DAYANANDA SAGAR COLLEGE OF ENGINEERING

(An Autonomous Institution affiliated to Visvesvaraya Technological University, Belagavi)

BOS APPROVED SYLLABUS FOR FIRST YEAR UG (BE) PROGRAMME 2016

ENGINEERING MATHEMATICS-I

Sub Code: MAT11	CIE:50
Hrs/ Week: 4	SEE:50
Total Hrs: 50	Credits: 4

Course Objectives:

1. Understand the concept of Calculus and apply it appropriately in solving Engineering problems.
2. Explain Vectors to analyse and calculate position, velocity and acceleration of a particle.
3. Use Matrices to solve system of linear equation and to estimate eigen values and eigen vectors of a matrix.

MODULE 1

DIFFERENTIAL CALCULUS

Derivation of nth derivative of some elementary functions – illustrative examples, Leibnitz Theorem (without proof) – Problems, Statement of Rolle's Theorem and geometrical interpretation, Lagrange's Mean Value Theorem and Cauchy's MVT(with proof), Taylor's and Maclaurin's Series Expansions for a function of one variable (statement only) – problems , Angle between Radius Vector and Tangent.

Self study component: Derivatives of Arc and Curvature, Radius of curvature (Cartesian and Parametric form).

10 hours

MODULE 2

PARTIAL DIFFERENTIATION

Partial Derivatives of second and higher orders, Total Derivatives, Partial Differentiation of composite functions (change of variables), Differentiation of an Implicit function, definition and evaluation of Jacobians, Maxima and Minima of functions of two variables, Differentiation under integral sign- Leibnitz rule.

Self study component: Lagrange's method of undetermined multipliers (with one subsidiary condition). **10 hours**

MODULE 3

VECTOR DIFFERENTIAL CALCULUS

Derivative of a vector function, Velocity, Acceleration, Scalar and Vector Fields, Gradient, Divergence and Curl.

Self study component: Vector Identities. **10 hours**

MODULE 4

ORDINARY DIFFERENTIAL EQUATIONS

Solution of first order and first degree Differential equations: Linear Differential equations - Bernoulli's Differential equations, Exact Differential equations, Reducible to Exact Differential equations, Physical Applications – Newton's law of cooling, Law of natural decay, Law of natural growth, Flow of electricity.

Equations solvable for p, Equations solvable for y, Equations solvable for x.

Self study component: Solution of first order and first degree Differential equations: Method of separation of Variables. **10 hours**

MODULE 5

LINEAR ALGEBRA

Elementary Transformation, Reduction of the given Matrix to Echelon form, Rank of a matrix, Solution of a system of Equations by Gauss Elimination method, Gauss-Jordon Method, Dominant Eigen Values by Rayleigh's Power Method.

Self study component: Eigen Values and Eigen vectors. **10 hours**

Text Books

1. B.S. Grewal, "Higher Engineering Mathematics" Khanna Publishers, 43rd Edition, 2013, ISBN: 9788174091956.

2. H. K. Dass, Er. Rajnish Verma, "Higher Engineering Mathematics", 3rd Edition, 2014, ISBN: 9788121938907.

References

1. B. V. Ramana, "Higher Engineering Mathematics", Tata Mc Graw-Hill, 2006, ISBN: 9780070634190.

2. N.P. Bali & Manish Goyal, "A text book of Engineering Mathematics", Laxmi Publications, 8th Edition, 2011, ISBN: 9788131808320.

3. Murray Speigel, Schaum's Outline of "Advanced Mathematics for Engineers and Scientists" McGraw-Hill, 1971, ISBN: 9780070602168.

4. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publishing House, 2002, ISBN: 8173194203.

Course outcomes:

On completion of the course a student will be able to

1. Restate Calculus (Differential calculus, Partial derivatives, Ordinary differential equation) and discuss system of linear equation, eigen value, eigen vector using Matrices.

2. Apply the knowledge of calculus to calculate rate of change of multivariate functions, solve differential equations, analyze position, velocity & acceleration using vectors and employ Matrix theory.

3. Summarize calculus and generalize matrix theory.

ENGINEERING PHYSICS

Sub Code: PHY12/PHY22	CIE:50
Hrs/ Week: 4	SEE:50
Total Hrs: 50	Credits: 4

Course Objectives:

1. To get a brief understanding of Modern Physics and basic principles of quantum mechanics and its applications.
2. To know the electrical properties of materials according to classical and quantum theory and Physics of semiconductors and the band gap.
3. To study the basics of Lasers, types of lasers and applications and optical fibers principles and advantages.
4. To get an understanding of the basic crystal structure and indexing.
5. To know about dielectrics and their applications.
6. To understand briefly about superconductors and their applications.
7. To learn about thin films, preparation and application.
8. To study density of states, synthesis methods of nano-materials and applications.

Module 1

Modern Physics and Quantum Mechanics

Black body radiation spectrum, Weins law, Rayleigh Jeans law, Planck's Law, Wave Particle dualism, de-Broglie hypothesis, Compton effect and its Physical significance. Matter waves and their Characteristic properties.

Heisenberg's uncertainty principle and its physical significance. Non-existence of electron in the nucleus. Wave function, Properties and physical significance of wave function, Probability density and Normalization of wave function. Setting up of one dimensional time independent Schrodinger wave equation. Application of Schrodinger wave equation: Energy Eigen values for a particle in a potential well of infinite depth.

Self study component: Group velocity and phase velocity. **10 hours**

Module 2

Electrical Properties of Materials

Free electron theory concept, Definitions: drift velocity, mean collision time, mean free path, relaxation time. Failures of classical free electron theory. Assumptions of quantum

free electron theory, Fermi factor and density of states concept. Merits of quantum free electron theory.

Conductivity of semi conducting materials, Concentration of electrons and holes in intrinsic semiconductors. Fermi level in an intrinsic Semiconductor. Hall effect, Hall coefficient, Measurement of Hall voltage.

Temperature dependence of resistivity in superconducting materials. Effect of magnetic field (Meissner effect). Type I and Type II superconductors with example. BCS theory, High temperature superconductors. Applications of superconductors: MAGLEV vehicles.

Self study component: SQUID. **10 hours**

Module 3

Lasers and Optical Fibers

Einstein's coefficients: expression for energy density (derivation). Requisites of a Laser system. Conditions for laser action. Principle, construction and working of CO_2 laser. Construction and working of semiconductor Laser. Applications of Laser: Laser welding, cutting and drilling.

Propagation mechanism in optical fibers. Angle of acceptance. Numerical aperture. Types of optical fibers and modes of propagation. Applications: Block diagram of point to point communication: explanation and advantages.

Self study component: Applications of LASER in atmospheric pollutant analysis.

10 hours

Module 4

Crystal structure and Dielectrics

Space lattice, Unit cell, Bravais lattice, Lattice parameters. Various crystal systems with one example each. Miller indices. Expression for inter planar spacing. Co-ordination number. Atomic packing factor. Bragg's law, Determination of crystal structure using Bragg's X–ray diffractometer.

Dielectric materials, Static dielectric constant, electronic, ionic, space charge and orientation polarizations. Frequency dependency of dielectric constant, Internal field or local fields in solids and liquids, Lorentz field in cubic materials, Clausius Mossotti relation.

Self study component: Ferroelectric materials and applications.

10 hours

Module 5

Thin films and Nano science

Thin films, Stages of thin film growth: nucleation, agglomeration and continuous film. Thin film deposition: Block diagram of thin film unit, Pirani gauge, Penning gauge, rotary pump, diffusion pump. Any one application of thin films.

Introduction to Nano Science, Mesoscopic state, Density of states in 1D, 2D and 3D structures. Synthesis: Top–down and Bottom–up approach, Ball Milling and Sol–Gel methods. Carbon nano tube: Types, properties and applications.

Self study component: Synthesis of Carbon nano tubes.

10 hours

Course outcomes:

1. Students can understand the relevance of quantum mechanics. Students are able to apply the semiconductor theory.
2. Students can learn basics of LASERS and Optical fiber communications.
3. Students become capable of indexing the basic crystal structure.
4. Students are able to understand dielectrics on the basis of polarization.
5. Superconductivity and its applications in technology are learnt.
6. Students get an exposure to thin films and its stages of growth and properties.
7. Nanotechnology and properties of nano-materials, processes involved and its applications are understood.

Text books:

1. Engineering Physics, Text book series, Wiley India Private Ltd., New Delhi.
2. S. O. Pillai, Solid State Physics, revised edition, New Age International Publishers.
3. Engineering Physics, S. P. Basavaraju, Subhas Stores, Bangalore.
4. Engineering Physics, N.H. Ayachit and P.K. Mittal, IK International Publishing house Pvt. Ltd.

Reference books:

1. S. M. Sze, Semiconductor devices, Physics and Technology, Wiley.
2. C. Kittel, Introduction to Solid State Physics, 7th edition, John Wiley Student Edition, New York.
3. K.L. Chopra, Thin film Phenomena, Mc Graw Hill, New York.
4. Milton Ohring, Materials Science of Thin Films, 2nd Edition.

ENGINEERING CHEMISTRY

Sub Code: CHY12/22	CIE:50
Hrs/ Week: 4	SEE:50
Total Hrs: 50	Credits: 4

Course Objectives:

To provide students with knowledge of engineering chemistry for building technical competence in industries, research and development in the following fields.

- Energy sources
- Electrochemistry & Battery Technology
- Corrosion & Metal Finishing
- Polymers
- Water Technology & Nano Materials.

Module 1

ENERGY SOURCES

Non renewable Energy Sources: Introduction, classification of chemical fuels, calorific value-gross and net calorific values, determination of calorific value of a fuel using bomb calorimeter, numerical problems. Cracking: Introduction, fluidized catalytic cracking, Synthesis of petrol by Fischer Tropsch process. Octane number. Gasoline knocking and its mechanism, anti- knocking agents, unleaded petrol, power alcohol, biodiesel.

Renewable Energy Sources: Introduction, photovoltaic cells- construction and working. Advantages and disadvantages of PV cells. Production of solar grade silicon (Union carbide process). Purification of silicon (zone refining). Wind Energy and Geothermal Energy.

Self Study Component: Doping of silicon-diffusion technique (n & p types). Various methods of tapping solar energy. **10 hours**

Module 2

ELECTROCHEMICAL CELLS AND BATTERY TECHNOLOGY:

Electrochemistry: Introduction, Derivation of Nernst equation for electrode potential. Types of electrodes: Metal-Metal ion, Metal-Metal insoluble salt ion, gas, amalgam, redox & ion selective. Reference electrodes: Introduction, SHE-demerits, Construction, Working and applications of calomel and Ag-AgCl electrodes. Construction and working of glass electrode, determination of pH using glass electrode. Electrolyte concentration cells, numerical problems on electrode potential, emf of cells and concentration cells.

Battery Technology: Introduction, classification-primary, secondary and reserve batteries. Characteristics-cell potential, current, capacity, energy density, power density, energy efficiency, cycle life and shelf life. Construction, working and applications of Zinc-Air,

Nickel-metal hydride batteries. Lithium batteries: Introduction, Construction, working and applications of Li-ion battery.

Fuel Cells: Introduction, Construction & Working of Hydrogen-Oxygen fuel cell.

Self Study Component: Measurement of standard electrode potential using calomel electrode. **10 hours**

Module 3

CORROSION SCIENCE AND METAL FINISHING

Corrosion: Introduction, electrochemical theory of corrosion, galvanic series. Factors affecting the rate of corrosion: ratio of anodic to cathodic areas, nature of metal, nature of corrosion product, nature of medium-pH, conductivity and temperature. Types of corrosion-differential metal and differential aeration corrosion.

Corrosion control: Inorganic coatings-Anodizing of Al. Metal coating-Galvanization and Tinning. Cathodic protection: Sacrificial anodic and impressed current methods.

Metal Finishing: Introduction, Technological importance, Electroplating: Introduction, principles governing-polarization, decomposition potential and overvoltage. Factors influencing the nature of electro-deposit: current density, concentration of metal ion & electrolyte, pH, temperature & throwing power of plating bath, additives-complexing agents, brighteners and levelers. Surface pre-treatment and Electroplating of chromium. Electroless plating: Introduction, distinction between electroplating and electroless plating of Copper.

Self Study Component: Estimation of corrosion rate by different techniques- Weight loss method, Potentiodynamic polarization method. Pitting and stress corrosion cracking (caustic embrittlement in boilers). Phosphating and chromating. Electroless plating of copper on Printed Circuit Board. **10 hours**

Module 4

POLYMERS

Polymers: Introduction, types of polymerization: addition and condensation, mechanism of polymerization-free radical mechanism taking ethylene as an example. Molecular weight of polymers: Number average and weight average, numerical problems. Glass transition temperature (Tg): Significance of Tg, Factors influencing Tg –Flexibility, inter molecular forces, molecular mass, branching & cross linking, and stereo regularity.

Elastomers: Introduction, synthesis, properties and applications of Silicone rubber. Adhesives: Introduction, synthesis, properties and applications of Epoxy resin. Polymer Composites: Introduction, synthesis, properties and applications of Kevlar.

Conducting polymers: Introduction, Polyaniline, Poly pyrrole and their applications.

Self Study Component: Synthesis, properties and applications of PMMA (plexi glass), Teflon, polyurethane. Mechanism of conduction in Polyaniline. **10 hours**

Module 5

WATER TECHNOLOGY AND NANO-MATERIALS

Water Technology: Introduction, boiler feed water, boiler troubles with disadvantages-scale and sludge formation, boiler corrosion (due to dissolved O_2, CO_2 and $MgCl_2$). Determination of DO and COD. Numerical problems on COD. Sewage treatment: Primary, secondary (activated sludge method) and tertiary methods. Softening of water by ion exchange process. Desalination of sea water by reverse osmosis and electro dialysis (ion selective).

Nano Materials: Introduction, size dependent properties, Synthesis-bottom up approach (sol-gel, chemical vapour condensation, hydrothermal processes). Nano scale materials, properties of fullerenes, carbon nano-tubes, nano-wires, nano-rods and nano-composites.

Self Study Component: Determination of BOD, methods of purification of portable water (bacteria removal using Silver nanoparticles). Applications of Nanomaterials. **10 hours**

Course Outcomes:

On completion of this course, students will have knowledge in:

1. Types of electrodes, electrochemical and concentration cells. modern batteries and fuel cells, Causes & effects of corrosion of metals and control of corrosion. Modification of surface properties of metals to develop resistance to corrosion, wear, tear, impact etc. by electroplating and electroless plating.
2. Production & consumption of energy for industrialization of country and living standards of people. Utilization of solar energy for different applications, Replacement of conventional materials by polymers for various applications.
3. Boiler troubles sewage treatment and desalination of sea water, and over-viewing of synthesis, properties and applications of nanomaterials.

Text books:

1. P.L.Timmanagoudar, SunilKumar K.Patil, “Engineering Chemistry”, Eastern book promoters, Belgaum.
2. R.V.Gadag & A.Nityananda Shetty., “Engineering Chemistry”, I K International Publishing House Private Ltd. New Delhi.
3. P.C.Jain & Monica Jain.,“Engineering Chemistry”, Dhanpat Rai Publications, New Delhi. “Wiley Engineering Chemistry”, Wiley India Pvt. Ltd. New Delhi. Second Edition.
4. B.S.Jai Prakash, R.Venugopal, Sivakumaraiah & Pushpa Iyengar. “Chemistry for Engineering Students”, Subhash Publications, Bangalore.

Reference books:

1. O.G.Palanna,“Engineering Chemistry”,Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint.
2. G.A.Ozin & A.C. Arsenault, “Nanochemistry-A Chemical Approach to Nanomaterials”, RSC publishing, 2005.
3. V.R.Gowariker, N.V.Viswanathan & J.Sreedhar., “Polymer Science”, Wiley- Eastern Ltd.
4. M.G.Fontana., “Corrosion Engineering”, Tata McGraw Hill Publishing Pvt. Ltd. New Delhi.

ELEMENTS OF CIVIL ENGINEERING & ENGINEERING MECHANICS

Subject Code: CIV13/23	CIE: 50
Hours/Week: 3	SEE: 50
Total hours : 40	Credits: 3

Course Objectives:

1) To understand various branches of Civil Engineering and its role for National development
2) Introduction to principles of Engineering mechanics and understand the force system on various structures of Civil engineering.
3) To determine the center of area and understand the basic concepts of Inertia and dynamics of rigid bodies.

Module 1:

Introduction to Civil Engineering &Engineering Mechanics

Introduction to Civil Engineering: Scope of different fields of Civil Engineering - Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water Resources and Irrigation Engineering, Transportation Engineering, Environmental Engineering.

Infrastructure: Types of infrastructure, Role of Civil Engineer in the Infrastructural Development.

Introduction to Engineering Mechanics: Force and its characteristics, Classification of force systems, Principle of physical independence, superposition, transmissibility of forces, Couple, Moment of a force, Equivalent force - Couple system; Numerical problems on moment of forces and couples, on equivalent force - couple system.

Self Study Component: Effect of the infrastructural facilities on socio-economic development of a country. **8 hours**

Module 2:

Analysis of Force Systems- Concurrent and Non-Concurrent Systems

Concurrent force system: Definitions, Composition and resolution of forces, Resultant, Composition of coplanar -concurrent force system, Numerical problems on composition of coplanar concurrent force systems.

Non-Concurrent force system: Composition of coplanar non-concurrent force system, Varignon's principle of moments.

Self Study Component: Numerical problems on composition of coplanar non-concurrent force systems. **8 hours**

Module 3: Equilibrium of forces and Friction

Equilibrium of concurrent and non-concurrent forces: Definition of Equilibrant; Conditions of static equilibrium for different force systems, Lami's theorem; Numerical problems on equilibrium of coplanar.

Support Reactions: Beams, Types of Loads and Supports, statically determinate beams, Numerical problems on support reactions for statically determinate beams with Point load (Normal and inclined) and uniformly distributed loads and Moments.

Friction: Definitions, Types of friction, Laws of static friction, Limiting friction, Angle of friction, Angle of repose; Impending motion on horizontal and inclined planes; Numerical Problems on single planes.

Self Study Component: Numerical Problems on Concurrent and non-concurrent force systems, two blocks on inclined planes. **8 hours**

Module 4 Centroids and Moments of Inertia

Centroid: Introduction to the concept, centroid of area, centroid of basic geometrical figures, computing centroid for composite sections and engineering composite sections – L ,I, Numerical problems.

Moment of Inertia: Definition, Parallel axis theorem, Perpendicular axis theorem, Moment of Inertia of triangle, rectangle and circle from first principles, Radius of gyration, Numerical problems.

Self Study Component: Circular section, computing moment of Inertia for angle and I sections.

8 hours

Module 5: Dynamics

Definitions – Displacement – Average velocity – Instantaneous velocity – Speed – Acceleration - Average acceleration – Variable acceleration–Numerical problems.

Self Study Component: Acceleration due to gravity, Newton’s Laws of Motion, Rectilinear Motion.

8 hours

Course outcomes:

Upon successful completion of this course the student shall be able to -

1) Understand briefly about Civil Engineering and its various components.
2) Understand force systems and their effects on rigid bodies.
3) Compute Centroid and Moment of Inertia for built up sections.

Text Books

1. Elements of Civil Engineering and Engineering Mechanics, by Kolhapure B. K., Eastern Book Publishers, Belgaum, 2013.
2. Engineering Mechanics-Statics and Dynamics by A Nelson, Tata McGraw Hill Education Private Ltd, New Delhi, 2009.
3. Elements of Civil Engineering (IV Edition) by S.S. Bhavikatti, New Age International Publisher, New Delhi, 3rd edition 2009.

References

1. Engineering Mechanics by S.Timoshenko,D.H.Young, and J.V.Rao, TATA McGraw-Hill Book Company, New Delhi.

2. Beer FP and Johnson ER, “Mechanics for Engineers- Dynamics and Statics”- 3rd SI Metric edition, Tata McGraw Hill. – 2008.

3. Shames IH, “Engineering Mechanics – Statics & Dynamics”- PHI – 2009.

PROGRAMMING IN C

Sub Code: PIC13/PIC23	CIE: 50
Hrs/ Week: 3	SEE: 50
Total Hrs: 40	Credits: 3

Course Objectives: The objectives of this course are to make students to learn basic principles of Problem solving, implementing through C programming language and to design & develop programming skills, and to know about data structures and their applications.

Module 1

Introduction to C Language: Algorithm & Flowchart, Programming languages & Types, C program structure, Token and Data types.

Operators and Expression: Types Of Operators: Arithmetic Operator, Logical Operator, Relational Operator, Conditional or Ternary Operator, Bitwise Operator, Increment & Decrement Operator, Assignment Operator, Unary Operator, Special Operator, Expression Evaluation, Operator Precedence and Associativity.

Self Study Component: ASCII values, operation system, types of operation systems, Type Conversion. **8 hours**

Module 2

Formatted & Unformatted Input & Output statements: prints, scanf, getch,getche, gets, getc, putch, puts, putc.

Branching and Looping: Two way selection (if, if-else, nested if-else, cascaded if-else), switch statement, Goto, Loops (For, while-do, do-while) in C, break and continue.

Self Study Component: exit(), explore math.h, stdio.h, conio.h, stdlib.h header files.

8 hours

Module 3

Arrays and Strings: Introduction, Sorting: Bubble sort & Selection sort, Searching: Linear & Binary search Algorithms, String Handling functions: length, copy, concatenate, sub string, reverse, upper case to lower case and vice versa programs with / without using inbuilt library functions.

Self Study Component: Multi-Dimensional arrays, array of strings, String input and output functions.

8 hours

Module 4

Functions: Functions declaration, Function prototype, Function call by value & call by reference, Return statement, Actual & Formal parameters of a function and Recursion.

Structures: Basics, Array of structure, structure within structure.

Self Study Component: passing structure to a function with/ without using pointers.

8 hours

Module 5

Pointers: Introduction to Pointers, Initialization of pointer, Declaration of pointers, Pointer to an array and functions (call by reference).

Self Study Component: Modes of operation on file, opening a file, closing a file, input/ output operation on file, getc, putc, getw, putw, eof, fprintf, fscanf functions. **8 hours**

Course Outcomes:

1. Achieve Knowledge of problem solving skills.
2. Understand the principles of Programming in C language
3. Developing modular programming skills.
4. Understands the concepts of pointers.

