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SEMESTER-II

COURSE CODE	Category	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMA 201		Applied Mathematics-II	60	20	20	-	-	3	1	-	4

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 Objective:
To introduce the students with the Fundamentals of the Calculus of Matrices, Differential Equations and Numerical Analysis

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 and PDE.

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, Bilinear and quadratic forms.

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
Differential Equation: Power series methods for solutions of ordinary differential equations. Legendre equation and Legendre polynomials, Bessel equation and Bessel functions of first and second kind.

UNIT IV

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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; Theoretical Errors in Interpolation; Spline Interpolation; Approximation by Least Square Method. Numerical Differentiation and Integration: Discrete Approximation of Derivatives: Forward, Backward and Central Finite Difference Forms, Numerical Integration, Simple Newton-Cotes Rules: Trapezoidal and Simpson's (1/3) Rules; Weddle's Rule, Gaussian Quadrature Rules: Gauss-Legendre, Gauss-Laguerre, Gauss-Hermite, Gauss-Chebychev.

UNIT V

Numerical Solution of ODE & PDE: Euler's Method for Numerical Solution of ODE; Modified Euler's Method; Runge-Kutta Method (RK2, RK4), Error estimate; Multistep Methods: Predictor-Corrector method, Adams-Moulton Method; Boundary Value Problems and Shooting Method; finite difference methods, numerical solutions of elliptic, parabolic, and hyperbolic partial differential equations.

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. 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

References:

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 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-Hill 2008.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCH 101		Applied Chemistry	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
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Course Objectives:
1. To give basic knowledge of polymer science.
2. To understand and apply the knowledge of electrochemistry and its laws.
3. To give basic knowledge of corrosion and control over it.
4. To understand the various sophisticated instrumental techniques.
5. To give basic knowledge of water, lubricants and different properties of water.

Course Outcomes:
After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes. The student will demonstrate capability of
1. Theoretical understanding of various high polymers and their properties.
2. Became aware of the importance of electrochemistry and its laws in the field of technology and dealing with its numerical approach.
3. Understanding metal corrosion and control over it.
4. Implementing instrumental techniques as powerful tool for qualitative and quantitative analysis of compounds.
5. Analyzing boiler feed water for industrial use and drinking water for domestic use.

UNIT I
Polymers And Reinforced Plastics: Classification of polymers - types of polymerization reactions - mechanism of addition polymerization: free radical, ionic and Ziegler - Natta - effect of structure on the properties of polymers - strength, plastic deformation, elasticity and crystallinity -Preparation and properties of important resins: Polyethylene, PVC, PMMA, Polyester, Teflon, Bakelite and Epoxy resins - compounding of plastics - moulding methods - injection, extrusion, compression

UNIT II
Electrochemistry: Arrhenius theory of electrolytic dissociation, Transport number, Kohlrausch's law, Solubility product, Redox reaction, Electrochemical and concentration cells.
Corrosion and its control: Corrosion: Basic concepts - mechanism of chemical, electrochemical corrosion - Pilling Bedworth rule – Types of Electrochemical corrosion - galvanic corrosion -

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differential aeration corrosion - pitting corrosion - stress corrosion – Measurement of corrosion (wt. loss method only) - factors influencing corrosion. Corrosion control: Cathodic protection - sacrificial anodic method – corrosion inhibitors. Protective coatings: surface preparation for metallic coatings - electro plating (copper plating) and electroless plating (Nickel plating) - chemical conversion coatings - anodizing, phosphating& chromate coating

UNIT III

Basic Instrumental Techniques: Basic principles, instrumentation and applications of potentiometry, UV - visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy and flame photometry Engineering Materials: Cement, Refractories etc.

