COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY END SEM University Exam	THEORY Two Term Exam	PRACTICAL Teachers Assessment*	PRACTICAL END SEM University Exam	PRACTICAL Teachers Assessment*
							TEACHING & EVALUATION SCHEME				
BTMACS201		MATHEMATICS-II	3	1	-	4	60	20	20	-	-

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES

The student will have ability to:

1. To introduce the students with the Fundamentals of the Calculus of Matrices, Differential Equations, Numerical Analysis and Statistics.

COURSE OUTCOMES

After the successful completion of this course students will be able to:

1. Understand and apply the basics of the calculus of matrices.
2. Solve the fundamental problems of the ordinary differential equations.
3. Apply the advanced techniques to find the solution of the ordinary differential equations.
4. Know the techniques of the numerical analysis.
5. Find the numerical solution of the ODE.
6. Understand and apply the basics of the statistical methods.

SYLLABUS

UNIT–I

Calculus of Matrices

Systems of linear equations and their solutions. Matrices, determinants, rank and inverse. Linear transformations. Range space and rank, null space and nullity. Eigenvalues and eigenvectors. Similarity transformations. Diagonalization of Hermitian matrices.

UNIT–II

Differential Equation

Ordinary Differential Equations: First order linear and nonlinear ordinary differential equations, exactness and integrating factors. Ordinary linear differential equations of n-th order, solutions of homogeneous and non-homogeneous equations. Operator method. Method of undetermined coefficients and variation of parameters.

UNIT–III

Numerical Analysis

Interpolation and Curve Fitting: Introduction to Interpolation; Calculus of Finite Differences; Finite Difference and Divided Difference Tables; Newton-Gregory Polynomial Form; Lagrange Polynomial Interpolation; Approximation by Least Square Method.

Numerical Differentiation and Integration: Discrete Approximation of Derivatives: Forward and Backward Difference Forms, Numerical Integration, Simple Newton-Cotes Rules: Trapezoidal and Simpson's (1/3) Rules; Weddle's Rule.

UNIT–IV

Numerical Solution of ODE: Euler's Method for Numerical Solution of ODE; Modified Euler's Method; Runge-Kutta Method (RK2, RK4); Multistep Method: Predictor-Corrector method.

UNIT–V

Probability Theory and Random Process
Axiomatic construction of the theory of probability, independence, conditional probability, and basic formulae, random variables, binomial, Poisson and normal random variable, probability distributions, functions of random variables; mathematical expectations, Definition and classification of random processes, discrete-time Markov chains.

TEXT BOOKS:

1. G. Strang, Linear Algebra And Its Applications, 4th Edition, Brooks/Cole, 2006
2. S. L. Ross, Differential Equations, 3rd Edition, Wiley, 1984.
3. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall, 1995.
4. W.E. Boyce and R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 7th Edition, Wiley, 2001.
5. E, K. E. Atkinson, Numerical Analysis, John Wiley, Low Price Edition (2004).
6. S. D. Conte and C. de Boor, Elementary Numerical Analysis - An Algorithmic Approach, McGraw-Hill, 2005.
7. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi

REFERENCE BOOKS:

1. E. Kreyszig, Advanced Engineering Mathematics, 9th Edition, Wiley, 2005.
2. R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 5th Ed, Wiley,1999.
3. J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.
4. J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in

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Applied Mathematics, Vol. 12, Springer Verlag, 2002.

5. J. D. Hoffman, Numerical Methods for Engineers and Scientists, McGraw Hill, 2001.
6. M.K Jain, S.R.K Iyengar and R.K Jain, Numerical methods for scientific and engineering computation (Fourth Edition), New Age International (P) Limited, New Delhi,2004.
7. S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw Hill2008.

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTPH101		APPLIED PHYSICS	3	1	2	5	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
The student will have ability to:
1. To develop the comprehensive understanding of laws of physics.
2. To develop ability to apply laws of physics for various engineering applications.
3. To develop the experimental skills, ability to analyze the data obtained experimentally to reach substantiated conclusions.

Course Outcomes:
1. Student will be able to comprehend laws of physics.
2. Student will be able to apply laws of physics for various engineering applications.
3. Student will be able to determine physical parameter experimentally and will be able to analyze the data obtained experimentally to draw substantiate conclusions.

