DR. BHIMRAO AMBEDKAR UNIVERSITY, AGRA

BACHELOR OF COMPUTER APPLICATION

(B.C.A.)

(THREE YEAR DEGREE COURSE)

with effect from session 2019-20

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Institute of Basic Science

Annexure-A

BACHELOR OF COMPUTER APPLICATIONS (BCA)

ORDINANCES

1. **Eligibility:** The minimum qualification for admission to B.C.A. course shall be 10+2 with mathematics as one of the subject and 50% marks aggregate at 10+2 level as per norms.

2. **Admission:** The selection of candidates will be made on the basis of written test/ order of merit on the basis of marks obtained at (10+2) level /Interview.

3. Bachelor of Computer Applications is a three years degree course divided in to six(06) semesters.

4. Each academic session (I,II,III year) shall be divided into two semester viz. the first semester (odd semester) and second semester (even semester) etc. Each semester shall consist of 90 working days as per UGC norms.

5. Each semester except the last (sixth), shall have five theory papers and practical. In sixth semester, the student will have to complete a project of carrying 200 marks.

6. For internal assessment of each paper there shallbe three periodical tests during a semester and the time allowed for each of thetest shall be one hour.

7. (i) The periodical tests shall be conducted by the teacher concerned during the semester going on and the answer books shall be shown to be examinee/student after evaluation by the concerned teacher.

   The division of marks for internal assessment shall be as under

First Periodical Test	20 Marks
Second Periodical Test	20 Marks
Third Periodical Test	20 Marks
Regularity, Class Performance and Discipline	10 Marks

   Marks of best two Periodical Tests will be considered. If a student does not obtain 20 or more marks in Internal assessment, for such students the marks of all the three

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II Sem. (i)	Internal Assessment	50	05	250
(ii)	Term Exam	50	05	250
(iii)	Practical		01	100
III Sem. (i)	Internal Assessment	50	05	250
(ii)	Terms Exam	50	05	250
(iii)	Practical		01	100
IV Sem. (i)	Internal Assessment	50	05	250
(ii)	Term Exam	50	05	250
(iii)	Practical		01	100
V Sem.(i)	Internal Assessment	50	05	250
(ii)	Term Exam	50	05	250
(iii)	Practical		01	100
VI Sem .	Project Work			200
	Grand Total			**3200**

16. (a) To pass a paper in each semester, the student shall be required to secure at least 40% marks in the external examination, internal assessment of each paper and practical examinations separately with an overall aggregate of 50% marks in each semester.

(b) If a student fails to obtain 50% marks in aggregate in the semester concerned but has attained minimum 40% marks in each individual paper (s) then the candidate shall have to appear again in the papers of his/her choice or in all the papers of the semester concerned and the marks so obtained by the student will be final for that semester.

(c) If a student fails in some papers in a semester, he/she can re-appear at the exam of maximum of three papers with corresponding semester exam with junior batch.

(d) A student will get only two attempts to re-appear in the exam of a paper.

(e) That a candidate shall not be declared successful at the B.C.A. examination unless he/she has secured at least 50% marks in the aggregate of all six semesters.

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(f) If a student fails to clear **seven or more papers** collectively i.e. of odd and even semester of a session i.e. (I & II semester of First year, III & IV semester of Second year, V & VI semester of Third year), he/she will not be promoted to next year(III semester of Second year, V semester of Third year) and will be considered as Ex- Student (treated as year back) of a odd semester i.e. (I, III, V semester) as the case may be.

17. (a) A student who has been declared successful in the B.C.A. examination shall be awarded B.C.A. Degree. If student has secured 60% or more marks, he/she shall be awarded First Division otherwise he/she shall be placed in Second Division. If a candidate has secured 75% or more marks in the aggregate of all six semesters,it shall be mentioned in his degree that he/she has passed B.C.A. examination with Distinction.

(b) The division obtained by the student will be mentioned in six semester mark sheet only on the basis of aggregate of all six semesters as per the norms and remaining mark sheets (i.e. I to V semester) will be given to the students with the result either **"PASSED"** or **"FAILED"** as the case may be.

18. A candidate shall have to complete B.C.A within maximum period of 6 years.

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Annexure-B

BACHELOR OF COMPUTER APPLICATIONS (BCA)

COURSES OF STUDY

FIRST YEAR	
SEMESTER-I	**Papers**
C-101	Computer Fundamentals and MS-Office
C-102	Introduction to Programming Using 'C'
C-103	Business Communication and Soft Skill
C-104	Introduction to HTML-CSS-XML
C-105	Mathematics-I
Practical	Practical Based on above Papers
SEMESTER-II	**Papers**
C- 201	Object Oriented Programming using 'C++'
C-202	Digital Electronics
C-203	Data Structure using 'C'/'C++'
C-204	Principles of Management
C-205	Numerical Methods
Practical	Practical Based on above Papers
SECOND YEAR	
SEMESTER –III	
C-301	Data Base Management System
C-302	E-Commerce and ERP
C-303	Computer Organization and Architecture
C-304	Operating System with the case study of UNIX & Windows
C-305	~~Numerical Methods~~ Statistical Method and Applications
Practical	Practical Based on above Papers
SEMESTER-IV	
C-401	JAVA Programming
C-402	Web Technology with PHP & MySQL
C-403	Artificial Intelligence
C-404	Computer Network
C-405	Optimization Techniques
Practical	Practical Based on above Papers

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THIRD YEAR

SEMESTER V

C-501	Network Security
C-502	Visual Basic.NET
C-503	Computer Graphics
C-504	System Analysis & Design
C-505	Design & Analysis of Algorithms
Practical	Practical Based on above Papers

SEMESTER VI

C-601	Major Project (External)

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BACHELOR OF COMPUTER APPLICATION (B.C.A.)

DETAILED SYLLABUS

FIRST SEMESTER

PAPER CODE: C-101

Computer Fundamentals and MS-Office

UNIT-I

Introduction to Computers: Introduction, Characteristics of Computers, Block diagram of computer. Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers, Super Computers. Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages). Data Organization, Drives, Files, Directories. Types of Memory (Primary And Secondary) RAM ROM, PROM, and EPROM. Secondary Storage Devices (FD, CD, HD, Pen drive) I/O Devices (Scanners, Plotters, LCD, Plasma Display) Number Systems Introduction to Binary, Octal, Hexadecimal system Conversion, Simple Addition, Subtraction, Multiplication.

UNIT-II

Algorithm and Flowcharts Algorithm: Definition, Characteristics, Advantages and disadvantages, Examples Flowchart: Definition, Define symbols of flowchart, Advantages and disadvantages, Examples

UNIT-III

Operating System and Services in O.S., DOS, History, Files and Directories, Internal and External Commands, Batch Files, Types of O.S.

UNIT-IV

Windows Operating Environment Features of MS-Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons, Windows Accessories, Notepad, Paintbrush.

UNIT-V

Editors and Word Processors Basic Concepts, Examples: MS-Word, Introduction to desktop publishing. Spreadsheets and Database packages Purpose, usage, command, MS-Excel, Creation of files in MS-Access, Switching between application, MS-PowerPoint.

Suggested Books:

1. Fundamental of Computers, By V.Rajaraman B.P.B. Publications
2. Fundamental of Computers, By P.K. Sinha
3. MS-Office 2000(For Windows), By Steve Sagman
4. Computer Networks, By Tennenbum Tata MacGraw Hill Publication

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DETAILED SYLLABUS

FIRST SEMESTER

PAPER CODE: C-102

Introduction to Programming using C

UNIT-I

C basics: C character set, Identifiers and keywords, Data types, constants, variables and arrays, declarations, expressions statements, symbolic constants, compound statements, arithmetic operators, unary operators, relational and logical operators, assignment operators, conditional operators, bit operators.

UNIT-II

Decision Control Structures: If Statement, If-else statement, Nested if (), If () ladder, Switch, case statement, Iterative statements: For loop, While loop, Do-while () loop, Conditional statements: Break, Continue, Storage Classes, Array: Declaration of an Array, Initialization of Array, Types of Array: Single Dimension Array, Two, Dimensional Array, Address Calculation of an Element of a 2-D Array

UNIT-III

Functions: Library Functions, User Defined Functions, Function Declaration, Prototype Declaration, Types of Arguments: Actual Arguments, Formal Arguments, Function Definition, Passing Arrays as Parameters, Methods to Call a Function: Call by Value, Call by Reference.

UNIT-IV

Pointers: Declaration of Pointer Variables, Pointer Arithmetic, Returning Multiple Output Values through a Function Strings.

UNIT-V

Structures, Unions, Array of Structures, Enumerations, File Handling: Opening a File, Closing a File, File, Opening Modes, Reading from and Writing to a File, Copying Content of an Existing File to another, Command Line Arguments, argc and argv Parameters, Pre-processor Directives.

Suggested Books:

1. E.Balagurusamy, "Programming in ANSI C", TMH
2. Peter Norton's, "Introduction to Computers", TMH
3. Yashwant Kanetkar, "Let us C", BPB

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DETAILED SYLLABUS

FIRST SEMESTER

PAPER CODE: C- 103

Business Communication and Soft Skills

UNIT-I

Means of Communication: Meaning and Definition, Process, Functions, Objectives, Importance, Essentials of good communication, Communication barriers, 7C's of Communication, Types of Communication: Meaning, nature and scope.

UNIT-II

Oral communication: Principle of effective oral communication Techniques of effective speech, Media of oral communication (Face, to, face conversation, Teleconferences, Press Conference, Demonstration, Radio Recording, Dictaphone, Meetings, Rumour, Demonstration and Dramatisation, Public address system, Grapevine, Group Discussion, Oral report, Closed circuit TV). The art of listening, Principles of good listening. **Written Communication** Purpose of writing, Clarity in Writing, Principle of Effective writing, Writing Techniques, Electronic Writing Process. **Business Letters & Reports**: Need and functions of business letters, Planning & layout of business letter, Kinds of business letters, Essentials of effective correspondence, Purpose, Kind and Objective of Reports, Writing Reports.

UNIT-III

Drafting of business letters: Enquiries and replies, Placing and fulfilling orders, Complaints and follow, up Sales letters, Circular letters Application for employment and resume. **Information Technology for Communication:** Word Processor, Telex, Facsimile(Fax), E-mail, Voice mail, Internet Multimedia, Teleconferencing, Mobile Phone Conversation, Video Conferencing, SMS, Telephone Answering Machine, Advantages and limitations of these types. **Self Analysis:** SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem. Creativity: Out of box thinking, Lateral Thinking.

UNIT-IV

Attitude: Factors influencing Attitude, Challenges and lessons from Attitude, Etiquette. Motivation: Factors of motivation, Self talk, Intrinsic & Extrinsic Motivators. Goal Setting: Wish List, SMART Goals, Blue print for success, Short Term, Long Term, Life Time Goals. **Interpersonal Skills:** Gratitude: Understanding the relationship between Leadership Networking & Team work. Assessing Interpersonal Skills Situation description of Interpersonal Skill. Team Work: Necessity of Team Work Personally, Socially and Educationally.

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UNIT-V

Leadership: Skills for a good Leader, Assessment of Leadership Skills, Stress Management: Causes of Stress and its impact, how to manage & distress, Circle of control, Stress Busters. Emotional Intelligence: What is Emotional Intelligence, emotional quotient why Emotional Intelligence matters, Emotion Scales, Managing Emotions. **Conflict Resolution:** Conflicts in Human Relations – Reasons Case Studies, Approaches to conflict resolution. Decision Making: Importance and necessity of Decision Making, Process and practical way of Decision Making, Weighing Positives & Negatives.

Suggested Books:

1. Business Communication, "K .K. Sinha, Galgotia Publishing Company, New Delhi".
2. Media and Communication Management, "C.S. Rayudu, Hikalaya Publishing House, Bombay".
3. Essentials of Business Communication, "Rajendra Pal and J.S. Korlhalli, Sultan Chand & Sons, New Delhi".