Text Books:

1. Brian W. Kernighan and Dennis M. Ritchie, **"The C Programming Language"**, 2nd Edition, PHI, 2012.
2. Somashekara ", **Problem solving with C** ", PHI Learning, 2015.
3. Jacqueline Jones & Keith Harrow, **"Problem Solving with C"**, 1st Edition, Pearson 2011.

Reference Books:

1. Vikas Gupta, **"Computer Concepts and C Programming"**, Dreamtech Press 2013.
2. R. S.Bichkar, "Programming with C", University Press, 2012.
3. V. Rajaraman, **"Computer Programming in C"**, PHI, 2013.
4. E .Balagurusamy, "Programming in ANSI C ". 4th Edition.

ELEMENTS OF MECHANICAL ENGINEERING

Sub Code: EME14/24	CIE:50
Hrs/ Week: 3	SEE:50
Total Hrs: 40	Credits: 3

Course Objectives:

Students belonging to all branches of Engineering are made to learn certain fundamental topics related to Mechanical Engineering so that they will have a minimum understanding of Mechanical systems, equipment and process.

- Study the different types of Turbines and its working of IC engines.
- Students will gain knowledge about the lathe and drilling machines.
- Students will be enriched with the different Joining processes and Robotics
- Study the basics of Refrigeration.

Module 1

Steam and Turbines

Steam Formation and Properties: Steam formation, Types of steam. Steam properties-specific volume, enthalpy and internal energy (Simple numerical on properties of steam)

Turbines: Classification, Principle operation of Impulse and reaction turbines, Delaval's turbine, Parson's turbine. (No compounding of turbines).
Water turbines: Classification, Principles and operations of Pelton wheel, and Kaplan turbine.

Self-Study Component: Francis turbine, Gas turbines: Classification, working principles and Operations of Open cycle and closed cycle gas turbines. **8 hours**

Module 2
IC Engines

Internal Combustion Engines: Classification, I.C. Engines parts, 2 Stroke and 4 stroke Petrol engines, 4 stroke diesel engines. P-V diagrams of Otto and Diesel cycles. Problems on indicated power, brake power, indicated thermal efficiency, brake thermal efficiency, mechanical efficiency, and specific fuel consumption, [numerical on IC Engines].

Self-Study component: Study of Different Types of I.C. engines like V-engine, Radial Engine, Inline Engine and its applications. **8 hours**

Module 3

Machines and Machine Tools

Lathe: Components of Lathe, Classification, Principle of operation, Lathe operations: Turning, facing, knurling, thread cutting, Taper Turning by swivelling compound rest. Specification of lathe.

Drilling machine: Components of Drilling machine, Classification, principle of operation bench drilling machine, radial drilling machine, operations on drilling machine- Boring, Reaming, Tapping, Counter Sinking, Counter Boring, spot facing, specification of drilling machine.

Self-Study Component: milling machines and its Operation's. **8 hours**

Module 4

Joining processes and Robotics

Soldering and Welding: Definitions, Classification and method of soldering and welding. Differences between soldering and Welding. Description of Electric Arc Welding and Oxy-Acetylene Welding.

Robotics: Introduction, Classification based on robots configuration; Polar, cylindrical, Cartesian coordinate and spherical. Application, Advantages, and disadvantages.

Self-Study Component: Principles of different types of Brazing. **8 hours**

Module 5

Refrigeration

Refrigeration: Definitions – Refrigerating effect, Ton of Refrigeration, Ice making capacity, COP, Relative COP, unit of Refrigeration.

Refrigerants: Properties of refrigerants, list of commonly used refrigerants. Principle and working of vapour compression refrigeration and vapour absorption.

Self-Study Component: Air Conditioning: Principles and applications of air conditioning systems, Room air conditioner. **8 hours**

Course Outcomes:

Students shall demonstrate knowledge associated with,
1. Prime movers such as Turbines and Lathe and drilling machines
2. IC engines working Principles.

3. Basic joining processes and Robotic configurations.
4. Refrigeration working principles.

Text Books:

1. "**Elements of Mechanical Engineering**", DSCE publications, 2015.

2. V.K.Manglik, **"Elements of Mechanical Engineering"**, PHI Publications, 2013.

3. K.R.Gopalkrishna, **"A text Book of Elements of Mechanical Engineering"**- Subhash Publishers, Bangalore, 2014

4. Kestoor Praveen, M.R. Ramesh, " **Elements of Mechanical Engineering**", Suggi publications, Bangalore, 2014

Reference Books:

1. S. Trymbaka Murthy, **"A Text Book of Elements of Mechanical Engineering"**, Universities Press (India) Pvt Ltd, Hyderabad, 4th Edition 2006.

2. K.P. Roy, S.K. Hajra Choudhury, Nirjhar Roy, **"Elements of Mechanical Engineering"**, Media Promoters & Publishers Pvt Ltd,Mumbai,7th Edition,2012

3. Pravin Kumar, **"Basic Mechanical Engineering"**, 2013 Edition, Pearson.

COMPUTER AIDED ENGINEERING DRAWING

Sub Code: CED14/24	CIE:50
Hrs/ Week: 2L/4P	SEE:50
Total Hrs: 60	Credits: 3

Course Objectives:

Engineering drawing is an important tool for all Engineers and for many others professionals. It is the language of Engineers. Engineering Drawing communicates all needed information from the engineer who designed a part to the workers who will manufacture it.

The aim of the subject is to equip students with the fundamentals of Computer Aided Engineering Drawing and to further the ability to communicate information by graphical means.

Module 1
Introduction to Computer Aided Sketching

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning and free hand practicing. Computer screen, layout of the software, standard tool bar/menus and description of most commonly used tool bars, navigational tools. Co-ordinate system and reference planes. Definitions of HP, VP, RPP & LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, Co-ordinate points, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning, line conventions, material conventions and lettering.

5 hours

Module 2
Orthographic Projections

Introduction, Definitions - Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes (No application problems). Orthographic Projections of Plane Surfaces (First Angle Projection Only)

Introduction, Definitions–projections of plane surfaces–triangle, square, rectangle, rhombus, pentagon, hexagon and circle, planes in different positions by change of position method only (No problems on punched plates and composite plates).

20 hours

Module 3

Projections of Solids (First angle Projection only)

Introduction, Definitions – Projections of right regulartetrahedron, hexahedron (cube), prisms, pyramids, cylinders and cones in different positions (No problems on octahedrons and combination solid). **20 hours**

Module 4

Isometric Projection (Using isometric scale only)

Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of tetrahedron, hexahedron (cube), right regular prisms, pyramids, cylinders, cones, spheres, cut spheres and combination of solids (Maximum of three solids).

15 hours

Course Outcomes:

At the end of the course, the student will be able to:
1. Understand the basic concepts of projections.
2. Knowledge of orthographic projections of planes and solids
3. Knowledge of orthographic & Isometric projections of various solids and combination of solids.
4. Apply the fundamental knowledge of drawing for other applications.

Text Books:

1) **Computer Aided Engineering Drawing**- DSCE publications, 2015

2)N.D. Bhatt & V.M. Panchal, **Engineering Drawing**, CharotarPublishing House, Gujarat, 48th edition, 2005.

3) A Primer on **Computer Aided Engineering Drawing**, Published by VTU, Belgaum, 2006

Reference Books:

1) S. Trymbaka Murthy, **Computer Aided Engineering Drawing** - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition- 2006.

2) K.R. Gopalakrishna, **Engineering Graphics,** Subash Publishers Bangalore, 32nd edition, 2005.

3) Luzadder Warren J., Duff John M., **Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production**- Eastern Economy Edition, Prentice-Hall of India Pvt. Ltd., New Delhi, 2005.

Note :

Software Packages : Students should be taught and made familiar with software packages such as, Autodesk Auto CAD 2014 (Freely downloadable). Autodesk Inventor 2014, Solidedge or other similar packages.

CIE for 50 marks

1. Assignment/ sketch book/ Print out	25 Marks
2. Surprise test/ Mid semester test	10 Marks
3. Test conducted towards the end of semester	15Marks

Question paper pattern for SEE:

1. Module -1 is only for practice and not for examination.
2. Question paper for each batch of students will be set separately by the examination authority. The answer sheets will have to be jointly evaluated by the Internal & External examiners.
3. A maximum of THREE questions will be set as per the following pattern (No mixing of questions from different Modules).

Q. No.	From Chapters	Marks Allotted
1	Module 2	30
2	Module 3	40
3	Module 4	30
Total		100

Q. No.	Solutions and Sketching in the Graph Book	Computer Display and Printout	Total Marks
1	15	15	30
2	20	20	40
3	15	15	30
Total Marks	50	50	100

Students have to submit the computer printouts and the sketches drawn on the graph sheets at the end of the examination. Both Internal & External examiners have to jointly evaluate the solutions (sketches) and computer display & printouts of each student for 100 marks (50 marks for solutions & sketches + 50 marks for computer display and printouts) and submit the marks list along with the solution (sketches) on graph sheets & computer printouts in separate covers.

4. Each batch must consist of a minimum of 10 students and a maximum of 12 students.
5. Examination can be conducted in parallel batches, if necessary.

BASIC ELECTRICAL ENGINEERING

Sub Code: ELE15/ 25	CIE:50
Hrs/ Week: 3	SEE:50
Total Hrs: 40	Credits: 3

Course Objectives:

This course aims at providing basic concepts of magnetic and AC circuits , construction and working principle of AC-DC machines, transformers, measuring instruments and wiring schemes.

Module 1

Magnetic Circuits:

Basic definitions, Magnetic field due to electric current flow, force on a current carrying conductor placed in a magnetic field, Faradays laws of electromagnetic induction, Lenz's law, Fleming's rules and its applications. Statically and dynamically induced emf's. Self and mutual inductance. Numerical Problems on mutual inductance and coefficient of coupling.

Self study component: DC Circuits: Introduction to DC circuits, active and passive two terminal elements, ohms law, behaviour of resistor, inductor, capacitor, Kirchhoff's laws, mesh analysis in simple DC circuits excited by independent voltage sources, concept of power and energy. Illustrative examples, analogy between electric and magnetic circuits, Energy stored in magnetic field. **8 hours**

Module 2

Single-phase A.C Circuits: Principle and Generation of sinusoidal voltage, definition of average value, root mean square value, form factor and peak factor of sinusoidally varying voltage and current, phasor representation of alternating quantities. Analysis, with phasor diagrams, of R, L, C, and series R-L-C circuits, real power, reactive power, apparent power and power factor. Illustrative examples.

Self study component: Analysis, with phasor diagrams of R-L, R-C circuits, Illustrative examples on series parallel circuits. **8 hours**

Module 3

Three Phase A.C Circuits: Necessity and advantages of three phase systems, generation of three phase power, definition of Phase sequence, balanced supply and

balanced load. Relationship between line and phase values of balanced star and delta connections. Measurement of power by two-wattmeter method. Illustrative examples.

Basic Instruments: Introduction, classification of instruments, Principle, Construction & Operation of dynamometer type Wattmeter, Single phase Induction type energy meter.

Domestic Wiring: Two-way and three-way control of a lamp, Electric shock, precautions against electric shock, Earthing: Pipe and Plate.

Self study component: Operating principles, essential features of measuring instruments (basics only), Moving coil permanent magnet (PMMC) instruments, Basics of moving iron ammeters and voltmeters, concept of extension of range of ammeter, voltmeter (shunt and multiplier). Service mains, meter board and distribution board. Types of wiring- Cleat, Casing & Capping and conduit (concealed) wiring, Elementary discussion on fuse and Miniature Circuit Breaker (MCB's). **8 hours**

Module 4

DC motors: Construction of DC machine , DC motor working principle, Back EMF and its significance. Torque equation, Problems on Torque equation, Characteristics of DC motors, applications, Necessity of starter.

Synchronous Generators: Principle of operation. Types and constructional features, EMF equation. Concept of winding factor (excluding derivation of distribution and pitch factors) Illustrative examples on EMF equation.

Self study component: DC Generators: Principle, construction and operation of DC generators. Types of DC generators, EMF equation of DC generator, basics of armature reaction, commutation, Interpoles, 3 point starter. **8 hours**

Module 5

Introduction to Transformers: Definition, need and classification, Construction, Working principle, EMF equation, losses, Regulation and efficiency, problems on EMF equation and efficiency.

Induction motors: Construction of induction motor, working principle, types, Slip and its significance, applications, necessity of starter, Star-Delta starter, Illustrative examples on slip calculation.

Self study component: Phasor diagram of Single-phase Transformer on no-load. Concept of rotating magnetic field. **8 hours**

Course Outcomes:

After completion of this course students will be able to:

1. Gain insight of Magnetic circuits and AC fundamentals.
2. Able to understand the construction and working principle of AC-DC Machines & Transformers.
3. Attain the knowledge of measuring instruments and able to build domestic wiring schemes.

Text Books:

1. "Basic Electrical Engineering", D.P. Kothari & I.J. Nagrath, Tata Mc Graw Hill Education.
2. "Basic Electrical Engineering" D. C. Kulshreshtha, TMH 1st Edition, Revised.

Reference Books :

1. " Problems in Electrical Engineering" , S.S. Parker Smith & NN Parker Smith.
2. "Basic Electrical Engineering", Jimmie J. Cathey, Syed A. Nasar, Schaum's Outline Series in Engineering, McGraw-Hill Book Company.
3. "Electrical & Electronics Technology", E. Hughes, PHI Publishers, 10th Edition.

BASIC ELECTRONICS ENGINEERING

Sub Code: ELN15/25	CIE:50
Hrs/ Week: 3	SEE:50
Total Hrs: 40	Credits: 3

Course Objectives:

To impart knowledge on

- Construction, operation and working of basic electronic devices.
- Principle of OPAMP, specifications and practical applications.
- Basics of digital concepts and number systems.
- Fundamentals of communications systems.

Module1

Semiconductor Diode and Applications: p-n junction diode, Characteristics and Parameters, DC load line analysis, Half-wave rectifier, Two-diode Full-wave rectifier, Bridge rectifier, Rectifier with Capacitor filter circuit, Zener diode, Numerical examples as applicable.

Bipolar Junction Transistors: BJT-Physical structure and operation, BJT Voltages and Currents, amplification, Common Base, Common Emitter and Common Collector Characteristics, Numerical examples as applicable.

Self study component: Derivations on Bridge rectifier, Zener diode voltage regulators: Regulator circuit with no load, Loaded Regulator, Diode approximations, BJT Biasing: DC Load line and Bias Point.

8 hours

Module 2

Devices (Construction, Operation and Characteristics): Field Effect Transistor, FET characteristics, MOSFET's, Types of MOSFET's, Silicon Controlled Rectifiers (SCR), Uni-Junction Transistor (UJT), Light Emitting Diode (LED).

Self study component: TRIAC and DIAC, Photo diode and Solar Cell, Seven Segment Displays.

8 hours

Module 3

Introduction to Operational Amplifiers: Introduction, Block diagram representation of OPAMP, Schematic symbol and pin configuration, Ideal OPAMP, practical characteristics, Virtual ground concepts, Inverting and Non Inverting OPAMP circuits, OPAMP applications: voltage follower, addition, Numerical examples as applicable.

Self study component: Subtraction, integration, differentiation, Complex Numerical Problems. **8 hours**

Module 4

Digital Concepts and Number Systems: Introduction to Number Systems, 1's and 2's complement method and their arithmetic.

Boolean Switching Algebra: Binary logic functions, Boolean algebra, Universality of NAND and NOR gate, Reduction of Boolean equations using Boolean algebra, Realization of Boolean functions using basic gates and Universal gates, Designing of Half adder and Full adder.

Self study component: Introduction, digital analog-Basic concepts. Positional number Systems, Number Systems conversions. **8 hours**

Module 5

Communication Systems: Introduction, Elements of Communication Systems, Modulation, Amplitude Modulation, Demodulation, Frequency Modulation (no derivation). Amplitude and Frequency Modulation: A comparison, Numerical examples as applicable.

Block diagram and Principle of Optical Fiber Communication, Advantages and Applications of Optical Fiber communication.

Self study component: Derivations on Frequency modulation**,** Mobile Telephone (Cellular Telephone), Super heterodyne receiver. **8 hours**

Course Outcomes:

Upon successful completion of this course, students should be able to:

1. Attain the knowledge of electronic devices, concepts of digital electronics and communication systems.
2. Understand the construction and operation of electronic devices.
3. Design simple circuits using diodes, operational amplifiers and logic gates.

Text Books:

1. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5th Edition, 2008.
2. Ramakant A. Gayakwad, "Op-amps and linear integrated circuits ", 4th Edition Prentice-HallLearning, New Delhi, 2002.
3. John M Yarbrough, "Digital Logic-Application and Design", Brooks/Cole Cengage Learning, India Edition.
4. George Kennedy, Electronic Communication Systems, TMH, 4th Edition.

Reference Books:

1. Robert Boylested and Louis Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education, 9th Edition, 2007.
2. Thomas Floyd, "Electronic Devices", Prentice Hall of India, New Delhi 2009.
3. Charles H Roth, Jr; "Fundamentals of Logic Design", Thomson Learning, 2004.
4. U B MahadevaSwamy, "A simplified approach to Basic Electronics", Sanguine Technical Publications, Bengaluru, 2015

WORKSHOP PRACTICE

Sub Code: WSL16/26	CIE:50
Hrs/ Week: 1I/2P	SEE:50
Total Hrs: 50	Credits: 2

Course Objectives:

It is essential for students of 1st year to undergo basic workshop practical training. The topics include practical works in welding and sheet metal shop and demonstration of various aspects.

- Workshop Practice helps the student to know how the work on shop floor is carried out.
- To impart knowledge and skill to use tools, machines, equipment, and measuring instruments.
- Educate students of Safe handling of machines and tools.
- To Gain knowledge of Power Tools and Hand Tools.

1. **Introduction:**

   Demonstration on use of Hand Tools: V-block, Marking Gauge, Files, Hack Saw, Drills, Taps, use of surface plate.

2. **Welding:** Study of electric arc welding tools & equipment.
   Models: Butt Joint, Lap Joint, L-joint and T-joint.

3. **Sheet Metal & Soldering Work:**
   Development & Soldering of the models: Frustum of cone, Prism (Hexagon & Pentagon), Funnel and Tray.

4. **Study & Demonstration** of power tools in Mechanical Engineering.

Course Outcomes:

At the end of the course, the student will be able to:
1. Gain knowledge of development of sheet metal models with an understanding of their applications.
2. Perform soldering and welding of different sheet metal & welded joints.
3. Understand the Basics of Workshop practices.
4. Gaining the knowledge of Power Tools and Hand Tools.

Reference Books

1. S K Hajra Choudhury, A K. Hajra Choudhury, "**Elements of Workshop Technology: Vol. I: Manufacturing Processes",** Media Promoters & Publishers Pvt Ltd., Mumbai. 15th Edition Reprinted 2013.

Examination scheme

Sheet Metal Work	**30 marks**
Welding	**10 marks**
Viva Voce	**10 marks**
Total marks: 50 marks	
Note: No mini drafters and drawing boards required. Drawings (Developments) can be done on sketch sheets using scale , pencil and Geometrical Instruments	

COMPUTER PROGRAMMING LABORATORY

Sub Code: CPL16/CPL26	CIE: 50
Hrs/ Week: 1I/2P	SEE: 50
Total Hrs: 50	Credits: 2

Course Objectives:

- To provide students with practical knowledge of programming skills and the analysis of program for the specific applications.
- To gain experience about structured programming
- To help students to understand the implementation of C language
- To understand various features in C

Laboratory Experiments

Implement the programs with WINDOWS / LINUX platform using appropriate C compiler.

1. Write a C program to
   a. Find the area and circumference of a circle.
   b. Find the simple interest.
2. Write a C program to
   a. Convert temperature from degree centigrade to Fahrenheit
   b. Find the sum of N subjects and percentage

3. Write a C program to find largest of three numbers
   a. Using nested if-else
   b. Using Ternary Operator
4. Write a C program to design a simple calculator using switch.
5. Write a C program to
   a. Generate and print first N prime numbers.
   b. Check the given 3 digit number is Armstrong or not.
6. Write a C program to
   a. Find factorial of a given number
   b. Find sum of even numbers between n1 and n2
7. Write a C program to sort the given array elements
   a. Using selection sort.
   b. Using Bubble sort.

8. Write a C program to
   a. Find transpose of given matrix
   b. Trace of a given matrix
   c. Find sum of matrix
9. Write a C program using functions to
   a. Generate first N Fibonacci series
   b. Find reverse of given number

10. Write a C program to create a structure called employee with the fields employee name, ID, Salary and print the same in the tabular format.
11. Write a C program to
    a. Swap two numbers using pointers
    b. Find the sum of 1-D array elements using pointers
12. Write a C program using functions to conduct binary search.

Reference Book:

1. Reema Thareja, **"Computer Fundamentals and Programming in C"**, Oxford Press, 2012.

Course Outcomes:

On completion of this course, students will have the knowledge in,

Students are able to have fundamental knowledge on basics of computer software, able to understand the basic terminologies used in computer programming. Students are in a position to write, compile and debug programs in C language and able to design programs involving decision structures, looping and functions. Students are exposed to various operating system environments in the laboratory.

Laboratory Final CIE marks Evaluation procedure:

CIE: 50 Marks → 25 Marks from continuous evaluation in every lab (10 Marks - record completion + 05 Marks - viva/ quiz + 10 Marks - conduction) + **25 Marks** from final lab CIE conduction (05 Marks - Write up + 15 Marks - execution + 05 Marks – Viva)

SEE: Practical Examination Conduction Procedure:

1. All laboratory experiments (Fourteen) are to be included for practical examination.
2. Students are allowed to pick one experiment from the lot.
3. Strictly follow the instructions as printed on the cover page of answer script for breakup of marks
4. Change of experiment is allowed only once and 10% Marks allotted to the procedure part to be made zero.

ENGINEERING PHYSICS LABORATORY

Sub Code: PHYL17/27	CIE:50
Hrs/ Week: 3 hours (1I/2P)	SEE:50
Total Hrs: 50	Credits: 2

Course Objectives:

1. To give hands on experience on various experiments.
2. To impart the knowledge in basic science such as in the field of semiconductors and their practical applications.
3. To train students in techniques and principles related to various devices or components.
4. To acquire ability to use measuring instruments.

