Vision of the Institute

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institute

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Civil Department

To give the nation qualitative Civil Engineers, who can contribute for the construction of a better world with sophisticated infrastructural facilities, eco-friendly houses, modern transportation facilities with a pollution free environment and to protect the precious natural resources of this planet.

Mission of Civil Department

- To shape the students into good entrepreneurs and to promote self-confidence and all-round development of the student personality through special lectures, practical training programs, field visits and technical seminars.
- To train the students to acquire generic knowledge in the areas of Civil Engineering
- To continuously update the physical infrastructure through modernization, thrust area development, R & D and other schemes
- To generate knowledge base through sustained research and developmental efforts.
- To produce engineers with self-confidence and overall personality who can be self-employed and generate employment opportunities to fellow engineers and take active part in nation building, keeping in view the challenges of the future

Program Educational Objectives (PEO's of Civil Department)

1. The main objective of the faculty is to guide them by the principles of sustainable development and global inter connectedness with the CIVIL structures, and make them to understand the impact of CIVIL engineering projects how they effects society and environment in case of failures.
2. To develop their Communication skills (Oral, Written and Visual, Graphic modes) which makes them to participate actively in their Communities and Profession when working as team leaders or members.
3. An intensive training is provided to identify, formulate and solving engineering problems in technical areas appropriate to CIVIL ENGINEERING.
4. To make them competent and engaged engineering professionals applying their technical & managerial skills in Planning, Designing and Construction.

Program Outcomes(PO's) of Civil Department

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics,
natural sciences, and engineering sciences.
3.Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Recognize the need for, and have the preparation and ability to engage in
independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes(PSO's) of Civil Department

1. An ability to learn constructional concepts and to implement them in the field work and to make the structural planning in a smarter way.
2. To encourage young energetic engineers in technical and software skills in the field of Civil Engineering with innovative thoughts along with existing and future trends in constructional field.
3. The capability to integrate knowledge in constructional field work and to improve skills to become an entrepreneur.

II Year - I Semester

S.No	Category	Course Title	L	T	P	C	IM	EM	TM
1	BSC	Mathematics -III (Complex Variables and PDE**)**	3	-	-	3	30	70	100
2	PCC	Strength of Materials - I	3	-	-	3	30	70	100
3	PCC	Fluid Mechanics	3	-	-	3	30	70	100
4	PCC	Surveying	3	-	-	3	30	70	100
5	PCC	Highway Engineering	3	-	-	3	30	70	100
6	PCC LAB	Concrete Technology Lab	-	-	3	1.5	15	35	50
7	PCC LAB	Highway Engineering Lab	-	-	3	1.5	15	35	50
8	PCC LAB	Surveying Field Work (Lab)	-	-	3	1.5	15	35	50
9	SOC	Building & Earth Science	1	-	2	2	15	35	50
10	MC	Constitution of India	2	-	-	-	-	-	-
Total			**18**	**0**	**11**	**21.5**	**210**	**490**	**700**

Subject	Mathematics III (Complex Variables & PDE)				
Year/semester	II B.Tech/I Sem	L	T	P	C
Regulation year	R - 20	3	0	0	3

Course Objectives:

To enable the students to

1. Make use the significance of differentiability and analyticity for complex variable functions and be familiar with the Cauchy-Riemann equations.
2. Find integrals along a path in the complex plane using the Cauchy's theorem and Residue theorem.
3. Solve the singularities of complex variable function by expanding them into Taylor‟s and Laurent‟s series and finding residues.
4. Make the students learn modeling various physical phenomena as first and higher order PDE and applications

SYLLABUS

UNIT - I

Functions of Complex Variables: Continuity and differentiability, