Subject Code: BHUM0-103

L T P C
2 0 0 2

Duration: 24 Hrs

Course Objectives and Learning Outcomes

To help the students discriminate between what is valuable and what is superficial in the life. To help the students develop the critical ability to distinguish between essence and form in life - this ability is to be developed not for a narrow area or field of study, but for everyday situations in life, covering the widest possible canvas. To help the students develop sensitivity and awareness; leading to commitment and courage to act on their own belief. It is not sufficient to develop the discrimination ability; it is important to act on such discrimination in a given situation. Knowingly or unknowingly, our education system has focused on the skill aspects (learning and doing) - it concentrates on providing to its students the skills to do things. In other words, it concentrates on providing "How to do" things. The aspects of understanding "What to do" or "Why something should be done" is assumed. No significant cogent material on understanding is included as a part of the curriculum. A result of this is the production of graduates who tend to join into a blind race for wealth, position and jobs. Often it leads to misuse of the skills; and confusion and wealth that breeds chaos in family, problems in society, and imbalance in nature. This course is an effort to fulfill our responsibility to provide our students this significant input about understanding. This course encourages students to discover what they consider valuable. Accordingly, they should be able to discriminate between valuable and the superficial in real situations in their life. It has been experimented at IIITH, IITK and UPTU on a large scale with significant results.

UNIT-I (6 Hrs)

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Understanding the need, basic guidelines, content and process for Value Education. Self-Exploration-what is it? - its content and process; “Natural Acceptance” and Experiential Validation- as the mechanism for self-exploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario Method to fulfill the above human aspirations: understanding and living in harmony at various levels

UNIT-II (8 Hrs)

Understanding Harmony in the Human Being - Harmony in Myself!

Understanding human being as a co-existence of the sentient “I” and the material “Body”

Understanding the needs of Self (“I”) and “Body” - *Sukhand Suvidha*

Understanding the Body as an instrument of “I” (I being the doer, seer and enjoyer)

Understanding the characteristics and activities of “I” and harmony in “I”

Understanding the harmony of I with the Body: *Sanyamand Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure *Sanyamand Swasthya*

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

Understanding harmony in the Family- the basic unit of human interaction; Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*; Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship; Understanding the meaning of *Vishwas*; Difference between intention and competence Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship

UNIT-III (6 Hrs)

Understanding the Harmony in the Society (Society Being an Extension of Family)

Samadhan, Samridhi, Abhay, Sah-astitvaas comprehensive Human Goals Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*SarvabhaumVyawastha*)- from family to world family!

Understanding Harmony in the Nature and Existence - Whole existence as Co-existence

Understanding the harmony in the Nature; Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature; Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space; Holistic perception of harmony at all levels of existence

UNIT-IV (4 Hrs)

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values Definitiveness of Ethical Human Conduct; Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order; Competence in professional ethics:

- Ability to utilize the professional competence for augmenting universal human order,
- Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
- Ability to identify and develop appropriate technologies and management patterns for above
- production systems;

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- Case studies of typical holistic technologies, management models and production systems; Strategy for transition from the present state to Universal Human Order:
- At the level of individual: as socially and ecologically responsible engineers, technologists and managers
- At the level of society: as mutually enriching institutions and organizations

Recommended Books

1. R.R. Gaur, R. Sangal, G.P. Bagaria, 'A Foundation Course in Value Education', **2009**.
2. Ivan Illich, 'Energy & Equity', The Trinity Press, Worcester, and Harper Collins, USA, 1974.
3. E.F. Schumacher, 'Small is Beautiful: A Study of Economics as if People mattered', Blond & Briggs, Britain, 1973.
4. A. Nagraj, 'Jeevan Vidyaek Parichay', Divya Path Sansthan, Amarkantak, 1998.
5. Sussan George, 'How the Other Half Die's', Penguin Press. Reprinted 1986, 1991.
6. P.L. Dhar, R.R. Gaur, 'Science and Humanism', Commonwealth Publishers, 1990.
7. A.N. Tripathy, 'Human Values', New Age International Publishers, 2003.
8. Subhas Palekar, 'How to Practice Natural Farming', Pracheen (Vaidik) Krishi Tantra Shodh, Amravati, 2000.
9. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 'Limits to Growth - Club of Rome's Report', Universe Books, 1972.
10. E.G. Seebauer & Robert L. Berry, 'Fundamentals of Ethics for Scientists & Engineers', Oxford University Press, 2000.
11. M. Govindrajran, S. Natrajan & V.S. Senthil Kumar, 'Engineering Ethics (including Human Values)', Eastern Economy Edition, Prentice Hall of India Ltd.
12. B.P. Banerjee, 'Foundations of Ethics and Management', Excel Books, 2005.

OBJECT ORIENTED PROGRAMMING USING C++

Subject Code: BCAP1-206

L T P C
3 1 0 4

Duration: 45 Hrs.

Course Objectives and Learning Outcomes

1. The objective of this course is to learn programming from real world examples and understand object oriented approach for finding solutions to various problems with the help of C++ language.
2. Students will learn to create computer based solutions to various real-world problems using C++ and will learn various concepts of object oriented approach towards problem solving.

UNIT-I (10 Hrs)

1. Evolution of OOP

Procedure Oriented Programming, OOP Paradigm, Advantages and Disadvantages of OOP over its predecessor paradigms.

2. Characteristics of OOP

Abstraction, Encapsulation, Data hiding, Inheritance, Polymorphism, Code Extensibility and Reusability, User defined Data Types.

3. Introduction to C++

Identifier, Keywords, Constants

4. Operators

Arithmetic, Relational, Logical, Conditional, Assignment, Sizeof operator, Operator precedence and Associativity.

Type conversion, Variable declaration, Expressions, Statements, Manipulators, Input and Output statements, Stream I/O, Conditional and Iterative statements, Breaking control statements.

UNIT-II (12 Hrs)

5. Storage Classes

Automatic, Static, Extern, Register.

6. Arrays

Arrays as Character Strings, Structures, Unions, Enumerations and User defined types.

7. Pointers

Pointer Operations, Pointer Arithmetic, Pointers and Arrays.

8. Functions

Prototyping, Definition and Call, Scope Rules, Parameter Passing: by value, by address and by reference, Functions returning references, Const functions, Recursion, Function Overloading, Default Arguments, Const arguments.

9. Classes

Class Declaration and Class Definition, defining member functions, making functions inline, Nesting of member functions, Members access control, this pointer.

10. Objects

Object as function arguments, Array of objects, Functions returning objects, Const member functions, Static data members, Static member functions, Friend functions and Friend classes.

UNIT-III (12 Hrs)

11. Constructors

Properties, Types of constructors (Default, Parameterized and Copy), Dynamic constructors, Multiple constructors in classes.

12. Destructors

Properties, Virtual destructors, Destroying objects, Rules for constructors and destructors. Array of objects, Dynamic memory allocation using new and delete operators, Nested and container classes.

13. Inheritance

Defining derived classes, Inheriting private members, Single inheritance, Types of derivation, Function redefining, Constructors in derived class.

14. Types of Inheritance

Single, Multiple, Multilevel and Hybrid.

15. Types of Base classes

Direct, Indirect, Virtual, Abstract, Code Reusability.

UNIT-IV (11 Hrs)

16. Polymorphism

Methods of achieving polymorphic behavior.

17. Operator Overloading

Overloading binary operator, overloading unary operators, Rules for Operator Overloading, Operator Overloading using friend function, Function Overloading: Early binding, Polymorphism with pointers, Virtual functions, Late binding, Pure virtual functions and Abstract base class.

18. Files and Streams

Classes for file stream operations, Opening and Closing of files, Stream state member functions, Binary file operations, Structures and file operations, Classes and File operations, I/O with multiple objects, Error handling, Sequential and Random access file processing.