Syllabus:

UNIT I
Quantum Physics: Introduction to Quantum hypothesis, Matter wave concept, Wave Group and Particle velocity and their relations, Uncertainty principle with elementary proof and applications to microscope and single slit, Compton Effect, Wave function and its physical significance. Development of time dependent and time independent Schrodinger wave equation, Applications of time independent Schrodinger wave equation.

UNIT II
Solid State Physics: Free electron model, Qualitative Analysis of Kronig Penney Model, Effective mass, Fermi level for Intrinsic and Extrinsic semiconductors, P-N junction diode, Zener diode, Tunnel diode, Photodiode, Solar- cells, Hall Effect, Introduction to Superconductivity, Meissner effect, Type I & II Superconductors.

UNIT III
Nuclear Physics: Nuclear Structure & Properties Nuclear models: Liquid drop with semi-empirical mass formula & shell model. Particle accelerators: Cyclotron, Synchrotron, Betatron. Counters and Detectors: Giger-Muller counters, Bainbridge Mass Spectrograph and Auston Mass Spectrograph.

UNIT IV
Laser & Fiber Optics: Stimulated and Spontaneous Emission, Einstein's A&B Coefficients, Population Inversion, Pumping, Techniques of Pumping, Optical Resonator, Properties and

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Applications of Laser, Ruby, Nd:YAG, He-Ne lasers.

Introduction to Optical fibre, Acceptance angle and cone, Numerical Aperture, V- Number, Ray theory of propagation through optical fibre, Pulse dispersion , applications of optical fibre.

UNIT V
Wave Optics: Introduction to Interference, Fresnel's Bi-prism, Interference in Thin films, Newton's rings experiment, Michelson's interferometer and its application, Introduction to Diffraction and its Types, Diffraction at single slit, double slit, resolving power, Rayleigh criterion, Resolving power of grating, Concept of polarized light, Double refraction, quarter and half wave plate, circularly & elliptically polarized light.

Text Books and Reference Books:
1. Engineering Physics by Dr. S. L. Gupta and Sanjeev Gupta, Dhanpat Rai Publication, New Delhi.
2. Engineering Physics by Navneet Gupta, Dhanpat Rai Publication, New Delhi.
3. Engineering Physics by H. J. Sawant, Technical Publications, Pune, Maharastra.
4. Engg Physics by M.N. Avdhanulu & P.G. Kshirsagar, S.Chand & Co.Edition (2010).
5. Fundamentals of Physics by Halliday, Wiley, India.
6. Concepts of Modern Physics by Beiser, TMH, New Delhi.
7. Solid State Physics by Kittel,Wiley India.
8. Atomic and Nuclear physics by Brijlal and Subraminiyan.
9. LASERSs and Electro Optics by Christopher C. Davis, Cambridge Univ. Press (1996).
10. Optroelectronics an Introduction by J. Wilson & J.F.B.Hawkes, "" Prentice-Hall II Edition.
11. LASER theory and applications by A. K. Ghatak & Tyagarajan, TMH (1984).
12. Optics by Ghatak, TMH.

List of Practical's:
1. Measurement of radius of curvature "R" of convex lens by Newton's ring experiment.
2. Measurement of Numerical aperture of fiber by LASER.
3. Determination of Energy band gap 'Eg' of Ge using Four Probe method.
4. Measurement of Frequency of A.C. mains by electrically maintained vibrating rod.
5. Measurement of Resolving Power of Telescope.
6. Measurement of "λ" of LASER light source using Diffraction Grating.
7. Determination of Planck's constant by using photocell.
8. Determination of Energy band gap (Eg) using PN Junction Diode.
9. To determine the mass of cane sugar dissolved in water using half shade polarimeter.
10. To study forward and reverse characteristics of Zener diode.
11. To study forward and reverse characteristics of P-N diode.
12. To study characteristics of Photo diode.
13. To study characteristics of LDR.
14. μ and ω of given prism using spectrometer.
15. Measuring height of a given object using Sextant.

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCS403		DATA STRUCTURE AND ALGORITHMS	3	1	2	5	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
The student will have ability to:
1. To teach efficient storage mechanisms of data for an easy access.
2. To design and implementation of various basic and advanced data structures.
3. To introduce various techniques for representation of the data in the real world.
4. To develop application using data structures.
5. To teach the concept of protection and management of data.