UNIT IV

Water Treatment: Water quality parameters: Physical, Chemical & Biological significance - Hardness of water - estimation of hardness (EDTA method) - Dissolved oxygen – determination (Winkler's method), Alkalinity - determination - disadvantages of using hard water in boilers: Scale, sludge formation - disadvantages - prevention - treatment: Internal conditioning - phosphate, carbon and carbonate conditioning methods - External: Zeolite, ion exchange,Lime Soda methods &Numericals- desalination - reverse osmosis and electrodialysis - domestic water treatment.

Surface Tension: Introduction; Origin of Surface Tension; Surface energy; Laplace & Young-Laplace Equation, Capillarity; Contact Angle; Measurement of Surface Tension by Capillary rise method; Variation of Surface Tension of a liquid with Temperature and Concentration.

Lubricants: Mechanism of lubrication, Classification of lubricants, Properties & testing of lubricating oil. Definition of viscosity of a liquid; Determination of Viscosity; Shear Viscosity; Intrinsic Viscosity; Molecular weight from Viscosity measurement & Numerical problems based on viscosity index.

UNIT V

Metal in Industry: Structure of coordination compounds corresponding to coordination number up to 6, Types of ligands, Isomerism [geometrical, optical, ionization, linkage and coordination], Theories of bonding in coordination compounds- crystal field theory, Valence bond theory, Chelation.

References:

1. Applied Chemistry – Theory and Practice, O.P. Viramani, A.K. Narula, New Age Pub.
2. Polymer Science – Ghosh, Tata McGraw Hill.
3. Chemistry for Environmental Engineering – Sawyer, McCarty and Parkin – McGraw Hill, International.
4. Basic Lubrication theory – Alistair Cameron
5. Engineering chemistry- Dr. JyotiMitna
6. Engineering chemistry- Dr. SunitaRatan
7. Applied Chemistry – S.M. Khopkar
8. Polymer Science- V.R. Gowawriker
9. Introduction of polymer science- G.S. Mishra

List of experiements:

1. To estimate the strength of the given unknown solution of Mohr's salt (Ferrous ammonium sulphate (FeSO4(NH4)2SO4.6H2O) using KMnO4 solution as an intermediate.

2. Estimation of hardness by EDTA method
3. Conductometric titration - determination of strength of an acid
4. Estimation of iron by potentiometry
5. Determination of molecular weight of polymer by viscosity average method
6. Determination of Na / K in water sample by Flame photometry (Demonstration)
7. Determination of total alkalinity and acidity of a water sample
8. Estimation of calcium ions present in tap water. (TDS)
9. To determines the viscosity of a given liquid (30% sugar solution) at room temperature using Ostwald's viscometer.
10. Testing of Flash point of lubricating oil by Pensky Martins apparatus.
11. To determine the viscosity index by Red wood Viscometer 1 & 2.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME 101		Engineering Drawing	60	20	20	30	20	3	-	4	5

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:
1. To familiarize with concepts of scale, conic sections and engineering curves.
2. To familiarize with the concepts related to the projections of points and line in all quadrants; construction of geometrical figures & solids, with its orientation on horizontal and vertical planes, and its projection; section of solid, development of solid and isometric projection view.

Course Outcomes:
1. Student would be able to draw scale, conic sections and engineering curves.
2. Student would be able to draw projection of point and line; indentify the use of these concepts in practical life.
3. Students would be able to understand plain &3D model at various orientations and draw their projection.
4. Student would be able to draw the projections of with and without sectioning of solid models and surface development.
5. Students would be able to understand the difference between orthographic view and isometric projections

UNIT I
SCALES, CONIC SECTION & ENGINEERING CURVES
SCALES- Representative Factor, types of scales, principle and construction of different scales
CONIC SECTION- Construction of ellipse, parabola and hyperbola by different methods; Normal and Tangent.
ENGINEERING CURVES- Cycloid, Epicycloids, Hyper cycloid, Involutes, Archimedean and Logarithmic spirals.

UNIT II
PROJECTION OF POINTS & LINE: PROJECTION- Introduction to projection, Types of projection, terminology, first angle and third angle.
PROJECTION OF POINTS- Introduction of point, conventional representation

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PROJECTION OF LINES- Introduction of straight line, orientation of straight line, true inclination and true length, concepts of end projectors, plan and traces and auxiliary planes.