Recommended Books

1. E. Balagurusamy, 'Object Oriented Programming with C++', 14th Edn., Tata McGraw-Hill, 2008.
2. Robert Lafore, 'Object Oriented Programming in C++', 4th Edn., Galgotia Publications, 2001.
3. D. Ravichandran, 'Programming in C', 1st Edn., New Age International, 1996, reprint 2011.
4. Herbert Schildt, 'C++: The Complete Reference', 4th Edn., Tata McGraw-Hill, 2003.
5. Stanley B. Lippman, Josee Lajoie, 'C++ Primer', 5th Edn., Pearson Education, 2011.
6. Deital and Deitel, 'C++ How to Program', 7th Edn., Pearson Education, 2010.

COMPUTER ORGANIZATION AND ARCHITECTURE

Subject Code: BCAP1-207

L T P C

Duration: 45 Hrs.

3 1 0 4

Course Objectives and Learning Outcomes

1. To make students aware about the basic building blocks of computer system and how the different components are interfaced together.
2. Students will come to know about the basic functioning of various parts of computer system from hardware point of view and interfacing of various peripheral devices used with the system.

UNIT-I (11 Hrs)

1. Introduction to Computer Organization

Introduction to Computer and CPU (Computer Organization, Design and Architecture), Stored Program Concept - Von Neumann Architecture, Introduction to Flynn's Classification-SISD, SIMD, MIMD

2. Register Transfer

Introduction to Registers, Register Transfer Language, Data movement among Registers and Memory.

3. Micro operations

Introduction to micro operations, Types of micro operations - Logic Operations, Shift operations, Arithmetic and Shift operations.

4. Common Bus System

Introduction to Common Bus System, Types of Buses (Data Bus, Control Bus, Address Bus), 16-bit Common Bus System, Data Movement among registers using Bus.

UNIT-II (10 Hrs)

5. Basic Computer Instructions

Introduction to Instruction, Types of Instructions, Instruction Cycle, Instruction Formats (Direct, Indirect, Zero, One, Two and Three-Address Instructions).

6. Interrupt

Introduction to Interrupt and Interrupt Cycle.

7. Design of Control Unit

Introduction to Control Unit, Types of Control Unit.

8. Addressing Modes

Introduction & different types of Addressing Modes

UNIT-III (12 Hrs)

9. I/O Organization

I/O Interface Unit, Types of ports (I/O port, Network Port, USB port, Serial and Parallel Port), Concept of I/O bus, Isolated I/O versus Memory-Mapped I/O.

10. I/O Data Transfer Techniques

Programmed I/O, Interrupt Initiated I/O, DMA Controller and IOP.

11. Synchronous and Asynchronous Data Transfer

Concept of strobe and handshaking, Source and Destination initiated data transfer.

UNIT-IV (12 Hrs)

12. Stack Organization

Memory Stack and Register Stack.

13. Memory organization

Memory Hierarchy, Main Memory (RAM and ROM chips, Logical and Physical Addresses, Memory Address Map, Memory Connection to CPU), Associative Memory.

14. Cache Memory

Cache Memory (Initialization of Cache Memory, writing data into Cache, Locality of Reference, Hit Ratio), Replacement Algorithms (LRU and FIFO).

15. Cache Memory Mapping Techniques

Direct Mapping, Associative Mapping and Set-Associative Mapping, Harvard Architecture, Mobile Devices Architecture (Android, Symbian and Windows Lite), Layered Approach Architecture.

Recommended Books

1. M. Morris Mano, 'Computer System Architecture', 3rd Edn., Pearson, 1993.
2. William Stallings, 'Computer Organization and Architecture', 9th Edn., Pearson, 2013.
3. P.V.S. Rao, 'Computer System Architecture', 1st Edn., PHI, 2008.

INTERNET AND ITS APPLICATIONS

Subject Code: BCAP1-208

L T P C
3 1 0 4

Duration: 45 Hrs.

Course Objectives and Learning Outcomes

1. This subject covers computer concepts and internet skills.
2. It also uses a software suite which includes Emails, Internet Protocols, Search Engine, Introduction of Intranet and Extranet.

UNIT-I (10 Hrs)

1. Introduction

Internet and its working, Business use of Internet, Services offered by Internet, Evaluation of Internet, Internet Service Provider (ISP), Windows environment for dial up networking (connecting to Internet), Audio on Internet, Internet Addressing (DNS) and IP addresses).