Course Outcomes:
Upon completion of the subject, students will be able to:
1. Get a good understanding of applications of Data Structures.
2. Develop application using data structures.
3. Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
4. Decide the appropriate data type and data structure for a given problem.
5. Select the best algorithm to solve a problem by considering various problem characteristics, such as the data size, the type of operations, etc.

Syllabus:

UNIT I
Introduction, Overview of Data structures, Types of data structures, Primitive and Non Primitive data structures and Operations, Algorithms. Characteristic of Array, One Dimensional Array, Operation with Array, Two Dimensional Arrays, Three or Multi-Dimensional Arrays. Strings, Array of Structures, Drawbacks of linear arrays, Pointer and Arrays, Pointers and Two Dimensional Arrays, Array of Pointers, Pointers and Strings.

UNIT II
The Stack as an ADT, Stack operation, Array Representation of Stack, Link Representation of Stack, Application of stack – Recursion, Polish Notation .
The Queue as an ADT, Queue operation, Array Representation of Queue, Linked Representation of Queue, Circular Queue, Priority Queue, & Dequeue, Application of Queues.

UNIT III
Linked List as an ADT, Linked List Vs. Arrays, Memory Allocation & De-allocation for a Linked List, Linked List operations, Types of Linked List, Implementation of Linked List, Application of Linked List polynomial.

UNIT IV
Definitions and Concepts, Binary trees, operations on binary trees, Binary tree and tree traversal algorithms, operations on binary trees, List, representation of Tree. Graph Representation, Graph traversal (DFS & BFS).

UNIT V
Sort Concept, Shell Sort, Radix sort, Insertion Sort, Quick Sort, Merge Sort,Heap Sort, List Search, Linear Index Search, Index Sequential Search Hashed List Search, Hashing Methods , Collision Resolution.

Text Books:
1. Ashok N. Kamthane, "Introduction to Data structures", Pearson Education India.
2. Tremblay &Sorenson, "Introduction to Data- Structure with applications", Tata Mc-Graw Hill.
3. Bhagat Singh & Thomas Naps, "Introduction to Data structure", Tata Mc- Graw Hill.
4. Robert Kruse, "Data Structures and Program Design", PHI.
5. Aaron M. Tenenbaum& Moshe J. Augenstein, "Data Structure using PASCAL", PHI.

Reference Books:
1. Data Structures Using C & C++, Rajesh K. Shukla, Wiley- India.
2. Data Structures Using C, ISRD Group, Second Edition, Tata McGraw-Hill.
3. Data Structure Using C, Balagurusamy.
4. C & Data Structures, Prof. P.S. Deshpande, Prof. O.G. Kakde, Dreamtech press.
5. Data Structures, Adapted by: GAV PAI, Schaum's Outlines.

List of Practical's:
1. To develop a program to find an average of an array using AVG function.
2. To implement a program that can insert, delete and edit an element in array.
3. To develop an algorithm that implements push and pop stack operations and implement the same using array.
4. To perform an algorithm that can insert and delete elements in queue and implement the same using array.
5. To implement an algorithm for insert and delete operations of circular queue and implement the same using array.
6. To develop an algorithm for binary tree operations and implement the same.
7. To design an algorithm for sequential search, implement and test it.
8. To develop an algorithm for binary search and perform the same.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCS404		COMPUTER SYSTEM ORGANIZATION	3	1	-	4	60	20	20	-	-

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
The student will have ability to:
1. Understand the architecture of a modern computer with its various processing units.
2. To impart knowledge on processor speed and processing of programs.
3. The performance measurement of the computer system.
4. To introduce hardware utilization methodology.
5. To impart knowledge in inter process communication.

Course Outcomes:
Upon completion of the subject, students will be able to:
1. Students can understand the architecture of modern computer.
2. They can analyze the Performance of a computer using performance equation.
3. Understanding of different instruction types.
4. They can understand how computer stores positive and negative numbers.

Syllabus:

UNIT I
Computer Basics and CPU: Von Newman model, various subsystems, CPU, Memory, I/O, System Bus, CPU and Memory registers, Program Counter, Accumulator, Instruction register, Micro operations, Register Transfer Language, Instruction Fetch, decode and execution, data movement and manipulation, Instruction formats and addressing modes of basic computer. 8085 microprocessor organization.