UNIT III

PROJECTION OF PLANES & SOLIDS: PROJECTIONS OF PLANES- Introduction of planes, types of planes, orientation of planes, projection of planes in different positions, traces of planes

PROJECTION OF SOLIDS- Introduction of solids, classification of solids, recommended naming of corners of solids, orientation of solids

UNIT IV

SECTION OF SOLIDS & DEVELOPMENT OF SURFACES: SECTION OF SOLIDS- Introduction of section of solids, terminology, types of section planes, section of prisms, section of pyramid and section of composite solids

DEVELOPMENT OF SURFACES- Introduction of development of surfaces, classification of surfaces, methods of development, development of prisms, pyramids, cylinder and cone, anti-development

UNIT V

ISOMETRIC PROJECTIONS: ISOMETRIC PROJECTIONS- Introduction of isometric projection, terminology, isometric projections and isometric views, isometric views of planes, right solids, truncated solids and composite solids

Text books:

1. Engineering Drawing by N.D. Bhatt.
2. Engineering Drawing by C. Agarwal&BasantAgarwal.
3. Engineering Drawing by P.S. Gill.

List of experiements:

1. Drawing various types of scales using representative fraction.
2. Drawing various conics section.
3. Drawing various engineering curves like Cycloid, Epicycloids, Hyper cycloid, Involutes, Archimedean and Logarithmic spirals.
4. Projection of points in all quadrants.
5. Projection of straight lines in all quadrants in various orientations.
6. Projection of geometrical planes with various orientations.
7. Projection of solid models with various orientations.
8. Projection of section of solids by using various types of cutting planes.
9. Drawing development of surface using various methods of prisms, pyramids, cone, cylinder, etc.
10. Drawing anti- development of surfaces.
11. Drawing isometric projections using various methods and isometric views.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS204		Computer Peripherals and Interfaces	60	20	20	-	50	3	1	2	5

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 Objective:
1. Understanding of a knowledge of memory chips, it's types and troubleshooting methodologies.
2. Understanding the power system and its troubleshooting methods.
3. Understand the different interfaces and ports working and its configuration process.

Course Outcomes:
After the course completion student will be able to
1. Analyze PC boards, ROM memory and different types of buses.
2. Troubleshoot Device drives and peripherals devices working and its configuration process
3. Analyze the power system and its troubleshooting methods.

UNIT 1
Memory: Memory, memory chips & modules, memory types, advanced memory technologies, troubleshooting memory.

UNIT II
Motherboard: PC family tree, motherboard controllers and system resources, input-output ports, IRQ, I/O bus system: ISA, MCA, ELSA, VESA local bus, PCI, AGP, PCIX; on board I/O devices, ROMBIOS, ROM POST, CMOS setup.

UNIT III
Power Supply: power supply function and operation, power supply quality and specification, power protection and back-up, backup power system; UPS; troubleshooting power supply

UNIT IV
Interfaces and I/O Ports: Floppy disk drive interface, IDE interface: ATA standards, master-slave configuration, data transfer mode; SCSI interface: SCSI bus, SCSI standards: which is better SCSI or IDE; serial ports, parallel ports, USB, Video apapters, troubleshooting Video adapters.

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UNIT V

Device drives and peripherals : Floppy disk drive, hard drive CD ROM drive, DVD ROM drive, record able drives , keyboards, mice printers and moniters, trouble shooting drives and peripherals.

Text Books:

1. Craig Zacker& John Rourtre: PC Hardware- The complete reference, TMH.
2. S.K. Chauhan: PC Upgrading, maintenance and troubleshooting guide.