UNIT-II (11 Hrs)

2. E-Mail

Introduction, Advantage and Disadvantage, Structure of an e-mail message, working of e-mail (sending and receiving messages), Managing e-mail (creating new folder, deleting messages, forwarding messages, filtering messages), Implementation of Outlook Express.

3. Internet Protocol

Introduction, File transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCP/IP.

UNIT-III (12 Hrs)

4. WWW

Introduction, Working of WWW, Web browsing (opening, viewing, saving, printing a web page and bookmark), Web designing using HTML, DHTML with programming techniques.

UNIT-IV (12 Hrs)

5. Search Engine

About search engine, Component of search engine, working of search engine, Difference between search engine and web directory.

6. Intranet and Extranet

Introduction, Application of Intranet, Business value of Intranet, working of Intranet, Role of Extranet, working of Extranet, Difference between Intranet and Extranet.

Recommended Books

1. Keith Sutherland, 'Understanding the Internet', 1st Edn., Butterworth Heinemann, 2000.
2. S.K. Bansal, 'Internet and Web Designing', 1st Edn., APH Publishing Corporation, 2013.
3. Behrouz A. Forouzan, 'Data Communications and Networking', 4th Edn., Tata McGraw Hill, 2006.
4. Paul, 'Multicasting on the Internet and Its Applications', 1st Edn., Springer, eBook, 1998.

MULTIMEDIA AND APPLICATIONS

Subject Code: BCAP1-209

L T P C

Duration: 30 Hrs.

3 0 0 3

Course Objectives and Learning Outcomes

1. This Course introduces the multimedia systems and their applications to students.
2. This course covers the different compression standards used in multimedia, some current technology and related issues.

UNIT-I (10 Hrs)

1. Introduction

Multimedia and its types, Introduction to Hypermedia, Hyper Text, Multimedia Systems and their Characteristics, Challenges, Desirable Features, Components and Applications, Trends in Multimedia.

2. Multimedia Technology

Multimedia Systems Technology, Multimedia Hardware devices, Multimedia software development tools, Multimedia Authoring Tools, Multimedia Standards for Document Architecture, Multimedia Software for different media.

UNIT-II (06 Hrs)

3. Storage Media

Magnetic and Optical Media, RAID and its levels, Compact Disc and its standards, DVD and its standards, Multimedia Servers.

UNIT-III (08 Hrs)

4. Audio

Basics of Digital Audio, Application of Digital Audio, Digitization of Sound, Sample Rates and Bit Size, Typical Audio Formats, Introduction to MIDI (Musical Instrument Digital Interface), Components of a MIDI System, Hardware Aspects of MIDI, MIDI Messages.

UNIT-IV (06 Hrs)

5. Image and Graphics Compression

Color in Images, Types of Color Models, Graphic/Image File Formats: TIFF, RIFF, BMP,

MRSPTU BCA SYLLABUS 2016 BATCH ONWARDS
(Approved in 1st MRSPTU Standing Committee of Academic Council on 20.12.2016)

PNG, PDF, Graphic/Image Data, and JPEG Compression, GIF Compression.

Recommended Books

1. Ralf Steinmetz and Klara Nahrstedt, 'Multimedia Computing Communications and Applications', 3rd Edn., Pearson Educations, **2012**.
2. Parag Havaldar, Gerard Medioni, 'Multimedia Systems: Algorithms, Standards and Industry Practices', 1st Edn., Cengage Learning, **2009**.
3. John F. Koegel Buford, 'Multimedia Systems', 1st Edn., Pearson Educations, **1994**.
4. Jeffcoate, 'Multimedia in Practice', 1st Edn., Prentice Hall, **1995**.

OBJECT ORIENTED PROGRAMMING USING C ++ LAB
(SOFTWARE LAB – III)

Subject Code: BCAP1-210

L T P C
0 0 4 2

Duration: 20 Hrs.