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DETAILED SYLLABUS

FIRST SEMESTER

PAPER CODE: C-104

Introduction to HTML, CSS- XML

UNIT-I

Basics of Internet and Web The basics of Internet, World Wide Web, Web page, Home page, Web site, Static, Dynamic and Active web page, Overview of Protocols, Simple Mail Transfer Protocol, Gopher, Telnet, Emails, TFTP, Simple Network Management Protocol, Hyper Text Transfer Protocol, Client server computing concepts. Web Client and Web Sever Web Browser, Browsers e.g., Netscape navigator, Internet Explorer, Mozilla Firefox, Client, Side Scripting Languages, VB Script and Java Script, Active X control and Plug-ins, Web Server Architecture, Image maps, CGI, API web database connectivity, DBC, ODBC

UNIT-II

Dynamic HTML, Document Object Model, Features of DHTML, CSSP (Cascading Style Sheet Positioning) and JSSS (JavaScript assisted Style Sheet), Layers of Netscape, The ID Attribute, DHTML Events

UNIT-III

Introduction to HTML: Editors, Basics, Element, Attribute, Headings, Paragraphs, Styles, Formatting, Quotations, Comments, CSS, Links, Images, Tables, Lists, Blocks, Classes, ID, frames, File Paths, Head, Layout, Computer Code, Entities, Symbols, Char set, Color and Background of Web Pages, Hypertext, Hyperlink and Hypermedia, Links, Anchors and URLs, Links to External Documents, Different Section of a Page and Graphics, Footnote and E-Mailing, Creating Table, Frame, Form and Style Sheet.

UNIT-IV

CSS: Introduction, Syntax, Colors, Backgrounds, Borders, Margins, Padding, Height/ Width, Box Model, Outline, Text, Fonts, Icons, Links, Lists, Tables, Display, Max, Width, Position, Overflow, Float, Inline, Block, Align, Combinators, Pseudo, Class, Pseudo Elements, Opacity, Navigation Bar, Dropdowns, Image Gallery, Image Sprites, Attr Selectors, Forms, Counters, Website Layout, Units, Specificity.

UNIT-V

XML: Introduction, Tree, Syntax, Elements, Attributes, Namespaces, Display, HTTP request, Parser, DOM, XPath, XSLT, XQuerry, XLink, Validator, DTD, Schema, Server

Suggested Books:

1. Shelley Powers, "Dynamic Web Publishing" 2
2. Html & CSS: The Complete Reference 5th Edition (English, Paperback, Thomas A. Powell)
3. XML: The Complete Reference Book by Heather Williamson

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DETAILED SYLLABUS

FIRST SEMESTER

PAPER CODE: C-105

Mathematics -I

UNIT-I

Determinants: Definition, Minors, Cofactors, Properties of Determinants MATRICES: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, Cramers Rule, Rank of Matrix Dependence of Vectors, Eigen Vectors of a Matrix, Caley, Hamilton Theorem (without proof).

UNIT-II

Limits & Continuity: Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity at a Point, Continuity Over an Interval, Intermediate Value Theorem, Type of Discontinuities

UNIT-III

Differentiation: Derivative, Derivatives of Sum, Differences, Product & Quotients, Chain Rule, Derivatives of Composite Functions, Logarithmic Differentiation, Rolle's Theorem, Mean Value Theorem, Expansion of Functions (Maclaurin's & Taylor's),Indeterminate Forms, L-Hospitals Rule, Maxima & Minima, Curve Tracing, Successive Differentiation & Liebnitz Theorem.

UNIT-IV

Integration: Integral as Limit of Sum, Fundamental Theorem of Calculus(without proof.), Indefinite Integrals, Methods of Integration Substitution, By Parts, Partial Fractions, Reduction Formulae for Trigonometric Functions, Gamma and Beta Functions(definition).

UNIT-V

Vector Algebra: Definition of a vector in 2 and 3 Dimensions, Double and Triple Scalar and Vector Product and physical interpretation of area and volume.

Suggested Books:

1. B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.
2. Shanti Narayan, "Integral Calculus", S. Chand & Company, 1999
3. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Company, 9th Revised Edition, 2001.