List of experiments:

1. Diffraction grating (Measurement of wavelength of laser source using diffraction grating).
2. Newton's Rings (Determination of radius of curvature of plano convex lens).
3. Characteristics of a Transistor (Study of Input and Output characteristics and calculation of input resistance, output resistance and amplification factor).
4. Determination of resistivity of a semiconductor using a four probe technique.
5. Photo Diode Characteristics (Study of I–V characteristics in reverse bias and variation of photocurrent as a function of reverse voltage and intensity).
6. I–V Characteristics of a Zener Diode. (Determination of knee voltage and Zener voltage).
7. Dielectric constant (Measurement of dielectric constant using charging and discharging of a capacitor).
8. Determination of Planck's constant using LEDs.
9. Determination of energy gap of a semiconductor.
10. Determination of Fermi energy. (Measurement of Fermi energy in copper).
11. Series and parallel LCR Circuits (Determination of resonant frequency and quality factor).
12. Verification of Stefan's Law.

- Any ten experiments compulsory

Course outcomes:

1. Students can understand the importance of Physics in the practical applications.
2. Students get an understanding of the characteristics of devices and materials.
3. Students gain knowledge in various techniques and working principles related to devices or components.

Reference books

1. Lab Manual, Department of Physics, DSCE.
2. Engineering Physics, N.H. Ayachit and P.K. Mittal, IK International Publishing house Pvt. Ltd.

Scheme of evaluation for Engineering Physics lab

CIE (50 MARKS maximum)

- Total marks for the record (10 marks for each experiment) to be reduced to 10 marks (100/10)

Record = 10 marks
Viva = 5 marks
Observation book=10 marks
Total = 25 marks

- Lab Internal test:

15 marks for both experiments:

1. Write up: Formula, Circuit or optical diagram, Model graph, Tabular column, Statement of result. 5 marks
2. Performance of experiment. 10 marks
3. Calculation and results. 5 marks

Viva = 5 marks
Total = 25 marks

The total marks awarded for CIE: Viva + Observation book + Record book+ Lab internals) = 5+10+10+ 25 = **50 marks.**

SEE (50 MARKS maximum)

Semester End Exam: 25 marks x 2 experiment = 50 marks

25 marks for each experiment:

Write up: Formula, Circuit or ray diagram, Model graph, Tabular column, Statement of result.	5 marks
Performance of experiment	12 marks
Calculation and results	5 marks
Viva	3 marks
TOTAL =	25 marks

SEE total marks: 25 marks x 2 experiment = 50 marks

ENGINEERING CHEMISTRY LABORATORY

Sub Code: CHYL17/27	CIE:50
Hrs/ Week: 3 hours (1I/2P)	SEE:50
Total Hrs: 50	Credits: 2

Course Objectives:

- To provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.

LIST OF EXPERIMENTS:

PART-A: Instrumental

1. Determination of viscosity coefficient of a given organic liquid using Ostwald's Viscometer.
2. Estimation of copper by using Colorimeter.
3. Conductometric estimation of strength of an acid mixture using standard NaOH solution
4. Determination of pKa value of a weak acid using pH meter.
5. Potentiometric estimation of FAS using standard $K_2Cr_2O_7$ solution.
6. Estimation of Sodium & Potassium by Flame photometric method.

PART-B: Volumetric

1. Determination of Total Hardness of a sample of water using disodium salt of EDTA.
2. Determination of Calcium Oxide in the given sample of cement by Rapid EDTA method.
3. Determination of percentage of Copper in brass using standard sodium thiosulphate solution.
4. Determination of Iron in the given sample of Haematite ore solution using potassium dichromate crystals by external indicator method.
5. Determination of Chemical Oxygen Demand of the given industrial waste Water sample.
6. Determination of Dissolved Oxygen in the given water sample by Winkler's method.

Course Outcomes:

The students will gain the knowledge in:

1. Handling the different types of instruments for analysis using small quantities of materials for quick and accurate analysis.

2. By carrying out different types of titrations for estimation of materials present in different types of raw materials like ores and alloys etc.
3. Analysis of water for hardness, COD and alkalinity.

Reference books:

1. DSCE laboratory manual.
2. J. Bassett, R.C. Denny, G.H. Jeffery, A. I. Vogel, Text book of quantitative inorganic analysis, 4th Edition.
3. O. P. Vermani & Narula, "Theory and Practice in Applied Chemistry" New Age International Publisher
4. Gary D. Christian, " Analytical chemistry" 6th edition, wiley India

Scheme of Examination:

1. One instrumental and one volumetric experiment shall be set.
2. Different experiments shall be set under instrumental (Part A) and a common experiment under volumetric (Part B).

CONSTITUTION OF INDIA & PROFESSIONAL ETHICS

Sub Code: CIP19/29	CIE:50
Hrs/ Week: 2	SEE:50
Total Hrs: 30	Credits: 2

Course Objectives:

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.

Module 1

Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution. Preamble to the Indian Constitution Fundamental Rights & important case laws.

Self study component: Citizen, law & media. **6 hours**

Module 2

Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. Union Executives – President, Prime Minister, Parliament and Supreme Court of India.

Self study component: Law making, role of Union Executive and cyber laws. **6 hours**

Module 3

State Executives – Governor, Chief Minister, State Legislature, High Court of State. Amendment Procedures, 42nd, 44th, 74th, 76th, 86th & 91st Amendments.

Self study component: Role of Governor, conflicts between Government & Executive. **6 hours**

Module 4

Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions, Electoral Process in India and Human rights.

Self study component: Implementation & execution of provisions. **6 hours**

Module 5

Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering.

Self study component: Conflict of interest & engineers. **6 hours**

Course Outcomes:

After the study of the course, the students are able:

1. To have general knowledge and legal literacy and thereby to take up competitive examinations
2. To understand state and central policies, fundamental duties
3. To understand Electoral Process, special provisions
4. To have an awareness of human rights in the national perspective. and
5. To understand Engineering ethics and responsibilities of Engineers.

Text books:

1. Durga Das Basu: "Introduction to the Constitution on India", (Students Edn.) Prentice –Hall EEE, 19th / 20th Edn., 2001.
2. Charles E. Haries, Michael S Pritchard and Michael J. Robins "Engineering Ethics" Thompson Asia, 2003.
3. G.B.Reddy, Constitution of India and Professional Ethics, IK International Publishing house Pvt. Ltd., 2006.
4. C.S.V. Murthy, Indian Constitutional and Professional Ethics, Himalaya Publishing House, 2006.

Reference books:

1 "An Introduction to Constitution of India", Vikas Publishing, 2002.
2. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "Engineering Ethics", Prentice – Hall of India Pvt. Ltd. New Delhi, 2004.
3. Durga Das Basu: Introduction to the Constitution of India -New Delhi: Wadhwa and Company Law Publishers, 2002.
4. M. P. Jain, Outlines of Indian Legal and Constitutional History, Lexis Nexis, 6th edition, 2010.

ENVIRONMENTAL STUDIES

Subject Code: EVS19/29	CIE: 50
Hours/Week: 2	SEE: 50
Total hours : 30	Credits: 2

Course objectives:

1. Recognize major concepts in Environmental sciences and demonstrate in depth understanding of the environment.
2. Develop analytical skills. Critical thinking and demonstrate problem solving skills using scientific techniques.
3. Demonstrate the knowledge and training for entering graduate or professional schools or the jobs market.

Module 1

Environment - components of Environmental Eco system, Human activities Food, Shelter, Economic and Social Security.

Impacts of Agriculture & Housing impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development.

Self study component: Environmental Indicators. **6 hours**

Module 2

Natural Resources - Water resources, Availability and quality aspects. Water borne diseases, Water induced diseases, Fluoride problem in drinking water. Mineral Resources, Forest Wealth.

Energy - Different types of energy, Electra-magnetic radiation. Conventional and Non-Conventional sources - Hydro Electric, Fossil fuel based Nuclear, Solar, Biomass and Bio-gas. Hydrogen as an alternative future source of energy.

Self study component: Energy auditing in buildings. **6 hours**

Module 3

Environmental Pollution and their effects, Water pollution, Land pollution, Noise pollution, Public Health aspects.

Global Environmental issues: Population Growth, urbanization, land management, water and wastewater management.

Self study component: Urban lake pollution. **6 hours**

Module 4

Air pollution and automobile pollution: Definition, effects- Global warming Acid Rain, &Ozone layer depletion, controlling measures.

Solid waste management- Waste management & Biomedical waste management-sources, characteristics and disposal methods.

Self study component: Effect of air pollution to source and climate, e-waste. **6 hours**

Module 5

Introduction to GIS and Remote Sensing, Application of GIS & Remote Sensing in Sensing Environmental Engineering.

Environmental Acts & Regulations - Role of Government, Legal aspects, role of Non-Governmental Organizations (NGO).

Self study component: Other applications in GIS, Environmental Education. **6 hours**

Course outcomes:

Students will be able to

1. Understanding the principles of ecology and Environmental issues that apply to air, land and water issues on a global scale.
2. Develop critical thinking and /or observation skills and apply them to the analysis of a problem or question related to environment.

3. Demonstrate ecology knowledge of a complex relationship between predators, prey and plant community.
4. Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.

Note: Question paper is of objective type for 50 marks (Fifty questions have to be set with 4 multiple choice answers).Students have to pass the subject compulsorily.

Text Books:

1. Ranjit Daniels R.J. and Jagdish Kirshnaswamy, (2009), "Environmental Studies", Wiley India Private Ltd., New Delhi
2. Rajagopalan R. (2005), "Environmental Studies - From Crisis to Cure", Oxford University Press
3. Aloka Debi," Environmental Sciences and Engineering" Univerities press (India) Pvt Ltd, 2012
4. ErachBharucha (2005), "Text Book of Environmental Studies", for UGC, University Press

Reference Books:

1. Raman Sivakumar, (2005), "Principles of Environmental Science and Engineering", Second Edition, Cengage learning, Singapore.
2. Meenakshi P. (2006), "Elements of Environmental Science and Engineering", Prentice Hall of India Private Limited, New Delhi

ENGINEERING MATHEMATICS-II

Sub Code: MAT21	CIE:50
Hrs/ Week: 4	SEE:50
Total Hrs: 50	Credits: 4

Course Objectives:

1. Classify ordinary partial differential equation based on the order and degree and solve it by applying different techniques.
2. Recall Integration formulae and explain the method of evaluating double and triple integrals.
3. Explain Laplace transform and apply it to solve ordinary differential equations.

MODULE 1

LINEAR DIFFERENTIAL EQUATIONS WITH CONSTANT COEFFICIENTS:

Second and higher order linear ordinary Differential Equations with constant coefficients- General solution of Homogeneous Equations, Method of finding Particular Solution- Inverse Differential operator Method.

Self study component: Method of variation of parameters. **10 hours**

MODULE 2

LINEAR DIFFERENTIAL EQUATIONS WITH VARIABLE COEFFICIENTS:

Solution of Cauchy and Legendre Differential Equations.

PARTIAL DIFFERENTIAL EQUATIONS:

Formation of PDE by elimination of arbitrary constants and arbitrary functions. Solution of Linear Partial Differential Equations of First Order-Method of grouping, Method of multipliers. Solution of Non homogenous Partial Differential Equations by direct integration method.

Self study component: Power Series solution of differential Equation. **10 hours**

MODULE 3

INTEGRAL CALCULUS:

Reduction formulae: $\int sin^n xdx$, $\int cos^n xdx$, $\int sin^m xcos^n xdx$, where n and m are positive integers, evaluation of the integrals with standard limits $(0, \frac{\pi}{2})$. Beta and gamma functions.

Self study component: Definite integrals-Limit as a sum. **10 hours**

MODULE 4

MULTIPLE INTEGRALS:

Evaluation of double Integrals, Change of order in double Integral, Change of Variables in Double Integral, Evaluation of Triple Integrals, Application of Double Integrals.

Self study component: Application of Triple Integrals. **10 hours**

MODULE 5

LAPLACE TRANSFORMS:

Definition and Laplace Transforms of Elementary functions, Laplace Transforms of $e^{at}f(t), t^n f(t)$ and $\frac{f(t)}{t}$, Periodic functions, Unit step function.

Inverse Laplace Transforms:

Inverse Laplace Transforms- By the method of Partial Fractions, Logarithmic and Trigonometric functions, Convolution Theorem (statement only)-problems. Solution to Linear Differential Equations by Laplace Transform.

Self study component: Unit impulse function. **10 hours**

Text Books:

1. B.S. Grewal, "Higher Engineering Mathematics" Khanna Publishers, 43rd Edition, 2013, ISBN: 9788174091956.

2. H. K. Dass, Er. Rajnish Verma, "Higher Engineering Mathematics", S. Chand Publishers, 3rd Edition, 2014, ISBN: 9788121938907.

References:

1. B.V.Ramana, "Higher Engineering Mathematics", Tata Mc Graw-Hill, 2006; ISBN: 9780070634190.

2. N.P. Bali & Manish Goyal, "A text book of Engineering Mathematics", Laxmi Publications, 8th Edition; ISBN: 9788131808320.

3. Murray Speigel, Schaum's Outline of "Advanced Mathematics for Engineers and Scientists" McGraw-Hill, 1971; ISBN: 9780070602168.

4. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publishing House, 2002; ISBN: 8173194203.

Course Outcomes:

On completion of the course a student will be able to

1. Reproduce techniques to solve differential equation (Ordinary differential equation & Partial differential equation), recall and extend the concepts of Integrals, explain Laplace Transform.

2. Solve differential equation, practice Integration, and apply Laplace transform.

3. Formulate and solve differential equation, integrate double, triple, improper integrals, appraise Laplace transform.

KANNADA KALI (Only for Non-Karnataka Students)
(Non Credit Mandatory Course)

Sub Code: KAN10/20	CIE:50
Hrs/ Week: 2	SEE:NA
Total Hrs: 30	Credits: Pass Grade

Course Objectives:

Non Karnataka students are taught Kannada through Kannada Kali.

Module 1

Introducing each other – 1. Personal Pronouns, Possessive forms, Interrogative words.

Introducing each other – 2. Personal Pronouns, Possessive forms, Yes/No Type Interrogation

Enquiring about a room for rent. Qualitative and quantitative adjectives.

Self study component: About Ramayana. Possessive forms of nouns, dubietive question, Relative nouns. **6 hours**

Module 2

Enquiring about the college. Predicative forms, locative case.

In a hotel-dative case defective verbs.

Planning for a picnic. Imperative, Permissive, hortative.

Self study component: Vegetable market. Numeral, plurals. **6 hours**

Module 3

Conversation between Doctor and the patient. Verb- iru, negation – illa, non – past tense.

Doctors advise to Patient. Potential forms, no–past continuous.

About Brindavan Garden. Past tense, negation.

Self study component: Discussing about a film. Past tense, negation. **6 hours**

Module 4

About routine activities of a student. Verbal Participle, reflexive form, negation.

Telephone conversation. Past and present perfect past continuous and their negation.

About Halebidu, Belur. Relative, principle, negation.

Self study component: Discussing about examination and future plan. Simple conditional and negative. **6 hours**

Module 5

Kannada Bhaashe (Lesson for reading)

Manataruva Sangatialla (Lesson for reading)

Beku Bedagalu (lesson for reading)

Self study component: About Karnataka **6 hours**

Course Outcomes:

Non Karnataka students will be able to interact in day to day activities.

Text books:

1. H K Lakappa Gowda, Sahitya: Bahumukha Chintane, IBH Prakashana.
2. Vivek Rai, Kannada Nudinadeya Barahagalu, Sapna Books.
3. K V Narayana, Kannada Adunudiya Sollarime, Pragathi Publishers.
4. Rahamath Tharikeri, Maradolagana Kichchu, Abhinava Publishers.

Note:

Each student admitted to the B.E program needs to register for these mandatory courses. There is no Semester End Examination (SEE) for the mandatory courses. The Pass Grade / Not Passed will be awarded to the student based on the performance in the Continuous Internal Evaluation (CIE). Students who do not secure the Pass Grade for the mandatory courses are not eligible for the award of the degree.

KANNADA MANASU (Only for Karnataka Students)
(Non Credit Mandatory Course)

Sub Code: KAN10/20	CIE:50
Hrs/ Week: 2	SEE:NA
Total Hrs: 30	Credits: Pass Grade

Course Objective:

Students of Karnataka will be able to know about culture of Karnataka.

ಕನ್ನಡ ಮನಸು

೧. ಶ್ರಾವಣ (ಕವನ) ದ. ರಾ. ಬೇಂದ್ರೆ.
೨. ಡಾ. ವಿಶ್ವೇಶ್ವರಯ್ಯ ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ (ವ್ಯಕ್ತಿಚಿತ್ರ) ಎ. ಎನ್. ಮೂರ್ತಿರಾವ್.
೩. ದೋಣಿ ಸರಿಗೋಬುಗಳಲ್ಲಿ (ಪ್ರವಾಸ ಕಥನ), ಶಿವರಾಮ ಕಾರಂತ.
೪. ಅಜ್ಜನ ರೇಷ್ಮೆ ಕಾಯಿಲೆ (ಪ್ರಬಂಧ) ಕುವೆಂಪು.
೫. ನಮ್ಮ ಎಮ್ಮೆಗೆ ಮಾತು ತಿಳಿಯುವುದೇ (ವಿನೋದ), ರೊರೂರು ರಾಮಸ್ವಾಮಿ ಅಯ್ಯಂಗಾರ್.
೬. ಅನೇಸಳ್ಳದಲ್ಲಿ ಸುಡುರಿಯರು (ವಿಜ್ಞಾನ ಲೇಖನ) ಜಿ. ಜಿ. ಎಲ್ ಸ್ವಾಮಿ.
೭. ಬೆಡ್ ನಂ. ಏಳು (ಕಥೆ) ತ್ರಿವೇಣಿ
೮. ರೊಟ್ಟಿ ಮತ್ತು ಕೋವಿ (ಕವನ) ಮು. ರಂ. ಎಕ್ಕುಂಡಿ.
೯. ರುಬ್ಬಿಡ್ಡಿ ರೂಡು (ಅಂಕಣ ಬರಹ), ಏಂಕೇಶ್.
೧೦. ಜೀಂಕ್ರ ಮೇಷ್ಟ್ರಿ ಮತ್ತು ಸಾವು ಮೀನು (ಪರಿಸರ ಲೇಖನ), ಕೆ. ಪೂರ್ಣಚಂದ್ರ ತೇಜಸ್ವಿ.
೧೧. ಡಾಂಧಿ (ಕಥೆ), ಬೆಸಗರಹಳ್ಳಿ ರಾಮಣ್ಣ
೧೨. ಬೆಟ್ಟಿಯ ಹಾಡು (ಕವನ), ಸಿದ್ಧಲಿಂಗಯ್ಯ.
೧೩. ಎಳ್ಳಿ ಸುಡುರಿಯರ ಕವಿಮ (ಕವನ), ನವಿತಾ ನಾಗಭೂಷಣ.
೧೪. ನೀರು (ಕಥೆ), ಬನವರಾಜ ಕುಕ್ಕರಹಳ್ಳಿ.
೧೫. ಕರ್ನಾಟಕ ನಂವ್ಯತಿಯ ಸ್ವರೂಪ (ಪರಿಚಯ ಲೇಖನ), ರಹಮತ ತರೀಕೆರೆ.

Self study component:

Proverbs (Gadhegalu), Kannada Poets (Kavigalu), Short stories (Kathegalu), Essays (Prabhandagalu), Own sentences (Swantha Vakya).

30 hours

Course Outcome:

Through the study of this course Students of Karnataka will understand history, culture, practices and heritage of Karnataka.

Note:

Each student admitted to the B.E program needs to register for these mandatory courses. There is no Semester End Examination (SEE) for the mandatory courses. The Pass Grade / Not Passed will be awarded to the student based on the performance in the Continuous Internal Evaluation (CIE). Students who do not secure the Pass Grade for the mandatory courses are not eligible for the award of the degree.

BUSINESS COMMUNICATION AND PRESENTATION SKILLS

Sub Code: BCP18/28	**CIE:50**
Hrs/ Week: 2	**SEE:50**
Total Hrs: 30	**Credits: 2**

Course Objectives:

To train the students to develop their communication skills as a competent prospective engineer. This course also offers the students to be well equipped to apply for a job, writing reports and participate in group discussions and face interviews. This course also provides the students to be familiar with newer techniques in technical communication.

Module 1

Business communication covering, Role of communication in information age; concept and meaning of communication; skills necessary for technical communication; Communications in a technical organization.

Self study component: Barriers to the process of communication. **6 hours**

Module 2

Style and organization in technical communication covering, Listening, speaking, reading and writing as skills; Objectivity, clarity, precision as defining features of technical communication; Language and format of various types of business letters; Language and style of reports; Report writing strategies.

Self study component: Various types of business writing: Letters, reports, notes, memos;

Analysis of a sample report for report writing. **6 hours**

Module 3

Communication and personality development covering, Psychological aspects of communication, cognition as a part of communication; Emotional Intelligence; Politeness and

Etiquette in communication; Cultural factors that influence communication.

Self study component: Mannerisms to be avoided in communication; Language and persuasion; Language and conflict resolution. **6 hours**

Module 4

Oral Presentation and professional speaking covering the basics of English pronunciation; Elements of effective presentation; Body Language and use of voice during presentation; Connecting with the audience during presentation; Projecting a positive image while speaking; Planning and preparing a model presentation; Organizing the presentation to suit the audience and context.

Self study component: Basics of public speaking; Preparing for a speech. **6 hours**

Module 5

Career oriental communication covering, Resume and biodata: Design & style; Applying for a job: Language and format of job application. How to prepare for interviews; Language and style to be used in interview; Group Discussion: structure and dynamics and effective participation in group discussion.

Self study component: Advanced Techniques in Technical Communication covering, Interview through telephone/video-conferencing; Power-point presentation and email, using internet materials for project reports; Writing for the media; Model group discussions.

6 hours

Text/Reference books:

1. Fred Luthans, Organizational Behaviour, McGraw Hill Higher education 12 edition.

2. Lesikar and petit, Report writing for Business McGraw-Hill/Irwin; 10 edition.

3. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hill; 2005.