UNIT II
Control Unit Organization: Hardwired control unit, Micro and nano programmed control unit, Control Memory, Address Sequencing, Micro Instruction formats, Micro program sequencer, Microprogramming, Arithmetic and Logic Unit: Arithmetic Processor, Addition, subtraction, multiplication and division, Floating point and decimal arithmetic and arithmetic units, design of arithmetic unit.

UNIT III
Input Output Organization: Modes of data transfer – program controlled, interrupt driven and direct memory access, Interrupt structures, I/O Interface, Asynchronous data transfer, I/O processor, 8085 I/O structure, 8085 instruction set and basic programming. Data transfer – Serial / parallel, synchronous/asynchronous, simplex/half duplex and full duplex.

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UNIT IV
Memory organization: Memory Maps, Memory Hierarchy, Cache Memory - Organization and mappings. Associative memory, Virtual memory, Memory Management Hardware.

UNIT V
Multiprocessors: Pipeline and Vector processing, Instruction and arithmetic pipelines, Vector and array processors, Interconnection structure and inter-processor communication.

Text Books:
1. William Stallings: Computer Organization and Architecture, PHI
2. Morris Mano: Computer System Architecture, PHI.

Reference Books:
1. Morris Mano: Computer System Architecture, PHI.
2. Tanenbaum: Structured Computer Organization, Pearson Education
3. J P Hayes, Computer Architecture and Organisations, Mc- Graw Hills, New Delhi
4. Gaonkar: Microprocessor Architecture, Programming, Applications with 8085; Penram Int.
5. ISRD group; Computer Organization; TMH
6. Carter; Computer Architecture (Schaum); TMH
7. Carl Hamacher: Computer Organization, TMH

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCS305		OBJECT ORIENTED PROGRAMMING	3	-	-	3	60	20	20	-	-

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
The student will have ability to:
1. To explain abstract data types, classes and different types of objects.
2. To distinguish among types of relationships between classes and express the associations diagrammatically.
3. To analyze the public, protected and private modes of inheriting the classes.
4. To demonstrate the overloading of functions and operators to grant them a different meaning.
5. To formulate programs using the concepts of object oriented programming languages.

Course Outcomes:
Upon completion of the subject, students will be able to:
1. Identify and describe the components of object-oriented technology and justify their relevance.
2. Classify and model the relationships/associations that exist between classes and objects.
3. Perform experiments on inheritance by implementing code reusability and polymorphism by overloading the functions as well as operators.
4. Develop programs for real world scenarios using the object oriented approach.

Syllabus:

UNIT I
Abstract data types, Objects and classes, Attributes and Methods, Objects as software units, Encapsulation and Information hiding, Objects instantiations and interactions, Object lifetime, Static and dynamic objects, global and local objects, Meta class, Modelling the real world objects.

UNIT II
Relationships between classes, Association of objects, Types of Association, Recursive Association, Multiplicities, Navigability, Named association, Aggregation of objects. Types of Aggregation, Delegation, Modelling Association and Aggregation.

UNIT III
Inheritance shnd Polymorphism, Types of polymorphism, Static and dynamic polymorphism, Operator and Method overloading, Inherited methods, Redefined methods, the protected interface, Abstract methods and classes, Public and protected properties, Private operations, Disinheritance, Multiple inheritance.

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UNIT IV
Container Classes, Container types, typical functions and iterator methods, Heterogeneous containers, Persistent objects, stream, and files, Object oriented programming languages.

UNIT V
Study of C++/Java as Object-oriented programming language.

Text Books:
1. Balagurusamy; Object oriented programming with C++; TMH.

Reference Books:
1. David Parsons; Object oriented programming with C++; BPB publication.
2. Object oriented programming in C++ by Robert Lafore: Galgotia.
3. Java Complete Reference: Herbert Schildt, Mc Graw Hill.
4. Hubbard; Programming in C++ (Schaum); TMH.
5. Mastering C++ by Venugopal, TMH

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCS208		PROGRAMMING SKILLS WITH 'C++'	-	-	2	1	-	-	-	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
The student will have ability to:
1. To explain abstract data types, classes and different types of objects.
2. To distinguish among types of relationships between classes and express the associations diagrammatically.
3. To analyze the public, protected and private modes of inheriting the classes.
4. To demonstrate the overloading of functions and operators to grant them a different meaning.
5. To formulate programs using the concepts of object oriented programming languages.