List of experiements:

1. To study motherboard.
2. Study of microprocessor.
3. To study SMPS and UPS.
4. To study the CD-ROM and DVD-ROM.
5. To study working of keyboard and mouse.
6. To study different ports and slots.
7. To study various types of Cables & Connectors.
8. Study of monitor.
9. To study different types of printers.
10. To assemble a PC.
11. To study Floppy Disk Drive.

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COURSE CODE	Category	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEE 102		Fundamentals of Electrical Engineering	60	20	20	30	20	3	1	2	5

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:
1. To impart the basic knowledge about the Electric and Magnetic circuits.
2. To explain the working principle, construction, applications of DC machines, AC machines.

Course Outcomes:

Students will be able to:
1. Understand and Analyze basic circuit concepts.
2. Apply knowledge of mathematics to analyze and solve electrical circuit problems.
3. Understand the AC fundamentals.
4. Illustrate basic knowledge about the Electric and Magnetic circuits.
5. Distinguish the working Principles of various Electrical Machines.

UNIT I
Electrical circuit analysis- Definition of electric circuit, network, linear circuit, non-linear circuit, bilateral circuit, unilateral circuit, Kirchhoff's law.Voltage and current sources, dependent and independent sources, source conversion, DC circuits analysis using mesh & nodal method, Thevenin's theorem, Norton's theorem, Superposition theorem, star-delta transformation.

UNIT II
A C Fundamentals- Production of alternating voltage, waveforms, average and RMS values, peak factor, form factor, phase and phase difference, phasor representation of alternating quantities, phasor diagram, behavior of AC series, parallel and series parallel circuits, power factor, power in AC circuit, 1-phase AC circuits under sinusoidal steady state, active, reactive and apparentpower, physical meaning of reactive power, power factor, 3-phase balanced andUnbalanced supply, star and delta connections.

UNIT III
Electromagnetism:Biot-savart law, Ampere's circuital law, field calculation using Biot-savart and ampere's circuital law. Magnetic circuits, Analogous quantities in magnetic and electric circuits,

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Faradays's law, self and mutual inductance. Energy stored in a magnetic field, Hysteretic and Eddy current losses. Electro-mechanical energy conversion.

UNIT IV

Transformers-Review of laws of electromagnetism, mmf, flux, and their relation, analysis of magnetic circuits, Single-phase transformer, basic concepts and construction features, voltage, current and impedance transformation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, OC and SC test.

UNIT V

Basic concepts of Rotating Electric machines- Constructional details of DC machine, Basic concepts of winding (Lap and wave). Principle of operation, EMF equation, characteristics (open circuit, load). DC motors: Principle of operation, Speed-torque Characteristics (shunt and series machine), starting (by 3 point starter), and speed control (armature voltage and field control).
Induction machine and Synchronous machine, Working principle of 3-Phase Induction motor, Emf equation of 3-Phase induction motor, Concept of slip in 3- Phase induction motor, Explanation of Torque-slip characteristics of 3-Phase induction motor. Principle of operation of Synchronous Machine

References:

1. Basic Electrical engineering, D.P Kothari & I.J Nagrath, TMH, Second Edition.
2. Basic Electrical Engineering, V.N Mittle&Arvind Mittal, TMH, Second Edition.
3. Electrical Engineering Fundamental, Vincent.D.Toro, Pearson Education, Second Edition.

List of experiements:

1. Verification of KCL and KVL Law's.
2. Separation of resistance and inductance of choke coil.
3. Study of Transformer, name plate rating.
4. Determination of Turns ratio and polarity of Single Phase Transformer.
5. Determination of equivalent circuit parameters of a single phase transformer by O.C. and S.C. tests.
6. Measurement of power in a three phase circuit by two wattmeter method.
7. Measurement of power in a three phase circuit by three wattmeter method
8. Measurement of various line & phase quantities for a 3-phase circuit.
9. Study of No load characteristics of D.C shunt Generators.
10. Study of comparative features of Synchronous Machine and Induction Machine.