4. Jackie L. Jankovich-Hartman, Elaine A. Lemay, Presentation Success: A Step-by-step Approach, Thomson Learning.

5. Farhathullah, T. M. Communication skills for Technical Students, Orient Blackswan, 2002.

BIOLOGY FOR ENGINEERS

Sub Code: BIE18/28	**CIE:50**
Hrs/ Week: 2	**SEE:50**
Total Hrs: 30	**Credits: 2**

Course objectives:

- To understand fundamentals of biological mechanisms of living organisms from the perception of engineers.
- In addition, the course is expected to encourage engineering students to think about solving biological problems with engineering tools.
- To understand Biological Diversity of living world and important macromolecules.
- To understand the molecular mechanisms of skeletal and muscular system to extrapolate instruments like Biosensors.
- General principles of cell signalling in Nervous system and Immune system.

MODULE 1

CELL BIOLOGY

Cell theory; Overview of Cell; comparison of cell types; Cell Structure and Function, cell division; Homoeostasis.

Self study: Cell reproduction and differentiation **6 hours**

MODULE 2

BIOCHEMISTRY

Genetic information flow; Biological Diversity; Chemistry of life; Enzymes: various enzymes & their applications in industries & other fields.

Self study: Tissue engineering & its applications **6 hours**

MODULE 3

MUSCULOSKELETAL SYSTEM AND ITS APPLICATIONS

Human muscular system; Human skeletal; joints and types of movements in human body

Self study: Applications – Mechatronics. **6 hours**

MODULE 4

NEURAL SYSTEM AND ITS APPLICATIONS

Nervous system; neuromuscular junction; action potential.

Self study: Application of Neural networks; data mining/optical character recognition.

6 hours

MODULE 5

CELL SIGNALING

General principles of cell signalling in a plant cell, animal cell and microbial cell.

Self study: cell signalling in immune system. **6 hours**

Course outcomes:

1. Graduate will be able to understand the basic organization of organisms.
2. Graduate will be able to analyze the various phenomena in the cell and extrapolate it to engineering fields.
3 Graduate will be knowledgeable/ skilful to solve a biological problem that requires engineering expertise.

Text books:

1. "Biology for engineers" S. Thyagarajan, N. Selvamurugan, M.P.Rajesh, R.A.Nazeer, Richard W. T, S. Bharathi and M.K. Jagannathan, TMH, New Delhi 2012.
2. "Biology for engineers" Arthur T. Johanson, CRC Press 2010.

3. "Ross and Wilson's Anatomy and physiology in Health and Illness" Anne Waugh and Allison Grant 3rd edition, Churchill livingstone publication.

Reference books:

1. "Handbook of General Anatomy" B.D. Churasia, 4th edition CBS Publisher.
2. Essentials of Medical Physiology, K. Sembulingam & Prema Sembulingam, Jaypee Publications, 2004.

CONTRIBUTOR PERSONALITY DEVELOPMENT
(Non Credit Mandatory Course)

Sub Code: CPD10/20	CIE:50
Hrs/ Week: 2	SEE:NA
Total Hrs: 30	Credits: Pass Grade

Course Objectives:

Objective is to train engineering students for developing contributor personality.

Module 1

UNIT-1: Who is a contributor?, Concept Explorations & application examples, Project 1: To recognize "contributor qualities" in action, and understand why contributors are valued so much in work place.

UNIT-2: The contributor's identity, being and becoming; Concept Explorations & application examples, Project 1: To recognize static identities and dynamic identities in people around me (people know and meet day in and day out)

Self study component: Remaining Projects of Units 1 & 2. **6 hours**

Module2

UNIT-3: The contributor's vision of success, not only external rewards but also deep inner fulfillment; Concept Explorations & application examples, Project 1: To recognize how a contributor consciously widens and deepens his/her "success vision" through life's experiences (Using film based case studies)

UNIT-4: The contributor's vision of career, from acquisitive career to contributive career; Concept Explorations & application examples, Project 1: To learn "contributor career strategies" from an experienced contributor.

Self study component: Remaining projects of units 3 & 4. **6 hours**

Module 3

UNIT-5: The scope of contribution, contribution to self, organization & society; Concept Explorations & application examples Project 1: To identify case examples of people who have widened their scope of contribution.

UNIT-6: Embarking on the journey to contributorship, from victim to creator of my own destiny, Concept Explorations & application examples, Project 1: To embark on the journey of contributorship.

Self study component: Remaining projects of Units 5 & 6. **6 hours**

Module 4

UNIT-7: Design solutions, Concept Explorations & application examples, Project 1: To identify how people (contributors) have found solutions to challenges they have face, and how they practiced designing solutions.

UNIT-8: Focus on value, Concept Explorations & application examples. Project 1: To study how people (contributors) are "focused on value" in their work and how they demonstrated 'value focus' practices.

Self study component: UNIT-9: Engage deeply, Concept Explorations & application examples; Project 1: To study how people (contributors) "engage deeply "in their work and how they demonstrated "engaging deeply "practices. **6 hours**

Module 5

UNIT-10: Think in enlightened self-interest, Concept Explorations & application examples, Project 1: To study how people (contributors) "think in enlightened self-interest.

UNIT-11: Practice imaginative sympathy, Concept Explorations & application examples, Project 1: To study how people (contributors) "practice imaginative sympathy".

Self study component: UNIT-12: Demonstrate trust behavior, Concept Explorations & application examples, Project 1: To study how people (contributors demonstrate "trust behavior". **6 hours**

Course Outcomes:

Engineering students will be able to become successful contributors.

Text books:

Become a contributor; develop your contributor personality, i-become publications, www.i-become.org

Note:
Each student admitted to the B.E program needs to register for these mandatory courses. There is no Semester End Examination (SEE) for the mandatory courses. The Pass Grade / Not Passed will be awarded to the student based on the performance in the Continuous Internal Evaluation (CIE). Students who do not secure the Pass Grade for the mandatory courses are not eligible for the award of the degree.

CPD course conduction, Evaluation and submission of marks:

1. The teaching department of CPD is respective branches.
2. The teaching faculties have to maintain the record of attendance.
3. CPD faculties have to make an internal assessment (IA) of 25 marks based on student attendance, class participation and interaction.
4. The semester end test question paper will consist of two parts; Part A will have 3 questions of 5 marks each (15 marks) and Part-B will have a case study analysis for 10 marks.
5. Semester end CPD test for 25 marks have to be evaluated and marks entered in attendance register beside IA marks, the total to be computed.
6. All marks to be entered in student blue books and to be signed by teaching faculty and department head. The blue books will remain in the respective departments.
7. The final marks list for 50 marks duly signed by teaching faculty and HOD to be submitted to First year office.

DAYANANDA SAGAR COLLEGE OF ENGINEERING

(An Autonomous Institution affiliated to Visvesvaraya Technological University, Belagavi)

CHOICE BASED CREDIT SYSTEM (CBCS)

SCHEME OF TEACHING AND EXAMINATION 2016

I SEMESTER B.E (Common to All Branches) PHYSICS GROUP

Sl. No.	Subject Code	Subject	Course Type	Board	Teaching Hours/ Week			Examination			Credits
					L	T/ I	P	CIE	SEE	Total	
1	MAT11	Engineering Maths-I	BS	Maths	4	0	0	50	50	100	4
2	PHY12	Engineering Physics	BS	BS & HSS	4	0	0	50	50	100	4
3	CIV13	Elements of Civil Engg. & Engineering Mechanics	EC	Civil Engg.	3	0	0	50	50	100	3
4	EME14	Elements of Mechanical Engg.	EC	Mech. Engg.	3	0	0	50	50	100	3
5	ELE15	Basic Electrical Engg.	EC	EEE	3	0	0	50	50	100	3
6	WSL16	Workshop Practice	EC	Mech. Engg.	0	1	2	50	50	100	2
7	PHYL17	Engg. Physics Lab	BS	BS & HSS	0	1	2	50	50	100	2
8	BCP18	Business Communication and Presentation skills	HSS	BS & HSS	2	0	0	50	50	100	2
9	CIP19	Constitution of India and Professional Ethics	HSS	BS & HSS	2	0	0	50	50	100	2
10	KAN10	Kannada Language*	HSS	BS & HSS	2	0	0	50	--	50	Pass Grade
		Total						500	450	950	25

BS: Basic Science, EC: Engineering Core, HSS: Humanities and Social Sciences, CIE: Continuous Internal Evaluation, SEE: Semester End Examination 1Hr. Lecture (L), Tutorial/ Instruction (T/ I)=1credit, 2Hrs. Practical=1credit

Students shall have to pass *Mandatory Audit course (non credit) before completion of IV Semester

Self study component (all subjects) and Illustrative examples (Maths) in the syllabus: No questions shall be included in the CIE and SEE from this portion.

DAYANANDA SAGAR COLLEGE OF ENGINEERING

(An Autonomous Institution affiliated to Visvesvaraya Technological University, Belagavi)

CHOICE BASED CREDIT SYSTEM (CBCS)

SCHEME OF TEACHING AND EXAMINATION 2016

(Common to All Branches) PHYSICS GROUP

II SEMESTER B.E.

Sl. No.	Subject Code	Subject	Course Type	Board	Teaching Hours/ Week			Examination			Credits
					L	T/ I	P	CIE	SEE	Total	
1	MAT21	Engineering Maths-II	BS	Maths	4	0	0	50	50	100	4
2	PHY22	Engineering Physics	BS	BS & HSS	4	0	0	50	50	100	4
3	CIV23	Elements of Civil Engg. & Engineering Mechanics	EC	Civil Engg.	3	0	0	50	50	100	3
4	EME24	Elements of Mechanical Engg.	EC	Mech. Engg.	3	0	0	50	50	100	3
5	ELE25	Basic Electrical Engg.	EC	EEE	3	0	0	50	50	100	3
6	WSL26	Workshop Practice	EC	Mech. Engg.	0	1	2	50	50	100	2
7	PHYL27	Engg. Physics Lab	BS	BS & HSS	0	1	2	50	50	100	2
8	BCP28	Business Communication and Presentation skills	HSS	BS & HSS	2	0	0	50	50	100	2
9	CIP29	Constitution of India and Professional Ethics	HSS	BS & HSS	2	0	0	50	50	100	2
10	KAN20	Kannada Language*	HSS	BS & HSS	2	0	0	50	--	50	Pass Grade
		Total						500	450	950	25

BS: Basic Science, EC: Engineering Core, HSS: Humanities and Social Sciences, CIE: Continuous Internal Evaluation, SEE: Semester End Examination 1Hr. Lecture (L), Tutorial/ Instruction (T/ I)=1credit, 2Hrs. Practical=1credit

Students shall have to pass *Mandatory Audit course (non credit) before completion of IV Semester

Self study component (all subjects) and Illustrative examples (Maths) in the syllabus: No questions shall be included in the CIE and SEE from this portion.

DAYANANDA SAGAR COLLEGE OF ENGINEERING

(An Autonomous Institution affiliated to Visvesvaraya Technological University, Belagavi)

CHOICE BASED CREDIT SYSTEM (CBCS)

SCHEME OF TEACHING AND EXAMINATION 2016

I SEMESTER B.E. (Common to All Branches) CHEMISTRY GROUP

Sl. No.	Subject Code	Subject	Course Type	Teaching Department	Board	Teaching Hours/ Week			Examination			Credits
						L	T/ I	P	CIE	SEE	Total	
1	MAT11	Engineering Maths - I	BS	MAT	Maths	4	0	0	50	50	100	4
2	CHY12	Engineering Chemistry	BS	CHY	BS & HSS	4	0	0	50	50	100	4
3	PIC13	Programming in C	EC	CS	CS Engg.	3	0	0	50	50	100	3
4	CED14	Computer Aided Engineering Drawing	EC	ME	Mech. Engg.	2	0	4	50	50	100	3
5	ELN15	Basic Electronics Engg.	EC	ECE	ECE	3	0	0	50	50	100	3
6	CPL16	Computer Programming Lab	EC	CS	Computer Science	0	1	2	50	50	100	2
7	CHYL17	Engg. Chemistry Lab	BS	CHY	BS & HSS	0	1	2	50	50	100	2
8	BIE18	Biology For Engineering	EC	ML & Biotech	Medical electronics	2	0	0	50	50	100	2
9	EVS19	Environmental Studies	EC	Civil Engg.	Civil Engg.	2	0	0	50	50	100	2
10	CPD10	Contributor Personality Development*	HSS	Engg	BS & HSS	2	0	0	50	-	50	Pass Grade
Total									500	450	950	25

BS: Basic Science, EC: Engineering Core, HSS: Humanities and Social Sciences, CIE: Continuous Internal Evaluation, SEE: Semester End Examination 1Hr. Lecture (L), Tutorial/ Instruction (T/ I)=1credit, 2Hrs. Practical=1credit

Students shall have to pass *Mandatory Audit course (non credit) before completion of IV Semester

Self study component (all subjects) and Illustrative examples (Maths) in the syllabus: No questions shall be included in the CIE and SEE from this portion.

DAYANANDA SAGAR COLLEGE OF ENGINEERING

(An Autonomous Institution affiliated to Visvesvaraya Technological University, Belagavi)

CHOICE BASED CREDIT SYSTEM (CBCS)

SCHEME OF TEACHING AND EXAMINATION 2016

II SEMESTER B.E. (Common to All Branches) CHEMISTRY GROUP

Sl. No.	Subject Code	Subject	Course Type	Teaching Department	Board	Teaching Hours/ Week			Examination			Credits
						L	T/ I	P	CIE	SEE	Total	
1	MAT21	Engineering Maths - II	BS	MAT	Maths	4	0	0	50	50	100	4
2	CHY22	Engineering Chemistry	BS	CHY	BS & HSS	4	0	0	50	50	100	4
3	PIC23	Programming in C	EC	CS	Computer Science	3	0	0	50	50	100	3
4	CED24	Computer Aided Engineering Drawing	EC	ME	Mech. Engg.	2	0	4	50	50	100	3
5	ELN25	Basic Electronics Engg.	EC	ECE	ECE	3	0	0	50	50	100	3
6	CPL26	Computer Programming Lab	EC	CS	Computer Science	0	1	2	50	50	100	2
7	CHYL27	Engg. Chemistry Lab	BS	CHY	BS & HSS	0	1	2	50	50	100	2
8	BIE28	Biology For Engineering	EC	ML & Biotech	Medical electronics	2	0	0	50	50	100	2
9	EVS29	Environmental Studies	EC	Civil Engg.	Civil Engg.	2	0	0	50	50	100	2
10	CPD20	Contributor Personality Development*	HSS	Engg	BS & HSS	2	0	0	50	-	50	Pass Grade
Total									500	450	950	25

BS: Basic Science, EC: Engineering Core, HSS: Humanities and Social Sciences, CIE: Continuous Internal Evaluation, SEE: Semester End Examination 1Hr. Lecture (L), Tutorial/ Instruction (T/ I)=1credit, 2Hrs. Practical=1credit

Students shall have to pass *Mandatory Audit course (non credit) before completion of IV Semester

Self study component (all subjects) and Illustrative examples (Maths) in the syllabus: No questions shall be included in the CIE and SEE from this portion.

DAYANANDA SAGAR COLLEGE OF ENGINEERING

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CHOICE BASED CREDIT SYSTEM (CBCS)

SCHEME OF TEACHING AND EXAMINATION 2016

Common Scheme of CIE for all subjects

Total marks for CIE: **50 marks** (Only 2 tests, students should attend both compulsorily)

1. CIE marks= 30 marks
2. Assignment for each CIE = 10 marks (Maximum 2 questions, 2 x 5 marks = 10 marks)
3. Students can choose any two from the following for each CIE: (5 marks each x 2 = 10 marks)
    - Self learning component (as assignment submission or demo or presentation**)** submission based on the syllabus(at least 500 words, 5 marks)
    - Quiz (10 questions reduce to 5 marks)
    - Reflection note submission on Guest lecture related to the subject (at least 500 words, 5 marks)
    - Surprise test (Answer any one out of two 5 marks questions).

Note: For self learning component, a list of topics (around 10) related to the respective portions may also be circulated to the students by the faculties.

DEPARTMENT OF ARCHITECTURE, DSCE

(Autonomous Institution Affiliated to VTU, Belgaum)

SCHEME OF TEACHING AND EXAMINATION 2016-2017

I SEMESTER B.Arch

Sl. No	Subject Code	Subject	Evaluation Type	Teaching Dept	Board	Credit Hours/ Week			Contact Hours/Week	Examination			Duration of Exam (Hrs)	Credits
						S	T	P		CIE	SEE	Total		
1	AT1AD	Architectural Design- Introductory Course	SEE - VIVA	Arch	Arch	7	1	0	8	50	50	100	-	7
2	AT1BCM	Building Construction and Materials- Masonry and	SEE - EXAM	Arch	Arch	4	2	0	6	50	50	100	4	5
3	AT1GRA	Introduction to Architectural Graphics	SEE - EXAM	Arch	Arch	3	1	0	4	50	50	100	3	3
4	AT1HOA	History of Architecture- Early Civilization	SEE - EXAM	Arch	Arch	0	3	0	3	50	50	100	3	3
5	AT1STR	Introduction to Structures	SEE - EXAM	Arch	Arch	0	3	0	3	50	50	100	3	3
6	AT1CS	Communication Skills	CIE	Arch	Arch	0	0	2	2	50	--	50	--	M
7	AT1BDV	Basic Design & Visual Aesthetics	SEE-CIE	Arch	Arch	6	0	0	6	50	--	50	--	2
8	AT1ADP	Architectural drawing & presentation	CIE	Arch	Arch	3	0	0	3	50	-	50	--	2
					Total				**35**	**400**	**250**	**650**		**25**

CIE: Continuous Internal Evaluation, **SEE**: Semester End Examination **S**: Studio, **T**: Theory And **P:** Practical

ARCHITECTURAL DESIGN: Introductory Course

Sub Code	: AT1AD	CIE	: 50
Hrs/ Week	: 08	SEE	: 50
Total Hrs	: 128	Credits: 7	

COURSE OBJECTIVES:

To develop the ability to translate abstract principles of design into architectural solutions for simple problems

MODULE I

What architectural education entails? What being an architect involves? And Architecture's connection with other forms of knowledge: Science, Mathematics, Philosophy, Religion, etc.

Local stories on Architecture.

Listing of important local buildings and explain why they are important. Listing and Drawing silhouettes of favorite buildings or places.

Observing the built environment around and experiencing enclosures (field trips)

MODULE II

Learning basics of architectural representation.

Scaled and measured drawing exercise of familiar objects & spaces - a table (object), a classroom and a staircase (static/transition spaces), pavilion, open/ enclosed spaces etc.

Collection and documentation of all building materials within 5 km radius

MODULE III

Introduction to basic development of forms: additive form, deductive form, rhythm, contrast, balance and symmetry.

Concepts of volume and scale, width to height ratio

Study models to explore the design principles. Multiple sectional drawings of study models

Introduction to anthropometry; relationship of architecture with human body

MODULE IV

Human functions and their implications for space requirements. Minimum and optimum areas for mono functions. User's data, movement and circulation diagrams. Spatial interpretations – various activities and their relationship with spaces

MODULE V

Introduction to furniture; relationship of objects with human body. Portfolio of study and design through drawing/representation

Design of functional furniture layout, circulation, lighting and ventilation for spaces such as living/dining, bedrooms, Architects office, Doctors clinic etc

Note:

The portfolio cov*ering all the assignments shall be presented for evaluation.*

REFERENCES:

1. ***Time Saver Standards for Architectural Design Data*** by John Hanock
2. ***Architectural Graphic Standards*** by Ramsay and Sleeper
3. ***Indian Anthropometric Dimensions for Ergonomic Design Practice*** by Debkumar Chakrabarti

BUILDING AND CONSTRUCTION MATERIALS: Masonry and Foundations

Sub Code	: AT1BCM	CIE	: 50
Hrs/ Week	: 06	SEE	: 50
Total Hrs	: 96	Credits: 5	

COURSE OBJECTIVE:

To introduce building materials and building elements and their intrinsic relationship to basic Building Systems

MODULE I

1. **Making Buildings 1**: Materials, Building Systems Overview (know-how of building materials and construction)
2. **Making Buildings 2**: Various conventions used for drawing plan, sections and elevations.
3. **Introduction to Brick Masonry Construction:** Brick as a building material: Types, properties, uses and manufacturing methods.

MODULE II

4. **Brick masonry load bearing wall construction:** Types of brick masonry walls and bonds, foundations, mortar type, plasters, buttresses, arches and lintels.
5. **Field visit:** Brick kiln, Sawmill, stone quarry, etc –Report on site visit.
6. **Stone Masonry Construction:** Stone as a building material: Types, properties and uses, quarrying
7. **Stone masonry load bearing wall construction**: Types of walls, bonds, arches and lintels.

MODULE III

8. **Wall construction**: Introduction to wall construction and detailing with building materials: Hollow and solid Concrete Blocks, Hollow and solid clay Blocks, Fly ash Blocks, Aerated Concrete Block, stabilized mud blocks, Glass Blocks, etc. Properties, uses and manufacturing methods.

MODULE IV

9. **Masonry Foundation:** Simple load bearing foundations in brick and stone
10. **Introduction to Wood as a Building Material:** Types – Natural, hard and softwood. Quality of timber used in buildings, defects, seasoning and preservation of timber.

MODULE V

11. **Wooden door assembly and production:** Types of wooden Doors, i.e., Battened, ledged, braced, paneled, flush and glazed doors. Study of joinery details.
12. **Wooden windows assembly and production:** Types of wooden glazed windows, study of joinery details.

Note:

Minimum one plate on each topic, site visits to be arranged by studio teacher. Study of material application in the form of portfolio. Material Pallette mandatory. All the plates on construction and portfolio on material application shall be assessed for progressive marks.