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DETAILED SYLLABUS

SECOND SEMESTER

PAPER CODE: C-201

Object Oriented Programming Using C++

UNIT-I

Introduction: Introducing Object Oriented Approach, Procedural Programming Language Vs Object Oriented Language. Basic concept of OOPs, operators, tokens, variables, Keywords, Data types, identifiers, characters, typedef statement, constants, Enumerated data type.

UNIT-II

Control Flow: If statement, If Else statement, Nested If, Else, Statements, For Loop, While Loop, Do, While Loop, Break, Switch, Continue, goto. Classes and Objects, Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, Constructors and destructors, Default parameter value, object types, C++ garbage collection, dynamic memory allocation, Metaclass / abstract classes.

UNIT-III

Array: Array Illustration, Multi, Dimensional arrays, Strings, Array of Strings, Function prototype, function return data type, parameter passing, Default argument, Inline function, Function Overloading, Array Function, Operator Overloading,

UNIT-IV

Pointers: Pointer to Derived Class, array of Pointers, Inheritance and Polymorphism: Inheritance, Class hierarchy, derivation, public, private & protected, abstract Classes, Single, Multilevel, Multiple, Hierarchical, Hybrid, benefits of Inheritance.

UNIT-V

Files and Exception Handling: Streams and files, Namespaces, Exception handling.

Suggested Books:

1. A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997.
2. S.B.Lippman&J.Lajoie," C++ Primer",3rd Edition, Addison Wesley, 2000.The C programming Lang.,Person Ecl,Dennis Ritchie
3. R.Lafore,"Object Oriented Programming using C++",Galgotia Publications,2004
4. D.Parasons,"Object Oriented Programming using C++",BPB Publication

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DETAILED SYLLABUS

SECOND SEMESTER

PAPER CODE: C-202

Digital Electronics

UNIT-I

Number System & Boolean Algebra: Number System: Binary, Octal, Decimal, Hexadecimal, Conversion of Number System, Binary Arithmetic &Complement, Binary Codes: Weighted & Non Weighted, Gray Code, Excess-3 Code. Error Detection Codes, Hamming Code, Boolean Function, Boolean Postulates, De-Morgan's Theorem, Boolean Expressions: Sum of Product, Product of Sum, Minimization of Boolean Expressions using K-Map, Logic Gates: AND, OR, NOT,NAND, NOR, XOR, XNOR, Implementations of Logic Functions using Gates, NAND, NOR Implementations, Multilevel gate Implementations.

UNIT-II

Combinational Circuits: Adders & Subtractors: Half Adder, Full Adder, Binary Adder, Half Subtractor, Full Subtractor, Magnitude Comparator: Two Bit Magnitude Comparator, Three Bit Magnitude Comparator, Multiplexer & De-Multiplexer: 4*1 Multiplexer, 8*1Multiplexer, Decoder & Encoder, Parity Checker &Generator, Code Converter.

UNIT-III

Sequential Circuit: Introduction to Flip Flops: SR, JK, T, D, Master Slave Flip Flops, Conversion of Flip Flops, Characteristic Table & Equation, Edge Triggering & Level Triggering, Excitation Table, State Diagram, State Table, State Reduction, Design of Sequential Circuits.

UNIT-IV:

Registers: Introduction of Registers, Classification of Registers, Register with Parallel Load, Shift Registers, Bidirectional Shift Register with Parallel Load.

UNIT-V:

Counters: Introduction of Counter, Asynchronous/Ripple Counters, Synchronous Counters, BCD Counter, 4-bit Binary Counter with Parallel Load, Design of Synchronous Counters, Ring Counter, Johnson Counter

Suggested Books:

1. Digital Logic and Computer design (PHI) 1998 : M.M. Mano
2. Computer Architecture (PHI) 1998 : M.M. Mano
3. Digital Electronics (TMH) 1998 : Malvino and Lea

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SECOND SEMESTER

PAPER CODE: C-203

Data Structure Using 'C'/'C++'

UNIT-I

Classification of Data Structure, Operations on Data Structure, Address Calculation, Application of arrays, Limitation of Array, Application of Arrays, Array as Parameters, Sparse Matrices