Course Outcomes:
Upon completion of the subject, students will be able to:
1. Identify and describe the components of object-oriented technology and justify their relevance.
2. Classify and model the relationships/associations that exist between classes and objects.
3. Perform experiments on inheritance by implementing code reusability and polymorphism by overloading the functions as well as operators.
4. Develop programs for real world scenarios using the object oriented approach.

Text Books:
1. Balagurusamy; Object oriented programming with C++; TMH.

Reference Books:
1. David Parsons; Object oriented programming with C++; BPB publication.
2. Object oriented programming in C++ by Robert Lafore: Galgotia.
3. Java Complete Reference: Herbert Schildt, Mc Graw Hill.
4. Hubbard; Programming in C++ (Schaum); TMH.
5. Mastering C++ by Venugopal, TMH

List of Practical's:
1. Program to demonstrate default arguments.
2. Program to demonstrate call by value.
3. Program to demonstrate call by reference.
4. Program to demonstrate call by address.
5. Program to demonstrate classes and objects.
6. Program to demonstrate static member function.
7. Program to demonstrate constant member function.

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8. Program to demonstrate object as argument
9. Program to demonstrate function returning an object.
10. Program to add two distances in feet and inch using friend function.
11. Program to demonstrate a function friend of two classes.
12. Program to demonstrate friend class.
13. Program to demonstrate different constructors and destructor.
14. Program to demonstrate constructor with default argument.
15. Program to demonstrate function overloading.
16. Program to demonstrate function overriding.
17. Program to demonstrate unary operator overloading.
18. Program to demonstrate binary operator overloading.
19. Program to demonstrate multiplication of postive numbers using single inheritance.
20. Program to demonstrate employee details using multiple inheritance.
21. Program to demonstrate calculation of area of shapes using virtual function.
22. Program to demonstrate student mark list using virtual base class.
23. Program to demonstrate function template.
24. Program to demonstrate class template.
25. Program to demonstrate sequential file access.
26. Program to demonstrate random file access.

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HUCS101		COMMUNICATION SKILLS	1	-	2	2	60	20	20	-	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
The students will be able to:
1. Develop the second language learners' ability to enhance and demonstrate LSRW Skills.
2. Enable students to acquire English Language Skills to further their studies at advanced levels.
3. prepare students to become more confident and active participants in all aspects of their undergraduate programs

Course Outcomes:
The students should be able to:
1. Enhance confidence in their ability to read, comprehend, organize, and retain written information.
2. Write grammatically correct sentences for various forms of written communication to express oneself.

Syllabus:

UNIT I
Communication: Nature, Meaning, Definition, Verbal and Non Verbal Communication Barriers to Communication.

UNIT II
Basic Language Skills: Grammar and usage- Parts of Speech, Tenses, S-V Agreement, Preposition, Article.

UNIT III
Basic Language Skills: Types of Sentence, Direct - Indirect, Active - Passive voice, Phrases & Clauses.

UNIT IV
Business Correspondence: Business Letter, Parts & Layouts of Business Resume and Job application, E-mail writing.

UNIT V
Report Writing: Importance of Report, Types of Report, Structure of a Report.

Reference Books:
1. Ashraf Rizvi.(2005). Effective Technical Communication. New Delhi:Tata Mc Graw Hill
2. Adair, John (2003). Effective Communication. London: Pan Macmillan Ltd.
3. A.J. Thomson and A.V. Martinet(1991).A Practical English Grammar(4th ed). Newyork: Ox- ford IBH Pub.
4. Kratz, Abby Robinson (1995). Effective Listening Skills. Toronto: ON: Irwin Professional Publishing.
5. Prasad, H. M.(2001) How to Prepare for Group Discussion and Interview. New Delhi: Tata McGraw-Hill.
6. Pease, Allan. (1998).Body Language. Delhi: Sudha Publications.

List of Practical's:
1. Self-Introduction
2. Reading Skills and Listening Skills
3. Oral Presentation
4. Linguistics and Phonetics
5. JAM (Just a Minute)
6. Group Discussion

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