REFERENCES:

1. ***Building Construction*** by W.B. Mackay
2. ***Construction Technology*** by Chudley
3. ***Construction of Buildings*** by Barry
4. ***Building Construction*** by Francis D K Ching

ARCHITECTURAL GRAPHICS: Introductory Course

Sub Code	: AT1GRA	CIE	: 50
Hrs/ Week	: 04	SEE	: 50
Total Hrs	: 64	Credits: 3	

COURSE OBJECTIVE:

To introduce students to the fundamental concepts and techniques of graphical drawings, and multi-angle representations of built elements and built forms with applicable renderings

MODULE I

1. **Introduction to visual representation and scales:** The basic principles of drawing and sign conventions; the concept of scales and application in architecture.
2. **Practice in lettering:** Lettering used in architectural drawings, including different fonts.
3. **Introduction to Euclidian Geometry:** Exercises in lines and angles, construction of triangles, quadrilaterals and regular polygons. Introduction to the development of simple surfaces – cubes, cuboids and pyramids.

MODULE II

4. **Introduction to curves:** Construction of plane curves, ellipse, parabola, hyperbola and ovals. Exercise in physical modeling for parabola and hyperbola.
5. **Arches:** Typical arch forms and methods of drawing them.

MODULE III

6. **Orthographic projection (first angle projection):** Principles of orthographic projection; projections of points, lines, planes – explore all combinations.
7. **Orthographic projection of solids**
8. **Orthographic projection of architectural built elements and built forms:** (Simple to complex)

MODULE IV

9. **3D Projections:** 3D representation in isometric projection of solids.
10. **3D Projections:** 3D representation in isometric projection of built elements and built forms (simple to complex).

MODULE V

11. **3D Projections:** 3D representation in axonometric projection of solids.
12. **3D Projections:** 3D representation in axonometric projection of built elements and built forms.
13. **Introduction to rendering:** Simple rendering of the 3D drawings of built elements and built forms – free- hand pencil rendering with shading and textures.

Note: A consolidated portfolio containing exercises related to each of the above modules to be presented for Internal Assessment.

REFERENCES:

1. ***Geometrical Drawing for Arts Students*** by IH Morris
2. ***Perspective*** by SH Mullik
3. ***Architectural Graphics*** by D.K Ching.

HISTORY OF ARCHITECTURE: Early Civilization

Sub Code	: AT1HOA	CIE	: 50
Hrs/ Week	: 4	SEE	: 50
Total Hrs	: 64	Credits: 3	

COURSE OBJECTIVE*:*

To provide an introduction to the culture and architecture of early civilizations

MODULE I

1. **Introduction** What History education entails? Architectures connection with History
2. **Introduction to Pre-Historic Civilization:** Primitive man - shelters, settlements, religious and burial systems E.g.: Oval hut, Nice, Dolmen tomb, gallery grave, passage grave, Houses at Catal Huyuk, Henge Monuments, StoneHenge
3. **Introduction to River valley cultures:** generic forces shaping settlements and habitats

MODULE II

4. **Indus Valley Civilization:** Forces shaping settlements and habitats: Layout of Mohenjodaro, House plan, Community well, Great Bath, Granary
5. **River valley cultures, Tigris and Euphrates**: Ziggurats at Warka, Ur and Tchoga Zanbil, Palace of Sargon.

MODULE III

6. **River valley culture, Nile:** Mastaba Tombs, Pyramid of Cheops, Temple of Khons, Karnak
7. **Introduction to Chinese Architecture:** Forces shaping settlements and habitats
8. **Introduction to Mayan and Japanese Architecture:** Forces shaping settlements and habitats.

MODULE IV

9. **Introduction to Desert and Mountainous cultures:** Forces shaping settlements and habitats with examples
10. **Introduction to Pre-Classical Civilization**: Mycenea, Persia, Etruscan. Pre-classical Civilization. Examples: Tiryns, the Temple of Juno Sospita, the Palace of Persepolis.

MODULE V

11. **Pre-classical Aryan & Mauryan :** Vedic and Epic Age Salient features Vedic Village
12. **Introduction to contemporary Tribal Cultures:** Forces shaping settlements and habitats in tribal cultures with examples

REFERENCES:

1. ***History of Architecture in India*** by Christopher Tadgell
2. ***Indian Architecture, Buddhist and Hindu period*** by Percy Brown
3. ***Architecture of India, Buddhist and Hindu*** by Satish Grover

BUILDING STRUCTURES: Introductory Course

Sub Code	: AT1STR	CIE	: 50
Hrs/ Week	: 03	SEE	: 50
Total Hrs	: 48	Credits: 3	

COURSE OBJECTIVE:

Introduction to principles of loads, structural materials and transmissibility of force with examples

MODULE I

1. **Evolution of Structures:** Historical perspective and definition of structure as a device for channeling loads that result from the use or presence of the building in relation to ground.
2. **Structural systems overview:** Vertical/lateral systems: wall, cantilever, moment frame, braced frame, horizontal one-way and two-way systems: truss, arch, vault, dome, shell, cable stayed, suspended, membrane.
3. **Experiment with Structures:**
   a. Example-1: Build a structure to house an un-boiled egg to be thrown from a building without breaking (avoid foam boxes and bulky structures).
   b. Example-2: Build a Structure of dimension 150x150x150mm using A4 size paper to withstand a load of 1 kilogram.
   c. Example-3: Build a beam or a truss using matchsticks to span a distance of 150mm, and test the maximum mid-span load the truss could carry.
   d. Example-4: Build a geodesic dome of 150mm dia using straws, ice cream sticks or matchsticks to span a distance of 150mm.

MODULE II

4. **Structural Materials:** Mechanical properties of Structural materials: wood, masonry, steel, concrete, fabric; energy use and rupture length. Advantages and disadvantages of Structural Materials and choice of Structural Material for domestic buildings, Industrial buildings, Tall buildings and Long Span buildings.
5. **Loads on Structures:** Dead load (DL), live load (LL), static, dynamic, impact, and thermal loads.

MODULE III

6. **Principle of transmissibility of forces:** Understanding load flow by tributary load and load path (slab, beam, and girder) and vertical members (post, wall, and footing); load path.
7. **Equilibrium of Forces:** Force, Reaction, Moment and Principle of Support conditions and their significance in resistance to forces and to maintain equilibrium.
8. **Basic principles of mechanics:** Tension, compression, shear, bending, torsion; symbols and notations; force and stress.

MODULE IV

9. **Stress/strain relations (Hooke's Law):** Modulus of Elasticity, linear and non-linear materials, elastic, plastic, and elastic-plastic materials; Poisson's Ratio; Thermal stress and strain.
10. **Graphic vector analysis:** Resultant and equilibrant of coplanar, concurrent and non-concurrent force systems. Parallelogram, force polygon, resultant, equilibrant, components; numeric method

MODULE V

11. **Truss**: Truss concept of triangulation, common truss configurations.
12. **Truss loads and reactions**: For a given configuration of the trusses and center to center spacing, calculations of the dead weight of the truss and the dead weight of the roof cover and support reaction loads.

***REFERENCES*:**

1. ***Structures*** - Martin Bechthold, Daniel L Schodek, and PHI Learning Private limited
2. ***Structure in Architecture: the building of buildings,*** by Mario Salvadori
3. ***Structure and Design*** by G. G. Schierle
4. ***Engg Mechanics*** by R K Bansal & Sanjay Bansal, 3rd ed
5. ***Engg Mechanics*** by Ferdinand L Singer, 3rd ed

COMMUNICATION SKILLS

Sub Code	: AT1CS	CIE	: 50
Hrs/ Week	: 02	SEE	: Nil
Total Hrs	: 48	Credits: M	

COURSE OBJECTIVE:
To develop skills in effective communication – both written and verbal and to explore the potential of media technology and the Internet to enhance communication

MODULE I

1. **Introduction:** Introduction to course objective and framework of assignments and assessment. Discussion on exploratory topics.
2. **Reading and listening comprehension:** Reading of a passage from famous books (e.g. Samskara). Students to draw an image on A4 paper based on the read passage.
3. **Verbal presentations:** Understanding the differences among seminars, conferences, convention, congress, debates, extempore speeches, panel discussions etc. Students to write a brief synopsis on seminar topic to be submitted to seminar committee for acceptance.

MODULE II

4. **ARCHITECTURAL LANGUAGE:** Basics of art and architecture terminology; Verbal expression of ideas and design description.
5. **INFOGRAPHICS:** Various techniques of representation of information in visuals

MODULE III

6. **Notes taking:** From spoken and written English.
7. **Comprehension of lectures and speeches to locate key points**
8. **Analytical Writing:** To develop the ability to write concisely and correctly and present ideas in a logical manner.

MODULE IV

9. **Introduction and discussion on exploratory topic for a letter:** Understanding the difference between formal and informal letters etc. Students to Write /draw a letter to fellow architects, clients, public authorities, contractors, enquiries to industries, dealers.
10. **Article writing:** on a Design or a Building, Introduction to Design Basis Report
11. **Writing a term paper:** term paper is a research paper written by students over an academic term

MODULE V

12. **Introduction and discussion on exploratory topic for a brief essay: O**bservation based writing. Topic for assignment: PATTERNS (in nature, Architecture, art, mathematics, language, infrastructure, social systems etc.) and student to write and illustrate a 300 word essay on patterns.
13. **Using the Internet to enhance communication**

REFERENCES:

1. ***Working in English: Teachers Book*** by Jones Leo.
2. ***Communicative English for Professional Courses*** by Mudambadithaya G.S.
3. ***English Conversation Practice*** by Taylor, Grant

BASIC DESIGN AND VISUAL ARTS

Sub Code	: AT1BDV	CIE	: 50
Hrs/ Week	: 06	SEE	: Nil
Total Hrs	: 96	Credits: 3	

COURSE OBJECTIVE:

To encourage a critical orientation to design thinking and action

MODULE I

1. **Observation & Study 1:** Selection of two outdoor objects/systems and observation of their natural occurrence, relationships with context, form & structure, colors & textures, and function.
2. Sketching & visual representation in various media.

MODULE II

3. **Observation & Study 2:** Selection of two indoor objects/systems and observation of their situation, relationships with context, form & structure, colors & textures, and functions.
4. 3 dimensional modeling in appropriate medium (Clay/paper/wire/plaster/wax etc.).

MODULE III

5. **Patterns-1:** Study of pattern-making in nature, (Such as trees, leaves, crystals, shells etc.) Observation & representation of 2-dimensional patterns in various visual media.eg. Charcoal/pencil/crayon/oils etc.
6. **Patterns-2**: Use of patterns to synthesize and create form. Use of Both physical and material patterns as well as patterns of transformation and Integration. Appreciation of the difference between architecture and pattern.

MODULE IV

7. **Material Study-1:** Selection of two materials used in everyday life (textiles, Earthenware, terracotta, metals, stone, plastic, glass etc.) Study of properties, Strength, examples of use.
8. **Material Study-2:** Sketching & visual representation of material in various media, like Paper, clay, plaster, wood, wire, wax, photography
9. **Material Study-3:** Hands-on making of object/joint/structure of own choice with one of the materials studied.

MODULE V

10. **Design of a free standing object using the materials studied**. E.g. park, Seat, bollard, push-cart, etc.
11. **Design of a semi-enclosed object/space using the materials studied**. E.g. gazebo, kiosk, bus stop, stage set, etc.

REFERENCES:

1. ***The Art of Color and Design*** by Maitland Graves
2. ***Ways of Seeing*** by John Berger
3. ***Design of Everyday Things*** by Donald Norman
4. ***Rendering with Pen and Ink*** by Robert Gill

ARCHITECTURAL DRAWING AND PRESENTATION

Sub Code	: AT1ADP	CIE	: 50
Hrs/ Week	: 03	SEE	: Nil
Total Hrs	: 48	Credits: 2	

COURSE OBJECTIVE:

To train the students in methods of Architectural Representation including drawing, sketching and model making

MODULE I

Sketching: Learning to See

1. Introduction to architectural sketching using various mediums such as graphite pencil, charcoal, pens, markers etc.
2. Sketching the line -Principles of free hand sketching such as proportions, light and shade;
3. Sketching an Object -with primary thrust on sketching of building elements and built environment. Figure drawing and human proportion

MODULE II

Technical Drawing

4. Introduction to various drawing instruments and methods of employing them for technical drawing
5. Lettering - Fonts, spacing, hierarchy in sizes and thickness
6. Line weights - Strokes in lines, bold and thin line representation, line types, arrowheads and basic symbols
7. Subjective representation - Plan, Section, Elevation, Composite representation

MODULE III

Measured Drawing/ Scale Drawing

8. Measured drawing/ Scale Drawing: Plan/s Section/s Elevation/s and isometric/ axonometric view drawn to appropriate scale, of simple two storeyed building including a stairway and/or toilet.

MODULE IV

Model Making: Basic Shapes

9. Introduction to various materials (such as paper, mount board, thermocol, foam board, etc.) tools and techniques of architectural model making
10. construction of simple three dimensional objects

MODULE V

MODEL MAKING: Architectural models.

11. Introduction to materials such as balsa wood, plastics, cork and the techniques to make Architectural Models
12. Scaled building models - Exercises preferably co-ordinated with subjects like 'Design', 'Building Technology and Materials' History of Architecture' etc.

REFERENCES:

1. ***The Art of Color and Design*** by Maitland Graves
2. ***Landscape Graphics***
3. ***Rendering with Pen and Ink*** by Robert Gill

DEPARTMENT OF ARCHITECTURE, DSCE

(Autonomous Institution Affiliated to VTU, Belgaum)

SCHEME OF TEACHING AND EXAMINATION 2016-2017

II SEMESTER B.Arch

Sl. No	Subject Code	Subject	Evaluation Type	Teaching Dept	Board	Credit Hours/ Week			Contact Hours/Week	Examination			Duration of Exam (Hrs)	Credits
						S	T	P		CIE	SEE	Total		
1	AT2AD	Architectural Design- Mono functional Spaces	SEE - VIVA	Arch	Arch	7	2	0	9	50	50	100	-	7
2	AT2BCM	Building Construction and Materials- Roof, Foundation and Staircase	SEE - EXAM	Arch	Arch	4	2	0	6	50	50	100	4	5
3	AT2GRA	Architectural Graphics- Projection & Perspective Drawing	SEE - EXAM	Arch	Arch	3	1	0	4	50	50	100	-	3
4	AT2HOA	History of Indian Architecture- Buddhist and Hindu Periods	SEE - EXAM	Arch	Arch	0	4	0	4	50	50	100	3	3
5	AT2STR	Structures- Basic Structural Systems	SEE - EXAM	Arch	Arch	0	3	0	3	50	50	100	3	3
6	AT2 TOA	Theory of Architecture- Principles of Aesthetics & Composition	SEE - EXAM	Arch	Arch	0	3	0	3	50	50	50	--	3
7	AT2SSA	Site Surveying and Analysis	SEE - EXAM	Arch	Arch	0	4	0	4	50	50	100	3	3
8	AT1BDS	Basic Design - Self and Space	CIE	Arch	Arch	0	0	3	3	50	-	50	--	2
9	AT2KK	KANNADA Kali (Non Credit Mandatory Course)	CIE	Language		0	0	3	3	50	-	50	--	M
								Total	**39**	**400**	**400**	**800**		**29**

CIE: Continuous Internal Evaluation, **SEE**: Semester End Examination **S**: Studio, **T**: Theory And **P:** Practical

ARCHITECTURAL DESIGN: Monofunctional Spaces

Sub Code	: AT2AD	CIE	: 50
Hrs/ Week	: 09	SEE	: 50
Total Hrs	: 144	Credits: 7	

COURSE OBJECTIVE:
To expose the students to the grammar of creating architectural space and form, including the study of variables like light, movement, transformation, scale, structure & skin

MODULE I
Nature of Space; PLACE: A "boundary", a "center" and a "spirit" PATH: A "way" and a "goal" DOMAIN: A conglomeration of paths and goals that forms a "whole" with its own "identity"

Materials Eg. Masonry (brick & stone), Steel/Glass with cladding infill, exposed Concrete

MODULE II
Enclosure, Ambiguity, Transparency in Plan, Section and Elevation, with concept sketches and diagrams so that presentation is self-explanatory ex. 1:50 plans, sections, and elevations.

Emphasis on work in studio by hand drawing and study model with lift off roof. The One Room House Lecture cum discussion on the Poetics of Space like light, movement, transformation, scale, structure and skin (case study based): keywords for discussion: contemplative / severe / dramatic / minimalist / natural / organic / contemporary / traditional.

MODULE III
Understanding the role of physical (terrain, climate, materials, etc.) and cultural factors (open, closed, transition spaces) that inform architecture.

Projects shall be explored with the help of models and sketches.
Any One Room enclosure could be taken to explore the implication of light, movement, transformation, scale, structure and skin. Emphasis on freeing the expression of the poetic self, rather than on meeting external standards, and student development of self-explanatory presentations

MODULE IV
Case study assignment (done in groups of four students per group): One from library/internet research and one from actual experience.
Project presented in the form of a portfolio. Emphasis on studio work/participation and Hand drawings.

MODULE V
Formulate a process of testing the various elements of space making learnt earlier in the semester through a project on an actual site. The project examples could be: A House for myself, Guest House, Farm house, Villa, Container house, Courtyard house, Tree house, etc.

Note:
The portfolio cov*ering all the assignments shall be presented for term work.*

REFERENCES:

1. ***Time Saver Standards for Architectural Design Data*** by John Hanock
2. ***Architectural Graphic Standards*** by Ramsay and Sleeper
3. ***Indian Anthropometric Dimensions for Ergonomic Design Practice*** by Debkumar Chakrabarti

BUILDING AND CONSTRUCTION MATERIALS: Roof, Foundation and Staircase

Sub Code	: AT2BCM	CIE	: 50
Hrs/ Week	: 06	SEE	: 50
Total Hrs	: 96	Credits: 5	

COURSE OBJECTIVE:

To introduce Building materials especially RCC and building elements, and their intrinsic relationship to basic Building systems, which includes roofing for medium spans, Concrete columns, Concrete foundations and staircases

MODULE I

1. **Introduction to Timber :** Timber, various parts, their purposes and method of construction. Use of tiling for roofing.
2. **Timber Roof** – Lean to roof, Collared Roof, King post roof, Queen Post Roof; Detailed Drawing of one roof system
3. **Introduction to Steel Roof** – Steel trussed roof, their purposes and method of construction. Use of GI sheets and aluminum sheets for roofing.

MODULE II

4. **Introduction to Cement and Steel as a Building material**: Cement – Types of cement, their applications, laboratory and field tests. Properties and architectural uses of reinforced steel. Reinforced Cement Concrete as a building material: Concrete Ingredients, grades of concrete, admixtures, properties of concrete, production of concrete, mix, proportioning (Site visit to a Ready-mix concrete (RMC) batching plant)

MODULE III

5. **Reinforced Cement Concrete as a building material**: Form work, placing, and compaction, curing of concrete, sampling and testing of concrete. Construction joints, expansion joints, finishes in concrete, chemical admixtures. (Site visit to concreting construction site)
6. **RCC** Foundations (Isolated footing) and Columns (Square and Round) Raft foundations, Grillage foundations and combined footing.

MODULE IV

7. **Introduction to Staircase**: Anthropometry of stairs, types of Staircases and construction methods of staircase in – Masonry, timber, RCC, Steel and Composite.
8. **Timber Stairs**: Single and Double Stringer stairs: Means and methods of Construction
9. **RCC Stairs**: Waist slab, folded plate, Stringer stairs, precast stairs: Means and methods of Construction.

MODULE V

10. **Steel Stairs**: Stringer stairs, Folded Type, Spiral stairs, Fire escape stairs: Means and methods of Construction
11. **Composite Stairs**: Brick/stone, Steel/Timber, Concrete/wood, steel/ glass: Means and methods of Construction

Note: Minimum one plate on each topic, site visits to be arranged by studio teacher. All the plates on construction and portfolio on material application shall be presented for progressive marks.

REFERENCES*:*

1. ***Building Construction*** by W.B. Mackay
2. ***Construction Technology*** by Chudley
3. ***Construction of Buildings*** by Barry
4. ***Building Construction*** by Francis D K Ching

ARCHITECTURAL GRAPHICS: Projection and Perspective Drawing

Sub Code	: AT2GRA	CIE	: 50
Hrs/ Week	: 04	SEE	: 50
Total Hrs	: 64	Credits: 3	

COURSE OBJECTIVE:

Development of visual representation and conceptual communication in the field of spatial design through 3D drawing techniques with applicable renderings that include shades and shadows

MODULE I

1. **3D Projections:** 3D representation in exploded axonometric projection of built elements and built forms.
2. **Development of surfaces:** Advanced topics with application to built forms, Suggested examples: Domes, curved roofs, etc.

MODULE II

3. **Section of solids, true shapes of section.**
4. **Inter-penetration of geometric solids:** Combination of different forms. Examples: Cylinder with cube or regular polygons, dome with a cube, etc.

MODULE III

5. **Perspective drawings:** History of perspective drawings with examples from international and Indian context. Principles of perspective drawings and examples of the visual effects of three dimensional objects when seen in perspective.
6. **Studies in perspective drawing:** Picture plane, station point, vanishing point, eye level, ground level, their variation and their resultant effects. Examples of simple geometric objects.

MODULE IV

7. **One-point perspective drawings:** Perspective drawings of simple built form with simple built elements – Suggested example: Interior view of a single room and built elements in incremental steps. Technical steps with the object falling within the cone of vision, object going out of the cone of vision, and objects and elements closer. Analysis of the differences with previous technical images. Perspective drawings of everyday objects like chair and table without many design features. Generate multiple perspective drawings by altering the VP and PP, and by keeping SP fixed for the same examples.
8. **2-point perspective drawings:** Perspective drawings of simple geometrical objects and their combinations. Examples: Perspective drawings of built forms with built elements. Perspective drawings of simple everyday objects. Generate multiple views of the same objects.

MODULE V

9. **Principles of shade and shadows:** Principles of drawing shade and shadow.
   Exercises exploring the principles of drawing shade and shadow in perspective drawings – drafting shade and shadows to examples from the perspective drawings.
10. **Free-hand perspectives:** Exercises in free-hand techniques for generating perspective drawings with multiple views on site with simple rendering. Introduce simple street elements and simple trees for the buildings generated in the perspective drawing classes.