Implement the following concepts in C++ Programming:

1. **Arrays:** Definition, declaration, scope, functions
2. **Structures:** Definition, declaration, scope, functions
3. **Union:** Definition, declaration, scope, functions
4. **Class:** Definition, declaration, members, scope of members.
5. **Class Function:** Definition (Inside class, Outside class), Inline functions, Static function, Friend functions, Scope of functions (public, private), and Nesting of member functions.
6. **Class Data members:** Creating objects, accessing member functions, Array of objects, Objects as arguments (pass by value, pass by reference)
7. **Constructor and destructor:** Creating default constructor, Parameterized constructor, Copy constructor, Destructor.
8. **Inheritance:** Base class, Derived class, Visibility mode (public, private, protected), Single Inheritance, Multi-level Inheritance, Multiple Inheritance, Nesting of classes, Access control to functions (with different scope), Function Overloading and Overriding, Operator Overloading.
9. **Polymorphism:** Early binding, Late binding, Virtual functions, Pure virtual functions.
10. **Input/Output Files:** Streams, Buffers and I/O-streams, various input-output functions, processing files using class functions.

INTERNET AND ITS APPLICATIONS LAB
(SOFTWARE LAB – IV)

Subject Code: BCAP1-211

L T P C
0 0 4 2

Duration: 20 Hrs.

Implement the following concepts in Lab:

Introduction: Internet, Use of Internet

E-Mail: Structure of an e-mail message, working of e-mail (sending and receiving messages), Managing e-mail (creating new folder, deleting messages, forwarding messages, filtering messages), Implementation of Outlook Express.

Internet Protocol: File transfer protocol (FTP), Gopher, Telnet, HTTP, TCP/IP.

WWW: Working of WWW, Web browsing (opening, viewing, saving, printing a web page and bookmark), Web designing using HTML, DHTML with programming techniques.

Search Engine: Working of Search Engine.

Intranet and Extranet: Working of Intranet, Working of Extranet.

FUNDAMENTALS OF MATHEMATICS

Subject Code: BMAT0-204

L T P C
3 1 0 4

Duration: 45 Hrs.

Course Objectives and Learning Outcomes

1. This syllabus is specially designed to help the students to understand the mathematical concepts like matrices, differential calculus and integral calculus which have applications in various subjects of Computer Applications.
2. Also Statistics has been added to help them understand the topics like central tendency, deviations, and moments etc which are very useful in many computer applications.
3. After learning these topics, students will be able to apply these concepts in designing the software applications for some specific devices.

UNIT-I (11 Hrs)

1. MATRIX ALGEBRA

Matrices, types of matrices, operations on matrices, determinants, inverse of a matrix, Elementary transformations, Rank of a matrix, solution of simultaneous linear equations using Cramer's rule and matrix inversion method.

Consistency of linear equations by Rank Method.

UNIT-II (10 Hrs)

2. STATISTICS

Introduction to statistics, measures of central tendency - Mean, Median and Mode, measures of dispersion, mean deviation, standard deviation and coefficient of Variation, correlation and regression analysis. Definition of probability, Addition and Multiplication Laws. Simple problems.

UNIT-III (12 Hrs)

3. DIFFERENTIAL CALCULUS

Introduction to differentiation, Differentiation of standard functions including trigonometric functions. Differentiation by method of substitution, maxima and minima.

UNIT-IV (12 Hrs)

4. INTEGRAL CALCULUS

Indefinite Integral, Integration by substitution, Integration by parts, Integration by partial Fractions, Definite Integral. Numerical Integration: Trapezoidal rule, Simpson's 1/3 rules, Simpson's 3/8 rule.

Recommended Books

1. D.C. Sancheti and V.K. Kapoor, 'Business Mathematics', Sultan Chand & Sons, 11th Edn., **2015**.
2. B.S. Grewal, 'Higher Engineering Mathematics', 43rd Edn., Khanna Publishers, **2014**.
3. B.S. Grewal, 'Numerical Methods in Engineering & Science', 10th Edn., Khanna Publishers, **2010**.
4. Rajaraman, 'Computer Oriented Numerical Methods', 3rd Edn., PHI Publications, **2013**.