UNIT-II

Continuous Implementation (Stack): Array Representation, Operations on Stacks: Push & Pop, Applications of stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack Recursion: Recursive Definition and Processes, Principles of Recursion, Tower of Hanoi Problem, Recursion Vs. Iteration Continuous. Implementation (Queue): Array representation and implementation of Queues, Operations on Queue: Create, Add, Delete, Full and Empty Queue, Circular Queue, Dequeue and Priority Queue

UNIT-III

Non Continuous Implementation: Link Lists: Linear List concept, Linked List Terminology, Representation of Linked List in Memory, Types of Linked List, Single Linked List, Doubly Linked List, Single Circular Linked list, Circular Doubly Linked List, Operations on Link List: Create List Insert node (empty list, beginning, middle, end), Delete node (first, general case), Traversing node, Searching node, Print list, Count Nodes, Sort Lists

UNIT-IV:

Trees: Introduction to Tree & its Terminology, Binary trees, Types of Binary trees, Representation of Binary Tree, Traversals (Inorder, Preorder, Postorder),Tree Expression, Binary Search Tree, Insertion and Deletion in BST.

UNIT-V:

Sorting & Searching Techniques: Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Sequential Search, Binary Search

Suggested Readings:

1. S. Lipschutz,"Data structures",Mc,Graw,Hill International Editions,1986.
2. A. Michael Berman,"Data Structures via C++",Oxford University Press,2002.
3. M. Weiss,"Data Structures and Algorithm Analysis in C++",Pearson Education

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DETAILED SYLLABUS

SECOND SEMESTER

PAPER CODE: C-204

Principles of Management

UNIT-I

Nature of Management: Meaning, Definition, it's nature purpose, importance & Functions, Management as Art, Science & Profession- Management as social System Concepts of management, Administration, Organization, Evolution of Management.

UNIT-II

Functions of Management: Planning - Meaning - Need & Importance, type's levels, advantages & limitations. Forecasting - Need & Techniques Decision making – Types, Process of rational decision making & techniques of decision making Organizing.

UNIT-III

Elements of organizing & processes: Types of organizations, Delegation of authority - Need, difficulties in delegation - Decentralization Staffing - Meaning & Importance Direction, Nature, Principles Communication, Types & Importance Motivation, Importance, theories, Leadership - Meaning - styles, qualities & functions of leaders

UNIT-IV

Functions of Management: Controlling - Need, Nature, importance, Process & Techniques Coordination - Need – Importance, Strategic Management Definition, Classes of Decisions, Levels of Decision, Strategy, Role of different Strategist, Relevance of Strategic Management and its Benefits Strategic Management in India.

UNIT-V

Recent Trends in Management: Social Responsibility of Management – environment friendly management, Management of Change Management of Crisis Total Quality Management Stress Management International Management

Suggested Books:

1. Essential of Management - Horold Koontz and Iteinz Weibrich – McGraw hills International
2. Management Theory & Practice - J.N.Chandan
3. Essential of Business Administration - K. Aswathapa Himalaya Publishing House

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DETAILED SYLLABUS

SECOND SEMESTER

PAPER CODE: C-205

Numerical Methods

UNIT-I

Roots of Equations: Bisections Method, False Position Method, Newton's Raphson Method, Rate of convergence of Newton's method.

UNIT-II

Interpolation and Extrapolation : Finite Differences, The operator E-Newton's Forward and Backward Differences, Newton's dividend differences formula, Lagrange's Interpolation formula for unequal Intervals, Gauss's Interpolation formula, Starling formula, Bessel's formula, Laplace, Everett formula.

UNIT-III

Numerical Differentiation Numerical Integration : Introduction, direct methods, maxima and minima of a tabulated function, General Quadratic formula, Trapezoidal rule, Simpson's One third rule, Simpson's three, eight rule.

UNIT-IV

Solution of Linear Equation: Gauss's Elimination method and Gauss's Siedel iterative method.

UNIT-V

Solution of Differential Equations: Euler's method, Picard's method, Fourth-order Ranga Kutta method.

Suggested Books:

1. Scarbourogh, "Numerical Analysis".
2. Gupta & Bose S.C. "Introduction to Numerical Analysis, "Academic Press, Kolkata, 3.
   S.S.Shashtri, "Numerical Analysis", PHI

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