REFERENCES*:*

1. ***Geometrical Drawing for Arts Students*** by IH Morris
2. ***Perspective*** by SH Mullik
3. ***Architectural Graphics*** by Francis D.K Ching
4. ***Rendering With Pen And Ink*** by Robert Gill

HISTORY OF INDIAN ARCHITECTURE: Buddhist and Hindu Periods

Sub Code	: AT2HOA	CIE	: 50
Hrs/ Week	: 4	SEE	: 50
Total Hrs	: 64	Credits: 3	

COURSE OBJECTIVE:
To provide an understanding of the evolution of Hindu Architecture in India in its various stylistic modes, characterized by technology, ornamentation and planning practices

OUTLINE:

MODULE I

1. **Introduction to Classical (Buddhist)**: Mahayana phase, stupa and rock cut cave Architecture.
2. **Buddhist Examples:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Great Stupa at Sanchi, Chaitya at Karli, Viharas at Ajanta, and Toranas at Sanchi b) Domestic (Built to inhabit) and c) Civic space
3. **Introduction to Jain Architecture:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; b) Domestic (Built to inhabit) and c) Civic space.

MODULE II

4. **Evolution of Hindu temple**: Indo Aryan and Dravidian – Early temples at Udaigiri, Tigawa and Sanchi.
5. **Evolution of Hindu temple**: Dravidian Experiments at Aihole (Durga temple and LadKhan temple), Deogarh, Bhitargaon and Badami.
6. **Beginnings of Dravidian architecture:** Pallavas, rathas at Mamallapuram, Shore temple, Kailsanatha and Vaikuntaperumal temples at Kancheepuram.

MODULE III

7. **The Cholas contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Brihadeshwara temple at Thanjavur and Gangaikonda Cholapuram b) Domestic (Built to inhabit) and c) Civic space
8. **The Pandyan & Madurai Dynasties contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Gopurams Madurai (Meenakshi temple) and Srirangam. b) Domestic (Built to inhabit) and c) Civic space;

MODULE IV

9. **The Hoysala contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Eg: Channakesava temple, Belur, Hoysalesvara temple, Halebid, Kesava temple, Somnathpur b) Domestic (Built to inhabit) and c) Civic space;
10. **Indo Aryan Mode**: the beginnings in Orissa – the Lingaraja at Bhubaneshwar.

MODULE V

11. **Hindu architecture at Rajputana & Khajuraho group:** (Temple of Surya, Orisa, Marwar) and Gujarat (Temple of Surya, Modhera). The Khajuraho group: Khandariya Mahadev, Jain temples – Chaumukh temple at Ranpur
12. **Later Dravidian period:** the Vijayanagar and– Noted temples at Hampi (Vitthala temple and Hazara Rama temple)

Note: Site visit &documentation of a Temple may be part assessment of the progressive marks.

REFERENCES*:*

1. ***History of Architecture in India*** by Christopher Tadgell
2. ***Indian Architecture, Buddhist and Hindu period*** by Percy Brown
3. ***Architecture of India, Buddhist and Hindu*** by Satish Grover

BUILDING STRUCTURES: Basic Structural Systems

Sub Code	: AT2STR	CIE	:50
Hrs/ Week	: 03	SEE	:50
Total Hrs	: 48	Credits:	3

COURSE OBJECTIVE:

Introduction to transmissibility of forces & reactions and to basic structural system of beams and columns

OUTLINE:

MODULE I

1. **Geometric properties:** Centroid, Centroidal axes and Moments of Inertia for regular sections by Parallel Axis Theorem.
2. **Beams and support reactions:** Beams and supporting conditions - Types of supports – Implications for computational and structural performance.
3. **Bending and Shear force in beams:** Method of balancing moments and free-body diagrams.

MODULE II

4. **Bending Moment and Shear Force Diagrams:** Concept of Shear force and Bending Moment diagrams. BMD and SFD for simple beams subjected to loads.
5. BMD and SFD for intermediate beams 2span, 3span and 4span beams (bending moment diagrams to be provided).
6. **Bending and Shear Stress in beams:** Theory of simple bending - Concept of bending and shear stress distribution at a cross section due to bending moment and shear for Rectangular, I and T sections.

MODULE III

7. **General formula:** Moment of Inertia, Section Modulus, Bending and Shear Stress.
8. **Deflection:** Determination of deflection for simply supported, fixed, continuous and Cantilever beams subjected to loads using standard formulas.

MODULE IV

9. **Columns and Struts:** Introduction to Short and long columns.
10. **Theory of Columns:** Buckling; effective length, critical load, slenderness ratio; Euler formula; "Kern" and rule of inner third.

MODULE V

11. **Steel Columns:** Axial stress and combined axial and bending stress design and analysis of steel columns.
12. **RCC columns:** Definition of short column as per IS 456 and design of short RCC columns (composite action, load taken by steel and load taken by concrete respectively).

REFERENCES*:*

1. ***Structures*** - Martin Bechthold, Daniel L Schodek, and PHI Learning Private limited
2. ***Structure in Architecture: the building of buildings,*** by Mario Salvadori
3. ***Structure and Design*** by G. G. Schierle
4. ***Engg Mechanics*** by R K Bansal & Sanjay Bansal, 3rd ed
5. ***Applied Mechanics & Strength of Materials*** by I B Prasad

THEORY OF ARCHITECTURE: Principles of Aesthetics & Composition

Sub Code	: AT2TOA	CIE	: 50
Hrs/ Week	: 03	SEE	: 50
Total Hrs	: 48	Credits: 3	

COURSE OBJECTIVE:

To acquaint the students with the basic aesthetic principles involved in architectural design and the grammar of architectural aesthetics.

MODULE I

1. **Definition of Art and role of Art in Society:** Role and meaning of art, various types of arts- fine arts, performing arts, commercial arts, industrial arts, folk arts, abstract art, visual arts, spatial arts, temporal arts, pop art etc., relationship of architecture with art.
2. **Principles of Aesthetics and Architectural Composition -1 –** Unity, Balance, Proportion, Scale in Architectural composition. Illustrations and its application to the practice of design with historical as well as contemporary buildings

MODULE II

3. **Principles of Aesthetics and Architectural Composition -2:** Contrast, harmony, accentuation, restraint in Architectural composition. Illustrations and its application to the practice of design in historical as well as contemporary building.
4. **Principles of Aesthetics and Architectural Composition -3:** Repose, vitality, strength in Architectural composition. Illustrations and its application to the practice of design in historical as well as contemporary building.

MODULE III

5. **Organizing principles of Aesthetics and Architectural Composition -1:** Symmetry, asymmetry, hierarchy, datum, axis, rhythm in Aesthetics and Architectural Composition and its application to the practice of design.
6. **Spatial organizations of Masses in Architecture -1:** Centralized and clustered; Illustrations of centralized and clustered massing in spatial organizations of masses in Architecture and its application to the practice of design with both historical as well as contemporary buildings.

MODULE IV

7. **Spatial organizations of Masses in Architecture -2:** linear, radial, grid organization. Illustrations of linear, radial, grid organization in spatial organizations of masses in Architecture and its application to the practice of design with both historical as well as contemporary buildings.
8. **Ornamentation in Architecture:** Historical perspective of the use of ornament in buildings and use of ornament as a decoration to embellish parts of a building. Use and need of ornament in architectural design – different types of ornamentation in buildings.
9. **Ornamentation in Architecture Criticism**–Argument against ornamentation. Ideas of architect Adolf Loos (Ornament and Crime); Ornaments as economically inefficient and morally degenerate, reduction of ornament or lack of decoration as the sign of an advanced society.

MODULE V

10. **Materials, Materiality and Tectonics:** Aesthetic and structural potentials in Architecture of materials like brick, timber, stone, concrete, glass.
11. **Style in Architecture:** Basis for classification of styles including chronology of styles arrangement according to order that changes over time. Evolution of styles; reflecting the emergence of new ideas as reaction to earlier styles as a result of changing of fashions, beliefs, technology etc.

12. **Perceptions in Architecture:** Experience of architecture in basic psychological and physiological terms. Way in which human minds and bodies respond to space, light, texture, color, and other architectural elements.

REFERENCES*:*

1. ***Architecture: Form, Space and Order*** by Francis DK Ching
2. ***Design Fundamentals in Architecture*** by Parmar VS
3. ***Theory of Architecture*** by Paul Alan Johnson
4. ***Creating Architectural Theory*** by John Lang

SITE SURVEYING & ANALYSIS

Sub Code	: AT2SSA	CIE	: 50
Hrs/ Week	: 04	SEE	: 50
Total Hrs	: 64	Credits: 3	

COURSE OBJECTIVE:

To develop the knowledge and skills related to surveying and levelling principles and practice and carrying out surveys of land of medium complexity and preparation of survey plans.

MODULE I

1. **Introduction to Surveying** – Definition, classification, principles of surveying, character of work, shrunk scale.
2. **Survey Theory-1:** Chain Survey: Instruments used, Types of chain, Instruments for ranging.

MODULE II

3. **Survey Theory-2:** Chain Survey: Setting out angles, erecting perpendiculars. Plane table survey – Plane table and accessories.
4. **Survey Theory-3:** Introduction to Levelling; Definition, classification, booking and reduction of levels, longer levelling, errors.

MODULE III

5. **Contouring**: Characteristics of contours, direct and indirect methods of contouring, interpolation, and uses of contours.
6. **Introduction to contemporary survey Instruments (Theodolite and Total station)**: Theodolite; instrument for measuring angles in the horizontal and vertical planes. Total station; electronic theodolite integrated with an electronic distance measurement to measure slope distances.

MODULE IV

7. **Observations of a Site (Up to 1 acre):** Survey without instruments using geometry and one's own body. To learn to read the terrain by intuition and by measure, including photography as a surveying method.
8. **Analysis of a Site (Up to 1 acre)**: On site factors; Analysis of natural factors, topography, hydrology, soils, landforms, vegetation, climate, microclimate.; influence of water bodies

MODULE V

9. **Studying survey drawings:** Learning to read a land survey drawing; type of land survey drawing, Scale and North direction in drawing, legend or list of the symbols used on drawings, counter indications on a drawing, grid references for measurements etc.
10. **Field Work-1**: Setting out works such as center lines of a building (working drawings of a small residence to be provided)

REFERENCES*:*

1. ***Surveying – Vol I*** by DR PC Punmia
2. ***Surveying and Levelling – Part 1*** by Kanetkar TP and Kulkarni SV

BASIC DESIGN: Self and Space

Sub Code	: AT2BDS	CIE	: 50
Hrs/ Week	: 03	SEE	: Nil
Total Hrs	: 48	Credits: 3	

COURSE OBJECTIVE:

To explore the relationship between materiality & space, between building, the environment and culture and to initiate an understanding of abstraction and analysis of space and form

MODULE I

1. **Mapping-1:** Conceiving one's own map – from home to studio/of the campus/of a Neighborhood. Explore issues of movement, navigation, circulation, direction and discovery through exercises.
2. **Mapping-2:** Drawing and Reading of maps – Explore issues of representation, scale, starting point, orientation, landmarks, and imagery. Use of different methods of rendering.

MODULE II

3. **Structure-1**: Understanding gravity, and the different ways we resist it. Study of Material & structure in nature, and how design brings them together. Sketch analysis of Structure and form in an example taken from Patterns-1.
4. **Structure-2:** Hands-on Design exercise – creation of a simple design in which form is distinct from structure. Eg. Portal frames, tensile structures
5. **Structure-3:** Hands-on Design exercise – creation of a simple design in which form is integral with structure. Eg. Shells, massive forms, pneumatics

MODULE III

6. **Scale-1:** Dimensional understanding of the human body; in static and dynamic modes. Measured drawing of space needed for basic postures & movements.
7. **Scale-2:** Study of the relationship between human body and the built environment understanding usage and comfort. Eg. Bazaar, doctor‟s clinic, train carriage etc.

MODULE IV

8. **Orientation & Climate:** Understanding of the significance of the Cardinal directions, and the role played by Sunlight, Wind and Rain in determining design response.
9. **Culture & Design:** Understanding social attitudes to Built-form: extroverted/introverted, formal/informal, typical/individual, simple/labyrinthine, contiguous/isolated etc.

MODULE V

10. **Documentation:** Sketch/photographic documentation of a street pattern, house form & community spaces
11. Analysis-1: Sketched analysis of built form in terms of patterns, structure and scale
12. Analysis-2: Sketched analysis of built form in terms of orientation & climate
13. Analysis-3: Sketched analysis of built form in terms of culture & society

REFERENCES*:*

1. ***Architecture: Form, Space & Order*** by Francis Ching
2. ***Cradle To Cradle: Remaking The Way We Make Things*** by Michael Braungart, William McDonaugh

Dayananda Sagar College of Engineering

(Autonomous Institution Affiliated to VTU, Belgaum)

CHOICE BASED CREDIT SYSTEM (CBCS)

SCHEME OF TEACHING AND EXAMINATION 2015-2016/2016-17

Department: DEPARTMENT OF MANAGEMENT STUDIES

Course: MASTER OF BUSINESS ADMINISTRATION

I SEMESTER MBA

Sl.No	Subject Code	Name of the Subject	Teaching hours/week			SEE Hours	Examination			CREDITS
			L	T	P		CIE	SEE	Total	
1	MBA11	Principles of Management	4	0	0	3	50	50	100	4
2	MBA12	Economics for Managers	4	0	0	3	50	50	100	4
3	MBA13	Accounting for Managers	4	0	0	3	50	50	100	4
4	MBA14	Quantitative methods-I	4	1	0	3	50	50	100	5
5	MBA15	Business, Government and Society	4	0	0	3	50	50	100	4
6	MBA16	Written Business Communication	3	0	2	3	50	50	100	4
Total							300	300	600	25

CIE: Continuous Internal Evaluation, SEE: Semester End Examination, L: Lecture, T: Tutorial, P: Practical

1Hr. Theory= 1 credit, 2Hrs. Practical=1 credit, 1Hrs. Tutorial =1 credit

[Numerical Subjects – 1 Hour Tutorial]

Dayananda Sagar College of Engineering

(Autonomous Institution Affiliated to VTU, Belgaum)

CHOICE BASED CREDIT SYSTEM (CBCS)

SCHEME OF TEACHING AND EXAMINATION 2015-2016/2016-17

Department: DEPARTMENT OF MANAGEMENT STUDIES
Course: MASTER OF BUSINESS ADMINISTRATION

II SEMESTER MBA

Sl.No	Subject Code	Name of the Subject	Teaching hours/week			SEE Hours	Examination			CREDITS
			L	T	P		CIE	SEE	Total	
1	MBA21	Human Resource Management& OB	4	0	0	3	50	50	100	4
2	MBA22	Financial Management	4	0	0	3	50	50	100	4
3	MBA23	Quantitative methods-II	4	1	0	3	50	50	100	5
4	MBA24	Marketing Management	4	0	0	3	50	50	100	4
5	MBA25	Oral Business Communication	3	0	2	3	50	50	100	4
6	MBA26	Entrepreneurial Development	4	0	0	3	50	50	100	4
Total							300	300	600	25

CIE: Continuous Internal Evaluation, SEE: Semester End Examination, L: Lecture, T: Tutorial, P: Practical
1Hr. Theory= 1 credit, 2Hrs. Practical=1 credit, 1Hrs. Tutorial =1 credit

[Numerical Subjects – 1 Hour Tutorial]

Department : MCA **Course : MCA**

I SEMESTER

Sl.No	Subject Code	Name of the Subject	Teaching hours/week			SEE Hours	Examination			CREDITS
			L	T	P		CIE	SEE	Total	
1	MCA11	Data Structures Using C	4	0	0	3	50	100	100	4
2	MCA12	Discrete Mathematical Structures	4	0	0	3	50	100	100	4
3	MCA13	Digital Logic and Computer Architecture	4	0	0	3	50	100	100	4
4	MCA14	UNIX Programming	4	0	0	3	50	100	100	4
5	MCA15	Web Technologies	4	0	0	3	50	100	100	4
6	MCA16	Data Structures Laboratory	1	0	2	3	50	50	100	2
7	MCA17	Unix Programming Laboratory	1	0	2	3	50	50	100	2
8	MCA18	Web Programming Laboratory	1	0	2	3	50	50	100	2
TOTAL							400	650	800	26

CIE: Continuous Internal Evaluation, SEE: Semester End Examination, L: Lecture, T: Tutorial, P: Practical

1Hr. Theory= 1 credit, 2Hrs. Practical=1 credit, 1Hr. Tutorial =1 credit

[All Labs will have 1hr instruction class]

I SEMESTER

DATA STRUCTURES USING C

Sub Code: MCA11	CIE:50
Hours/ Week: 04	SEE:100
Total Hours: 50	Exam Hours: 03

COURSE OBJECTIVES

- To introduce fundamental concepts of data structures
- To emphasize the importance of data structures in developing and implementing efficient algorithms
- To design, analyse, and implement C programs by using basic data structures and algorithms.

MODULE 1

Reflections on C programming **10 hours**

Constants, variables and Data types, Operators and expressions, Managing Input output operations, Decision making and branching, Decision making and looping, Arrays, strings and Functions, pointers, Structures and Unions, File management in C. Hands on session on C programming**.

(In this module, student will revise the skills in C programming by doing exercises in the class room sessions.)

MODULE 2

Data Structures **10 hours**

Introduction to Data Structures, Abstract Data type, ADT implementations, Recursion: GCD, Fibonacci, Tower of Hanoi, conversions between infix prefix and postfix expressions, Stacks, Applications of Stacks Queues, Circular Queues, Priority Queue.**

MODULE 3

Dynamic Memory Allocation and Linked Lists **10 hours**

Introduction, Dynamic memory allocation, linked lists, advantages of linked lists, types of linked lists, pointers revisited, basic list operations, applications of linked lists, circular linked lists, doubly linked lists, doubly linked list operations, doubly linked lists circular lists, stacks and queues using linked lists, case studies

MODULE 4

Binary Search Trees **10 hours**

Binary Trees representation and Terminology, Binary tree traversal, AVL Trees, Red Black Tree, Threaded Binary Tree

MODULE 5

Sorting and Searching Techniques **10 hours**

Introduction, Sorting: sorting efficiency, bubble sort, quick sort, selection sort, merge sort, simple insertion sort, merge sort, Heap Sort

Searching: Linear search, binary search, indexed sequential search.

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to

- Apply advance C programming techniques such as pointers, dynamic memory allocation, structures to developing solutions for particular problems;
- Design and implement abstract data types such as linked list, stack, queue and tree by using C as the programming language using static or dynamic implementations;
- Analyse, evaluate and choose appropriate abstract data types and algorithms to solve particular problems

Text Books:

1 C programming And Data Structures, E Balaguruswamy, 4th edition, Tata McGraw Hill Publications.

2. Data Structures- A pseudo code approach with C, Richard F.Gilberg & Behrouz A. Forouzan, 2nd edition, Cengage Learning.

REFERENCE BOOKS

1.Fundamentals of Data Structures in C, 2nd edition, Ellis Horowitz, Sartaj Sahni and Susan Anderson Freed, Universities press

2.Data Structures through C- Yeshwant Kanetkar, 2nd Edition, BPB Publications

3.Data Structures with C (Schaums Outline Series)- Seymour Lipschutz

** Self Learning Component.

Discrete Mathematical Structures

Sub Code: MCA12	CIE:50
Hours/ Week: 04	SEE:100
Total Hours: 50	Exam Hours: 03

COURSE OBJECTIVESS *:*

- Recognizes logic by constructing direct and indirect proofs
- Infers logical reasoning to solve variety of problems
- constructs induction proofs by summation, inequalities and divisibility arguments
- Identifies different set notations
- comprehends cardinality, finiteness and determine the association between them
- Demonstrates different types of functions and their connection between cardinality
- Applies and analyses usage of graphs.

Module 1 **10Hours**

Logic:

Propositional logic, equivalences, predicates and quantifiers, rules of inference, introduction to proofs, proof methods, Examples**.

Module 2 **10Hours**

Sets, Functions and Relations:

Sets, set operations, functions, recursive functions, sequences and summations, relations, equivalence relations and partial ordering, Examples**.

Module 3 **10 Hours**

Basics of counting, the pigeonhole principle, permutations and combinations, recurrence relations, generating functions, inclusion-exclusion, examples**.

Module 4 **10Hours**

Probability:

Introduction to probability, axioms of probability, independence and conditional probability, Examples**.

Module 5

10Hours

Graph Theory:

Graphs, terminology and special types of graphs, isomorphism, Euler and Hamiltonian paths, planar graphs, graph coloring**.

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to

- Comprehend the proofs and definitions represented
- Data representation through different sets, relations, functions and graphs.
- Problem solving using probability computations and statistical analysis.

Text Books :

1. Kenneth H Rosen "Discrete Mathematics and its Applications with Combinatorics and Graph Theory" 7th Edition, McGraw –Hill 2010.

Reference Books:

1. Ralph P Grimaldi, B. V Ramana, "Discrete & Combinatorial Mathematics, An Applied Introduction" 5th Edition.
2. Eric Gosset "Discrete Mathematics with Proof" Wiley India, 2nd edition.
3. Y N Singh "Discrete Mathematics Structures" Wiley India, 1st edition.
4. JayanthGangually: "A treatise on Discrete Mathematics Structures" pearson, 2010.
5. Thomas Koshy: "Discrete Mathematics with Applications" Elsevier, 2005, Reprint2008.

** Self Learning Component.

Digital Logic and Computer Architecture

Sub Code: MCA13	CIE:50
Hours/ Week: 04	SEE:100
Total Hours: 50	Exam Hours: 03

COURSE OBJECTIVES:

- To familiarize with the basic concepts of digital systems and logic.
- Design sequential and combinational circuits
- Learn computer architecture and various designs.
- Make use of the basics of assembly language

Module 1 **10 Hours**

Digital Computer and Information: Digital Computers, binary numbers, decimal numbers, base of number system. Base Conversion: 1's compliment and 2's complement, addition and subtraction of numbers using complements, Arithmetic Operations, Decimal Codes, Alphanumeric Codes, Code conversion**.

Module 2

14Hours

Combinational Logic Circuit Design : Binary Logic and Gates, Binary storage and registers, Binary codes, Boolean algebra, Standard forms**, Map Simplification, Map Manipulation, NAND and NOR Gates, Integrated Circuits. Map method - up to 4 variable functions, Sum of Products and Product of Sums simplification. NAND, NOR**, implementations,

Combinational Circuits, Design Topics, Analysis Procedure, Design Procedure, Decoders, Encoders, Multiplexers, demultiplexers, Binary adder – subtractors, Binary Multipliers, Decimal Arithmetic**.