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BTCS205	**-**	**Software Foundation and Progamming 1(with 'C++')**	**-**	**-**	**-**	**-**	**50**	**-**	**-**	**2**	**1**

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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BTCS 207		Computer Programming-II	-	-	-	30	20	-	-	2	1

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
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Course Objectives:

1. To understand Object oriented concepts.
2. To understand programming using object oriented techniques.
3. To understand the use of various system libraries.
4. To have the knowledge of important topics and principles of software development.
5. To write a computer program &to solvespecified problems.
6. To use the Java SDK environment to create, debug and run simple Java programs.
7. To study event driven Graphical User Interface (GUI) programming

Course Outcomes:

1. Students should be able to explain the object oriented concepts.
2. Students should be able to write programs using object-based programming techniques including classes, objects and inheritance.
3. Able to use of various system libraries.
4. Be aware of the important topics and principles of software development.
5. Have the ability to write a computer program to solvespecified problems.
6. Be able to use the Java SDK environment to create, debug and run simple Java programs.
7. Introduce event driven Graphical User Interface (GUI) programming

UNIT I
Java Fundamentals: Features of Java, OOPs concepts, Java virtual machine, Byte code interpretation Data types, variable, arrays, expressions, operators, and control structures, Objects, Introduction to Class: Instance members and member functions, constructors, constructor overloading, Static Method, Static classes, Inner classes

UNIT II
Introduction to Java classes and objects: Java features: Java syntax, data types, data type conversions, control statements, operators and their precedence. Introduction to Class: Instance members and member functions. Inner Classes, String Handling, Wrapper classes

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UNIT III

Inheritance, Polymorphism and Collection: Class relationships: Inheritance and its types, Merits and Demerits. Association, Association inheritance, Polymorphism: Dynamic method dispatch, Runtime polymorphism, Abstract classes, Interfaces and packages, Collections.

UNIT IV

Exception Handling and Multithreading: Exceptions: Need for exceptions, Exception hierarchy: Checked Unchecked exceptions, Try, catch, finally, Throw, throws, creating exceptions.
Multithreading: Thread Life cycle, Multi threading advantages and issues, Simple thread program, Priorities and scheduling, Thread Synchronization.

UNIT V

Java I/O, Applets, Event Handling, and Database Connectivity: Basic concept of streams I/O stream & reader-writer classes. File handling. Applet and its Life Cycle, Basic GUI elements, Event Delegation Model and event handling Swing components: Applet, JButton, JFrame, etc.Sample swing programs JDBC architecture, establishing connectivity and working with connection interface working with statements, Creating and executing SQL statements, working with Result Set

References:

1. Java- Head First 2nd edition Kathy Sierra , Bert Bates.
2. Programming with Java A Primer, E. Balaguruswamy Tata McGraw Hill Companies.
3. Java Programming John P. Flynt Thomson 2nd.
4. Java Programming Language Ken Arnold Pearson.
5. The complete reference JAVA2, Hervertschildt. TMH.
6. Big Java, Cay Horstmann 2nd edition, Wiley India Edition.
7. Java – Balaguruswamy.

List of experiements

1. Installation of J2SDK
2. Write a program to show Scope of Variables
3. Write a program to show Concept of CLASS in JAVA
4. Write a program to show Type Casting in JAVA
5. Write a program to show How Exception Handling is in JAVA
6. Write a Program to show Inheritance
7. Write a program to show Polymorphism
8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA
9. Write a program to show use and Advantages of CONTRUCTOR
10. Write a program to show Interfacing between two classes
11. Write a program to Add a Class to a Package
12. Write a program to show Life Cycle of a Thread
13. Write a program to demonstrate AWT.
14. Write a program to Hide a Class

15. Write a Program to show Data Base Connectivity Using JAVA
16. Write a Program to show “HELLO JAVA” in Explorer using Applet
17. Write a Program to show Connectivity using JDBC
18. Write a program to demonstrate multithreading using Java.
19. Write a program to demonstrate applet life cycle.
20. Write a program to demonstrate concept of servlet