Module 3 **10 Hours**

Sequential Circuits: Sequential Circuit Definitions, Latches, Flip-Flops- SR, D, JK, Edge Triggered, T Flip-Flop, Master-Slave, Designing with D Flip-Flops and JK Flip-Flops with Timing Diagram. Definition of Register and Counter**, Registers, Shift Registers, Synchronous Ripple Counter, Asynchronous, Synchronous Binary Counters, BCD counters**.

Module 4 **6 Hours**

Memory and Programmable Logic Devices : Memory and Programmable Logic Device**, Random-access Memory**, RAM integrated Circuits, Array of RAM ICs.

Module 5

10Hours

Instruction Set Architecture :Computer Architecture Concepts, Operand Addressing, Addressing Modes, Instruction set Architectures, Data manipulation Instructions, Floating point Computation, Program Control Instruction, Program interrupts**.

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to

- Conceptualize the importance of different number systems, its arithmetic.
- Design combinatorial and sequential digital logic circuits and reduce expressions using Boolean algebra and kmaps.
- Apply concepts of computer architecture and assembly language programming.

Text books:

1. M Morris Mano, Charles R Kime. "*Logic and Computer Design Fundamentals*". Pearson Education, 2nd Edition, 2005.

2. Morris Mano **,** *Digital logic and computer design*: PHI 23' reprint October2000

3. Carl Hamacher, Z Virnesic & S Zaky **,**Computer Organization ,5th Edition, McGraw Hill, 2002.

Reference books:

1. John P. Hayes , "Computer Architecture and Organization", University Press, 2nd Edition, 2009
2. Soumitra Kumar Mandal , "Digital Electronics – Principles and Applications",Tata McGraw – Hill, 2010

** Self Learning Component.

UNIX Programming

Sub Code: MCA14	CIE:50
Hours/ Week: 04	SEE:100
Total Hours: 50	Exam Hours: 03

COURSE OBJECTIVESS:

The aim of this course is to enable the student to:

- To define and classify the approaches of an operating system.
- Illustrate the Unix Operating System in detail and to show how to work in Unix
- To understand the concept of basic commands, files, filters and process
- Application of the concepts in shell scripts
- Demonstrate the privileges of administrator
- Discuss and demonstrate the advanced filter

Module 1 **14 Hours**

Introduction of Operating System and UNIX : Introduction to Operating System: Operating System definition, Computer System organisation, Distributed Systems, Special Purpose Systems, Computing Environments, Open-Source Operating Systems. Overview of System structure**: operating system services**, user interface, system calls, OS design**, System boot.

UNIX - Introduction, History, Architecture, Experience the Unix environment, Basic commands ls,cat, cal, date, calendar, who, printf, tty, sty, uname, passwd, echo, tput, bc, script, spell and ispell, Examples**,UNIX File System: The file, what's in a filename? The parent-child relationship, pwd, the Home directory, absolute pathnames, using absolute pathnames for a command, cd, mkdir, rmdir, Relative pathnames, The UNIX file system.

Module 2 **8 Hours**

Introduction to the Shell: Introduction to Shell Scripting, Shell Scripts, working with Vi editor, read, Command Line Arguments, Exit Status of a Command, The Logical Operators && and ||, exit, if, and case conditions, expr, sleep and wait, while, until, for, $, @, redirection. The here document, set, trap, Sample Validation and Data Entry Scripts,examples**.

Module 3 **14 Hours**

Basic File Attributes: Is – l, the –d option, File Permissions, chmod, Security and File Permission, users and groups, security level, changing permission, user masks, changing ownership and group, File Attributes, More file attributes**, hard link, symbolic link, umask, find.

Simple Filters -Pr, head, tail, cut, paste, sort, uniq, tr commands, Filters using Regular Expression : grep & sed grep, Regular Expression, egrep, fgrep, sed instruction, Line Addressing, Inserting and Changing Text, Context addressing, writing selected lines to a file, the –f option,
Substitution, Prosperities of Regular Expressions Context addressing, writing selected lines to a file, the –f option, Substitution, Properties of Regular Expressions**.

Module 4 **7 Hours**

The Process: Process basics, PS, internal and external commands, running jobs in background, nice, at and batch, cron, time commands, Essential System Administration root, administrator's privileges, startup & shutdown, managing disk space, cpio, tar, Customizing the Environment : System Variables, profile, sty, PWD, Aliases, Command History, On-line Command Editing**.

Module 5 **9 Hours**

Awk-Advanced Filters:

Simple awk Filtering, Splitting a Line into Fields, printf, the Logical and Relational Operators, Number Processing, Variables, The –f option, BEGIN and END positional Parameters, get line, Built-in variables, Arrays, Functions, Interface with the Shell, Control Flow, Advanced Shell Programming, The sh command, export, cd, the Command, expr, Conditional Parameter Substitution, Merging Streams, Shell Functions, eval, Exec Statement **,**Examples **

COURSE OUTCOMES:S:

Upon successful completion of the course, the student will be able to

- Understanding the operating system concepts and the UNIX working environment.
- To Visualize the commands and develop interactive shell scripts.
- Comprehend the resource management techniques.

Text Book:

1. Your UNIX-The Ultimate Guide, Sumitabha Das, Tata McGraw Hill,
2. Silberschatz, P.B. Galvin, G. Gadne, Operating System Concepts, Wiley-India Edition, 8th Edition. 2011.

Reference Book:

1. "Unix Shell Programming", Yashwant Kanetkar,
2. "Beginning Shell Scripting", Eric Foster -Johnson, John C Welch, Micah Anderson, Wrox publication.

** Self Learning Component.

Web Technologies

Sub Code: MCA15	CIE:50
Hrs/ Week: 04	SEE:100
Total Hrs: 50	Exam Hrs: 04

COURSE OBJECTIVES:

The subject course provides

- To comprehend and understand the underlying principles, methods and approaches of Web technologies.
- To design and build web pages using HTML and CSS
- Illustrate the need of Java Script and jQuery and to build client end applications

Module 1 **12 Hours**

HTML: HTML Introduction, Editors, Basic elements, attributes, Headings, Paragraphs, Formatting, links, Head, Images, Tables, Lists, Blocks, layout, forms, iFrames, Colors, Color names, Color Values, URL, Document Object Modeling(DOM), Programming Examples.

HTML5: Getting started, The browser wars, Feature Detection, Browser Detection, The HTML5 New Elements,HTML5 canvas, HTML5 SVG, HTML5 Drag/Drop, HTML5 Geo location, HTML5 Video, HTML5 Audio,HTML5 Input Types, HTML5 FormElements,HTML5 Form attributes, HTML5 Web storage, Programming examples**.

Module 2 **06Hours**

Cascading Style Sheet (CSS)

CSS and CSS3: CSS Basic–Introduction, Syntax, Id &Class, CSS Styling–Styling backgrounds, Styling Text, Styling Fonts, Styling Links, Styling Lists, Styling Tables.CSS Box Model –Border, Outline, Margin, Padding.

CSS3: Introduction, Borders, Backgrounds, Text effects, Fonts, 2DTransforms, 3D Transforms, Transitions, Animations, Examples**.

Module 3 **14 Hours**

Introduction to JavaScript (JS)

Overview of JavaScript, Object orientation and JavaScript, Syntactic characteristics, Primitives, operations, and expressions, Screen output and keyboard input, Control statements, Object creation and modification, Arrays, Functions, Constructors, Pattern matching using regular expressions, Errors in scripts, Examples**

JavaScript and HTML Documents: The JavaScript Execution Environment, The Document Object Model, Elements Access in Java Script, Events and Event Handling, Handling Events from Body Elements, Handling Events from Text Box and password Elements, The DOM2 Event Model, The navigator Object, DOM Tree Traversal and Modification.
Dynamic Documents with JavaScript: Introduction, Positioning Elements, Moving Elements, Element Visibility, Changing Colors and Fonts, Dynamic Content, Stacking Elements, Locating the Mouse Cursor, Reacting to a Mouse Click, Slow Movement of Elements, Dragging and Dropping Elements, Examples**.

Module 4 **10 Hours**

JQuery

Introduction, Syntax, Selectors, Events, jQuery Effects–Query Hide / show, jQuery Fade , jQuery Fade, jQuery Slide, jQuery Animate, jQuerystop(), jQueryCallback, jQuery Chaining, HTML –jQuery Get, jQuery Set, jQuery Add, jQuery Remove, jQuery CSSClasses, jQuerycss(), jQuery Dimensions.

Module 5 **08 Hours**

Google API
Google Maps JavaScript API Basics, Introduction, Creating a simple map in a custom DIV element, Creating a simple full screen map, Moving from the Web to mobile devices, Changing map properties programmatically, Changing base maps.
Working with Controls: Introduction, Adding and removing controls, changing the position of controls, Creating and adding a geo-location control, Creating a table of contents control for layers, Adding your own logo as a control.
Understanding Google Maps JavaScript API Events, Introduction, Creating two synced maps side by side, Getting the coordinates of a mouse click, Creating a context menu on a map, Restricting the map extent, Creating a control that shows coordinates, Creating your own events.

Course Outcomes:

Upon successful completion of the course, the student will be able to

- Design and build web pages
- Develop client end web applications using Java Script
- Building Interactive web applications using jQuery
- To work with Google map API

TEXT BOOKS:

1. Head First HTML5 Programming by Eric Freeman and Elisabeth Robson
2. Head First jQuery by Ryan Benedetti and Ronan Cranley
3. Head First HTML with css and XHTML by Eric T Freeman, Elisabeth Freeman and Elisabeth Robson

REFERENCE BOOKS:

1. HTML5 Black Book-covers css3, JS, XML ,Xhtml, Ajax, PhP and jQuery by Kogent Learning Solutions Inc, Dreamtech Press
2. Unravelling HTML5, CSS3 and JavaScript – with Visual studio 2013 by Istvan Novak
3. Robert W. Sebesta: Programming the World Wide Web, 7th Edition, Pearson Education, 2008.(Chapters 1, 5, 6, 7)

** Self Learning Component.

Data Structures Using C Laboratory

Sub Code: MCA 16	CIE:50
Hours/ Week: 03	SEE:50
Total Hours: 42	Exam Hours: 03

COURSE OBJECTIVESS:

- To understand the utilization of memory in a efficient and effective manner
- Develop skills to design and analyze data structures such as Lists, Stacks, Queues, Trees
- Build capability to identify and apply the suitable data structure for a given real world problem
- Appreciate the practical applications of data structures

Exercise

1 Program to perform stack Implementation.
2 Program to convert from infix notation to Postfix to Prefix notations.
3 Simulate the working of Priority queue providing the following operations – Insert, Delete and Display.
4 Demonstrate recursion
a. Solve Towers of Hanoi Problem
b. Calculate the sum for a given number 'n' from 1 to n.
5 Implement linked lists and some operations on linked lists.
6 Implement Circular linked lists.
7 Implement
a. Selection sort.
b. Heap sort.
8 Create a binary tree and implement the tree traversal techniques of inorder, preorder and Postorder.
9 Implement the search techniques of
a. Linear Search
b. Binary Search**
10 Program Insertion, Deletion and Traversal In Binary Search Tree.

COURSE OUTCOMES:

At the end of this lab session, the student will

- To analyze a problem and identify the appropriate data structure for solving real world problems.
- To implement data structure concepts and to further pursue analysis and design of algorithms.
- Implementing searching and sorting algorithms.

. ** Self learning component.

UNIX Programming Laboratory

Sub Code: MCA17	CIE:50
Hours/ Week: 03	SEE:50
Total Hours: 42	Exam Hours: 03

COURSE OBJECTIVES:

- Familiarize the Unix environment
- Learn to work on Vi-editor
- Understand basic commands
- Apply commands and to write the shell scripts
- Understand the Filters and to use the basic filters
- Illustrate the file system concepts and to apply them in programs
- Learn the system management
- Distinguish between basic and advanced filters

Introduction to UNIX:

A. Explore the UNIX environment.

B. Explore vi editor with vim tutor. Perform the following operations using vi editor, but not limited to:

1 Insert character, delete character, replace

2. Save the file and continue working.

3. Save the file a exit the editor

4. Quit the editor

5. Quit without saving the file

6. Rename a file, copy a file

7. Insert lines, delete lines,

8. Set line numbers

9. Search for a pattern

10. Familiarise with arrow keys.**

Exercise

1a. Write a shell script using expr command to read in a string and display a suitable message if it does not have at least 10 characters.

1b. Write a shell script that takes a valid directory name as an argument and recursively descend all the sub-directories, finds the maximum length of any file in that hierarchy and writes this maximum value to the standard output.

2a. Write a shell script that accepts a path name and creates all the components in that Path name as directories. For example, if the script is named newpath, then the command newpath a/b/c/d should create directories a, a/b, a/b/c, a/b/c/d.

2b. Write a shell script that accepts two file names as arguments, checks if the Permissions for these files are identical and if the permissions are identical, output common permissions and otherwise output each file name followed by its permissions.

3a. Write a shell script which accepts valid log-in names as arguments and prints their corresponding home directories, if no arguments are specified, print a suitable error message.

3b. Create a script file3 called file-properties that reads a file name entered and outputs it properties.

4. Write shell script to implement terminal locking (similar to the lock command). It should prompt the user for a password. After accepting the password entered by the user, it must prompt again for the matching password as confirmation and if match occurs, it must lock the keyword until a matching password is entered again by the user, Note that the script must be written to disregard BREAK, control-D. No time limit need be implemented for the lock duration.

5a. Write a shell script that displays all the links to a file specified as the first argument to the script. The second argument, which is optional, can be used to specify in which the search is to begin. If this second argument is not present, the search is to begin in current working directory. In either case, the starting directory as well as all its subdirectories at 16 all levels must be searched. The script need not include any error checking.

5b. Write a shell script that accepts as filename as argument and display its creation time if file exist and if it does not send output error message.

6a. Write a shell script to display the calendar for current month with current date replaced by * or ** depending on whether the date has one digit or two digits.

6b. Write a shell script to find a file/s that matches a pattern given as command line argument in the home directory, display the contents of the file and copy the file into the directory~/mydir.

7a. Write a shell script that gets executed displays the message either “Good Morning” or “Good Afternoon” or “Good Evening” depending upon time at which the user logs in.

7b. Write a shell script that accept a list of filenames as its argument, count and report occurrence of each word that is present in the first argument file on other argument files.

8a. Write a shell script that determine the period for which a specified user is working on system and display appropriate message.

8b Write a shell script that reports the logging in of a specified user within one minute after he/she log in. The script automatically terminate if specified user does not log in during a specified period of time.

9a. Write a shell script that accept the file name, starting and ending line number as an argument and display all the lines between the given line number.

9b. Write a shell script that folds long lines into 40 columns. Thus any line that exceeds 40 characters must be broken after 40th, a “\” is to be appended as the indication of folding and the processing is to be continued with the residue. The input is to be supplied through a text file created by the user.

10a. Write an awk script that accepts date argument in the form of dd-mm-yy and displays it in the form if month, day and year. The script should check the validity of the argument and in the case of error, display a suitable message.

10b. Write an awk script to delete duplicated line from a text file. The order of the original lines must remain unchanged.

11a. Write an awk script to find out total number of books sold in each discipline as well as total book sold using associate array down table as given below.

Unix System - 60

Web Technologies - 50

Operating Systems - 30

Computer Architecture - 44

C Programming - 98

Database Management Systems - 34

11b. Write an awk script to compute gross salary of an employee accordingly to rule given below.

If basic salary is < 15000 then HRA=20% of basic & DA=45% of basic

If basic salary is >=15000 then HRA=30% of basic & DA=50% of basic.

Note: In the examination *each* student picks one question from a lot of *all the* 11 Questions

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to

- Justify use of shell scripts with respect to concepts of commands, filters, process and file system.
- Support system resources through administrative commands.
- Build programs using advanced filters.

** Self Learning Component.

Web Programming Laboratory

Sub Code: MCA18	CIE:50
Hours/ Week: 03	SEE:50
Total Hours: 42	Exam Hours: 03

COURSE OBJECTIVES:

- Describe the design principles and techniques of web site design
- Provide the knowledge and skills to build websites using recent tools and technologies
- Build UI using jQuery

Questions

1. Develop and demonstrate a XHTML Document

a) Types of List

b) A Simple Table

c) A Complex Table (With Row and Col Span)**

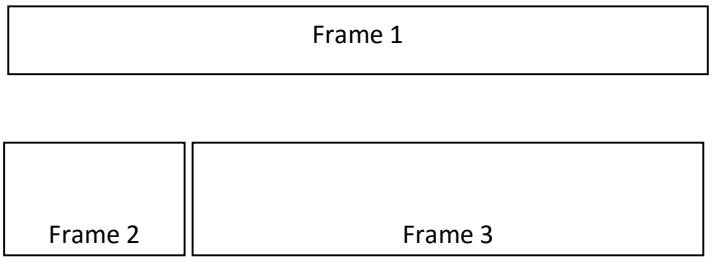
2. Design a registration form, that comprises of most of the form elements (Text box, Password box Radio button, Check box, List Box, Select box, text area, file box)**

3. Design a frame structure as given below with following specifications:

a) Frame 1 should contain Title details

b) Frame 2 should contains list of items with hyperlinks

c) Frame 3 should contains details of the selected list item.



4. Develop and demonstrate a XHTML document that illustrates the use external style sheet, ordered list, table, borders, padding, color, and the tag.

5. Develop and demonstrate a XHTML file that includes JavaScript script for the following problems:

a) Input: A number n obtained using prompt

Output: The first n Fibonacci numbers

b) Input a line of text from a text box and sort all the words in alphabetic order and display using alert.

6. Develop and demonstrate a XHTML file that includes JavaScript script that uses functions for the following problems:

a. Parameter: A string

Output: The position in the string of the left-most vowel

b. Parameter: A number

Output: The number with its digits in the reverse order

7. a) Develop and demonstrate, using JavaScript script, a XHTML document that collects the USN (the valid format is: A digit from 1 to 4 followed by two upper-case characters followed by two digits followed by two upper-case characters followed by three digits; no embedded spaces allowed) of the user. Event handler must be included for the form element that collects this information to validate the input. Messages in the alert windows must be produced when errors are detected.

b) Modify the above program to get the current semester also (restricted to be a number from 1 to 6)

8. Develop and demonstrate, using JavaScript script, a XHTML document that contains three short paragraphs of text, stacked on top of each other, with only enough of each showing so that the mouse cursor can be placed over some part of them. When the cursor is placed over the exposed part of any paragraph, it should rise to the top to become completely visible.

9. a) Design an XML document to store information about a student in an engineering college affiliated to VTU. The information must include USN, Name, Name of the College, Branch, Year of Joining, and e-mail id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.

b) Create an XSLT style sheet for one student element of the above document and use it to create a display of that element.

10. Demonstrate jQuery Effects(Fade, Slide, animate)) by taking a text paragraph and an image

11. Write a Google Map JavaScript – API program to read city co-ordinates (longitude and latitude) and generate the respective map.

12. Write a Google Map JavaScript – API Program to display map of INDIA, onclick of mouse button on the map, the program should display a marker and marker message box showing the location info**.

COURSE OUTCOMES:S:

Upon successful completion of the course, the student will be able to

- Apply good working knowledge of XHTML, CSS, Jquery.
- Build dynamic web pages using java scripts.
- Appreciate server side programming skills.

Note: In the examination *each* student picks one question from the lot of *all* 12 questions.

** Self Learning Component.

Department :MCA **Course :MCA**

II SEMESTER

Sl.No	Subject Code	Name of the Subject	Teaching hours/week			SEE Hours	Examination			CREDITS
			L	T	P		CIE	SEE	Total	
1	MCA21	Python Programming	4	0	0	3	50	100	100	4
2	MCA22	Object Oriented Programming using C++	4	0	0	3	50	100	100	4
3	MCA23	Operating System	4	0	0	3	50	100	100	4
4	MCA24	System Software	4	0	0	3	50	100	100	4
5	MCA25	Database Management System	4	0	0	3	50	100	100	4
6	MCA26	Python Lab	1	0	2	3	50	50	100	2
7	MCA27	Database Lab	1	0	2	3	50	50	100	2
8	MCA28	OOP Using C++ Lab	1	0	2	3	50	50	100	2
TOTAL							400	650	800	26

CIE:Continuous Internal Evaluation, SEE: Semester End Examination, L: Lecture, T: Tutorial, P: Practical

1Hr. Theory= 1 credit, 2Hrs. Practical=1 credit, 1Hrs. Tutorial =1 credit

[All Labs will have 1hr instruction class]

II semester

Python Programming

Sub Code: MCA21	CIE:50
Hours/ Week: 04	SEE:100
Total Hours: 50	Exam Hours: 03

COURSE OBJECTIVES:

- Introductory concepts of python and storing the collection of storage of lists.
- Learns about files, types of files.
- Steps to solve real time applications using object oriented programming.

Module 1 **10 Hours**

Installing Python, Simple program using Python, Expressions and Values, Variables and Computer Memory, error detection, Multiple line statements, Designing and using functions, functions provided by Python, Tracing function calls in memory model, omitting return statement. Working with Text: Creating Strings of Characters, Using Special Characters in Strings, Creating a Multiline String, Printing Information**, Getting Information from the Keyboard.

Module 2 **10 Hours**

A Boolean Type , Choosing Statements to Execute, Nested If Statements , Remembering the Results of a Boolean Expression Evaluation , A Modular Approach to Program Organization, Importing Modules , Defining Your Own Modules, Testing Code Semi automatically Grouping Functions Using Methods: Modules, Classes, and Methods , Calling Methods the Object-Oriented Way, Exploring String Methods, Underscores**.

Module 3 **10 Hours**

Storing Collections of Data Using Lists: Storing and Accessing Data in Lists, modifying Lists, Operations on Lists, Slicing Lists, Aliasing, List Methods, Working with a List of Lists. Repeating Code Using Loops: Processing Items in a List, Processing Characters in Strings, Looping Over a Range of Numbers, Processing Lists Using Indices, Nesting Loops in Loops, Looping Until a Condition Is Reached, Repetition Based on User Input, Controlling Loops Using
Break and Continue Reading and Writing**.

Module 4 **10 Hours**

Files: Kinds of files, Opening a File, Techniques for Reading Files, Files over the Internet, Writing Files, and Writing Algorithms That Use the File-Reading Techniques, Multiline Records. Storing Data Using Other Collection Types: Storing Data Using Sets, Storing Data

Using Tuples, Storing Data Using Dictionaries, Inverting a Dictionary, Using the In Operator on Tuples, Sets, and Dictionaries, Comparing Collections**.

Module 5 **10 Hours**

Collection of New Information Object-Oriented Programming : Understanding a Problem Domain , Function "Isinstance," Class Object, and Class Book , Writing a Method in Class Book, Plugging into Python Syntax: More Special Methods ,Creating Graphical User interface: Building a Basic GUI, Models, Views, and Controllers, Customizing the Visual Style Introducing few more Widgets, Object-Oriented GUIs, Keeping the Concepts from Being a GUI Mess**.

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to

- Understand and comprehend the basics of python programming.
- Apply knowledge in real time applications.
- Understands about files and its applications.

Text Books

1. Practical Programming: An introduction to Computer Science Using Python, second edition, Paul Gries, Jennifer Campbell, Jason Montojo, The Pragmatic Bookshelf.
2. Python for Informatics: Exploring Information, Charles Severance.
3. Learning Python, Fourth Edition, Mark Lutz, O'Reilly publication

Reference Books

1. Introduction to Python for Computational Science and Engineering (A beginner's guide), Hans Fangohr.

2. Exploring Python, Timothy A. Budd, Mc Graw Hill Education

** Self Learning Component.

Object Oriented Programming Using C++

Sub Code: MCA22	CIE:50
Hours/ Week: 04	SEE:100
Total Hours: 50	Exam Hours: 03

COURSE OBJECTIVES:

- To introduce object oriented programming concepts to automate the real time systems.
- To demonstrate polymorphism of different operators which can be used based on the context of the program.
- To overcome the drawbacks of structured programming by introducing inheritance concept which reduce the code complexity and increases the code reusability.
- To achieve code optimization using Generic functions and classes.
- To demonstrate compile time and run time exceptions, to handle abnormal program termination. These exceptions can be handled by the programmer using exception handling mechanisms.

Module 1 — 12Hours

Introduction to OOPs, Modular Programming with Functions

Object Oriented paradigm, Structured vs. Object Oriented Paradigm. Elements of Object Oriented Programming: Object, Classes, Encapsulation & data abstraction, Inheritance, Polymorphism etc., C++ Overview, different data types, operators, expressions, const & volatile qualifiers, arrays and strings, reference variables.Modular Programming with Functions: Function Components , argument p a s s in g, inline functions , function overloading, function templates, recursive functions**.

Module 2 — 12 Hours

Classes & Objects and Operator Overloading

Introduction, Class Specification, Class Objects, access members, defining member functions, data hiding, constructors, destructors, parameterized constructors, static data members, functions, scope resolution operator, passing objects as arguments, returning objects, friend functions & classes, arrays of objects, Dynamic objects – Pointers to objects, Class members. Operator Overloading **:** Creating a Member Operator function, Binary operator overloading, concatenation of strings , strings comparison using operator overloading, overloading the assignment operator , overloading operators such as [], ->, increment & decrement operators, operator overloading using friend functions +,-, overloading input stream and output stream operators using friend function**.

Module 3 **11 Hours**

Inheritance Virtual functions & Polymorphism

Base Class, Inheritance & protected members, protected base class inheritance, inheriting multiple base classes, Constructors, Destructors & Inheritance. Passing parameters to base Class Constructors, Granting access, Virtual base classes, Virtual function -Calling a Virtual function through a base class reference, Virtual attribute is inherited**, Virtual functions are hierarchical, pure virtual functions, abstract classes, using Virtual functions, Early & late binding.

Module 4 **11 Hours**

Templates, Exception Handling and I/O Streams

Generic classes, a class template with more than one generic type, The power of templates. Exception Handling: Exception handling model, Exception handling constructs, list of exceptions, catch all exceptions, Handling uncaught exceptions. I/O Streams: IO Stream basics, output operator <<, input >>, additional I/O operators, overloading the output operator <<, overloading the input operator >>, file input & output, manipulators**.

Module 5 **4 Hours**

Standard Template Library:

STL: An overview, containers, vectors, lists, maps.

COURSE OUTCOMES:

At the end of this course student is-

- Able to understand and implement features of oops.
- Appreciate and apply oops concepts to solve real world problems.
- Capable of learning the object oriented programming languages**.**

Text Books:

1**.** K.R. Venugopal, Rajkumar Buyya, T. Ravishankar: Mastering C++ , TataMcGraw Hill Publication, 2006.

2. Herbert Schildt: C++ The Complete Reference, 4th Edition, Tata McGraw Hill, 2007.

Reference Book:

1. Stephen Prata : C++ Primer Plus, 6th Edition, Person Education.

2. Al Stevens: C++ Programming, 7th Edition, Wiley India Publications

3. Stanley B.Lippmann, Josee Lajore: C++Primer, 4th Edition, Addison Wesley, 2005.

4. Object oriented programming with C++, E. Balaguruswamy, TMH.

** Self Learning Component.

Operating Systems

Sub Code: MCA23	CIE:50
Hours/ Week: 04	SEE:100
Total Hours: 50	Exam Hours: 03

COURSE OBJECTIVESS:

The subject course provides

- To comprehend and understand the underlying principles, techniques and approaches of knowledge in operating systems.
- Illustrate inherent functionality and processing of program execution
- Identify the various underlying elements of operating system along with their interaction and provide services for execution of application software.

Module 1 — 10 Hours

Operating System Introduction:

Operating Systems objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Special - Purpose Systems, Operating System services, User OS Interface, System Calls**, Types of System Calls**, System Programs, Operating System Design and Implementation, OS Structure, Virtual Machines.

Module 2 — 10 Hours

Process and CPU Scheduling

Process concepts-The Process, Process State, Process Control Block, Threads, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Preemptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling, Case studies: Linux, Windows**.

Process Coordination – Process Synchronization, The Critical Section Problem, Peterson's solution, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors, Case Studies: Linux, Windows**.

Module 3 — 10 Hours

Memory Management and Virtual Memory

Logical & Physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Page Replacement Algorithms, Allocation of Frames, Thrashing, Case Studies: Linux, Windows**

Module 4 **10 Hours**

File System Interface

The Concept of a File, Access methods, Directory Structure, File System Mounting, File Sharing, Protection, File System Implementation - File System Structure, File System Implementation, Allocation methods, Free-space Management, Directory Implementation, Efficiency and Performance**, Case Studies: Linux, Windows**.

Mass Storage Structure – Overview of Mass Storage Structure**, Disk Structure**, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management

Module 5 **10 Hours**

Deadlocks

System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Protection – System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection, Case Studies: Linux, Windows.

COURSE OUTCOMES:

- Understand the history of OS and master functions, structures and design issues of OS

  Through a comparative study between windows and linux.
- Comprehend various process management concepts such as threads, scheduling, synchronization and deadlocks along with memory management concepts.
- Understand manage and secure various associated resources through algorithms**.**

TEXT BOOKS:

1. Operating System Principles , Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, Wiley Student Edition
2. Operating Systems – Internals and Design Principles, W. Stallings, 6th Edition, Pearson Education.

REFERENCE BOOKS:

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, Pearson/PHI
2. Operating Systems A concept-based Approach, 2nd Edition, D.M. Dhamdhere, TMH.
3. Principles of Operating Systems , B.L.Stuart, Cengage learning, India Edition.
4. Operating Systems, A.S.Godbole,2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.

** Self Learning Component.

System Software

Sub Code: MCA24	CIE:50
Hours/ Week: 04	SEE:100
Total Hours: 50	Exam Hours: 03

COURSE OBJECTIVES:

To provide

- Introduce system software and differentiate between system software and application software. Emphasize on architecture of Simplified Instructional Computer and its extended version.
- Discuss the design and implementation of assemblers. There are certain fundamental functions that any assembler must perform, such as translation mnemonic operation codes to their machine language equivalents and assigning machine addresses to symbolic labels used by the programmer. This unit also teaches how to design of an assembler for Simplified Instructional Computer.
- Understand the various types of loaders and linkers available. Features and functions of loaders. Design and implementation of loaders and linkers. As an implementation example MS DOS Linker, Sun OS Linker and Cray MPP Linker are explained.
- Understand what is meant by macro, where and why it is used. Features of general-purpose macro processor. Design and implementation of macro processor. As and implementation of macro processor. As an implementation example Macro Assembler, ANSI C Macro and ELENA Macro Processor are explained.
- Introduce the concepts and principles of compiler design. Providing students with basic understanding of grammars and language definition. Introducing students to the various phases of designing a compiler. Introducing students to the various programming techniques and structures used in compiler construction.

Module 1 **7 Hours**

Machine Architecture

Introduction, System Software and Machine Architecture, Simplified Instructional Computer (SIC) – SIC Machine Architecture, SIC/XE Machine Architecture, SIC Programming Examples. VAX Architecture, UltraSPARC Architecture**.

Module 2 **13 Hours**

Assemblers

Basic Assembler Function - A Simple SIC Assembler, Assembler Algorithm and Data Structures,Machine Dependent Assembler Features - Instruction Formats & Addressing Modes, Program Relocation. Machine Independent Assembler Features – Literals, Symbol-Definition Statements, Expression, Program Blocks, Control Sections and Programming Linking, Assembler Design Operations - One-Pass Assembler, Multi-Pass Assembler, Implementation Examples – MASM Assembler, SPARC Assembler **.

Module 3 **10 Hours**

Loaders and Linkers

Basic Loader Functions - Design of an Absolute Loader, A Simple Bootstrap Loader, Machine-Dependent Loader Features – Relocation, Program Linking, Algorithm and Data Structures for a Linking Loader; Machine-Independent Loader Features – Automatic Library Search, Loader Options, Loader Design Options - Linkage Editor, Dynamic Linkage, Bootstrap Loaders, Implementation Examples – MS-DOS linker, SunOS Linker, Cray MPP linker

Module 4 **9 Hours**

Macro Processor

Basic Macro Processor Functions - Macro Definitions and Expansion, Macro Processor Algorithm and Data Structures, Machine-Independent Macro Processor Features – Concatenation of Macro Parameters, Generation of Unique Labels, Conditional Macro Expansion, Keyword Macro ParametErs, Macro Processor Design Options – Recursive Macro Expansion, General- Purpose Macro Processors, Macro Processing Within Language Translators, Implementation Examples - MASM Macro Processor, ANSI C Macro Processor., ELENA macro processor**.

Module 5 **11 Hours**

Compilers

Basic Compilers Functions- Grammars, Lexical Analysis, Syntactic Analysis, Code Generation. Machine Dependent Compiler Features- Intermediate Form of the Program, Machine dependent code Optimization. Machine Independent Compiler Features- Structured variables, Machine Independent code Optimization. Compiler Design Options- Division into passes, Interpreters, P-code Compilers, Compiler-Compilers, SunOS C compiler, YACC Compiler-compiler**.

COURSE OUTCOMES:

On Completion of this course, the students are able to

- Understand, design and implement the introductory concepts of assembly level programming, system software and machine architecture.
- Understand and design linkers and loaders with examples.
- Understand and design macro processors and compilers through examples.

Text Books:

1. Leland.L.Beck: System Software, 3rd Edition, Addison-Wesley, 1997.

Reference Books:

1. J.Nithyashri, “System Software”, 2nd Edition, Tata McGraw Hill, 2010.

** Self Learning Component.

Database Management Systems

Sub Code: MCA25	CIE:50
Hours/ Week: 04	SEE:100
Total Hours: 50	Exam Hours: 03

COURSE OBJECTIVES:

- Demonstrate the fundamentals of data models and conceptualize and depict a database system
- Make use of ER diagram in developing ER Model
- To Summarize the SQL and relational database design.
- Illustrate transaction processing, concurrency control techniques and recovery
- Inference the database design in the real world entities.

Module 1 **14 Hours**

Introduction

An example; Characteristics of Database approach; Actors on the screen; Workers behind the scene; Advantages of using DBMS approach; A brief history of Database Applications; When not to use a DBMS. Data Models, Schemas and Instances; Three-Schema Architecture and Data Independence; Database Languages and Interfaces; The Database System Environment; Centralized and Client-Server Architectures for DBMS; Classification of Database Management Systems.

Entity-Relationship Model**:** Using High-Level Conceptual Data Models for Database Design; An Example Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationship Types, Relationship Sets, Roles and Structural Constraints; Weak Entity Types; Refining the ER Design for COMPANY Database; ER Diagrams, Naming Conventions and Design Issues; Relationship Types of Degree Higher than Two, Relational Database Design Using ER- to-Relational Mapping**.

Module 2 **10 Hours**

Relational Model and Relational Algebra

Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update Operations, Transactions and Dealing with Constraint Violations; Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary

Relational Operations: JOIN and DIVISION; Additional Relational Operations; Examples of Queries in Relational Algebra**;

Module 3 **12 Hours**

SQL

SQL Data Definition and Data Types; Specifying Constraints in SQL; Schema Change Statements in SQL; Basic Queries in SQL; More Complex SQL Queries, Insert, Delete and Update Statements in SQL; Specifying Constraints as Assertions and Triggers; Views (Virtual Tables) in SQL; Additional Features of SQL; Database Programming: Issues and Techniques; Embedded SQL, Dynamic SQL**; Database Stored Procedures and SQL / PSM.

Module 4 **7 Hours**

Database Design

Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form

Module 5 **7 Hours**

Transaction Processing

Transaction Processing – Properties of Transactions - Serializability – Transaction support in SQL - Locking Techniques – Time Stamp ordering – Validation Techniques – Granularity of Data Items – Recovery concepts** – Shadow paging – Log Based Recovery – Database Security Issues – Access control – Statistical Database Security.

COURSE OUTCOMES:

On completion of this course, student is able to

- Able to understand and implement features of OOPS.
- Appreciate and apply oops concepts to solve real world problems.
- Capable of learning other object oriented programming languages.

Text Books:

1. Ramez Elamassri and Shankant B-Navathe, “Fundamentals of Database Systems”, Sixth Edition, Pearson Education Delhi, 2010
2. Raghu Ramakrishnan, Johannes Gehrke ,’ Database management systems” McGraw Hill
3. Frank. P. Coyle, “XML,Web Services And The Data Revolution”, Pearson Education, 2012.

REFERENCES:

1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan “Database System Concepts”, Sixth Edition, McGraw Hill, 2010

** Self Learning Component.

PYTHON PROGRAMMING LABORATORY

Sub Code: MCA26	CIE:50
Hours/ Week: 04	SEE:50
Total Hours: 42	Exam Hours: 03

COURSE OBJECTIVES:

- Learns basics of python programming language.
- Can implement advanced programs in python based on the knowledge gained.

1. Write a program to sum all the elements from n1 to n2 where n1 and n2 are positive integers.
2. Input an array of n numbers and find separately the sum of positive numbers and negative numbers.
3. Write a python program to print Fibonacci series**.
4. Write a python program to find factorial of a number.
5. Write a python program to convert decimal to binary using recursion.
6. Write a program to search an element using linear search.
7. Write a python program to search an element using binary search.
8. Write a python program to simulate a simple calculator**.
9. Using a stack evaluate an arithmetic expression.
10. Write a python program to multiply two matrices.
11. Write a python program to find the roots of a quadratic equation.
12. Write a python program to shuffle a deck of cards.
13. Write a python program to merge mails.
14. Write a python program to input an expression in infix form and get output in postfix form.
15. Write a python program to sort the numbers using quick sort.
16. Write a python program to find Hash of File.
17. Write a python program to count the number of each Vowel.
18. Write a python program to check if a string is a Palindrome or not.
19. Write a python program to sort words in alphabetical order.
20. Write a python program to swap two variables.

COURSE OUTCOMES:

On Completion of this course, the students are able to

- Understand basics of python programming.
- Write basic programs in using python

** Self Learning Component.

DATA BASE LABORATORY

Sub Code: MCA27	CIE:50
Hours/ Week: 03	SEE:50
Total Hours: 42	Exam Hours: 03

(Part A and Part B are assessed equally)

COURSE OBJECTIVES:

- Demonstrate database handling process.
- Illustrate queries on the databases.

PART A:

SQL Practical

Data Definition Language: Create, Alter, Drop, Rename, Truncate Data Manipulation Language: Insert, Update, Delete, Select

Data Control Language: Grant, Revoke, Roles

Transaction Control: Commit, Rollback, Savepoint SQL SELECT Statements: Selecting All Columns, Selecting Specific Columns, Column Alias, Concatenation Operator, Arithmetic Operators, Comparison Conditions, Logical Conditions, ORDER BY Clause

Functions:

Single Row Functions, Character Functions, Number Functions, Date Functions, Conversion Functions, General Functions, Multiple Row Functions, Group Function Subquery: Subquery, Types of Subquery, Group Function, Having Clause **

Joins:

Equijoins, Non-Equijoins, Joining Three Tables, Self Joins, Left Outer Joins, Right Outer Joins, Full Outer Joins, Cross Joins, Natural Joins Other Concepts: Sequence, View, Index, Synonyms**

Constraints:

Not Null, Unique Key, Primary Key, Foreign Key, Check, Dropping 19 a Constraint, Enabling & Disabling

COURSE OUTCOMES:

On successful completion of this course, student will be

- Implement SQL queries using relational model concepts.
- Apply normalization concepts for relational scheme.
- Design and develop a data base application.

PART B:

Mini Project:

COURSE OBJECTIVES:

- To teach database handling using real world entities (case study)
- To teach application DBMS concepts to apply in particular case studies.

Database project:

Use of Real World Application with Technological Application by using Opern Source software application and Tool

Software / Tools: Mysql, Postgre SQL 9.0

COURSE OUTCOMES:

On successful completion of this course, student will be

- Implement SQL queries using relational model concepts.
- Apply normalization concepts for relational scheme.
- Design and develop a data base application.

** Self Learning Component.

OOP USING C++ LABORATORY

Sub Code: MCA28	CIE:50
Hours/ Week: 03	SEE:50
Total Hours: 42	Exam Hours: 03

COURSE OBJECTIVES:

- To practice the fundamental programming methodologies in C++ programming language.
- To explore object-oriented programming features such as abstraction, polymorphism, inheritance, etc., using C++.
- To write reusable Modules (collections of functions).

Exercise

1. Define a STUDENT class with USN, Name, and Marks in 3 tests of a subject. Declare an array of 10 STUDENT objects. Using appropriate functions, find the average of the two better marks for each student. Print the USN, Name and the average marks of all the students.

2. Write a C++ program to create a class called COMPLEX and implement the following overloading functions ADD that return a complex number:
(i) ADD (a, s2) – where 'a' is an integer (real part) and s2 is a complex number
(ii) ADD (s1, s2) – where s1 and s2 are complex numbers

3. Write a C++ program for scalar multiplication of two vectors using operator overloading**.

4. Write a C++ program to create a template function for Bubble Sort and demonstrate sorting
of integers and doubles.

5. Write a C++ program to create a class called LIST (linked list) with member functions to insert an element at the front and delete an element from the front of the list. Demonstrate all the functions after creating a LIST object.

6. Write a C++ program to create a class called STACK using an array of integers. Implement the following operations by overloading the operators '+' and '--':
(i) s1 = s1 + element; where s1 is an object of the class STACK and element is an integer to be pushed on the top of the stack
(ii) s1 = --s1 ; where s1 is an object of the class STACK. '--'operator pops the element.

Handle the STACK empty and full conditions. Also display the contents of the stack after each operation, by overloading the << operator.

7. Create a class called MATRIX using two-dimensional array of integers. Implement the following operations by overloading the operator == which checks the compatibility of two matrices to be added and subtracted. Perform the addition and subtraction by overloading the + and – operators respectively. Display the results by overloading the operator <<. If (m1==m2) then m3 = m1+m2 and m4 = m1-m2 else display error.

8. Write a C++ program to create a class called OCTAL which has the characteristics of an octal number. Implement the following operations by writing an appropriate constructor and an overloaded operator +.
(i) OCTAL h = x; where x is an integer.
(ii) int y = h + k; where h is an OCTAL object and k is an integer.
Display the OCTAL result by overloading the operator <<. Also display the values of h and y.

9. Write a C++ program to create a class template called QUEUE with member functions to add an element and to delete an element from the queue. Using the member functions, implement a queue of integers and double. Demonstrate the operations by displaying the contents of the queue after every operation.

10. Define a class SET with Data members: array of int, int variable to indicate number of elements in a SET object; and Member functions: to read element of a SET object, to print elements of a SET object, to find union of 2 objects of SET using operator overloading (S3=S1+S2), to find intersection of 2 objects of SET using operator overloading (S4= S1*S2). S1, S2, S3 and S4 are objects of SET. Use this class in a main function to show the above operations.

11. Write a C++ program to create a class called STUDENT with data members USN, Name and Age. Using inheritance, create the classes UGSTUDENT and PGSTUDENT having fields as Semester, Fees and Stipend. Enter the data for at least 5 students. Find the semester wise average age for all UG and PG students separately.

12. Write a C++ program to create a class called STRING and implement the following operations. Display the results after every operation by overloading the operator <<.
(i) STRING s1 = “VTU”
(ii) STRING s2 = “BELGAUM”
(iii) STRING s3 = s1 + s2 (Use copy constructor)

13. Define a base class STACK1 which performs only push, pop, display operations. Override the above operations through a derived class STACK2 which takes care of STACK FULL & STACK EMPTY situations. Show how the objects of these classes use the above functions in a main function.

14. Create an abstract base class EMPLOYEE with data members: Name, EmpID and BasicSal and a pure virtual function Cal_Sal().Create two derived classes MANAGER (with data

members: DA and HRA) and SALESMAN (with data members: DA, HRA and TA). Write appropriate constructors and member functions to initialize the data, read and write the data and to calculate the net salary. The main() function should create array of base class pointers/references to invoke overridden functions and hence to implement run-time polymorphism.

15. Write a program to create a file to store some records and search for a particular record and display it**.

Note: In the examination each student has to pick one question from a lot of *all* the 15 questions.

COURSE OUTCOMES:

On successful completion of this course, student will be

- Demonstrate OOPs concepts using C++.
- Implement inheritance, polymorphism and object relationship using C++.
- Use user defined data types to build business logic.

**Self Learning Component.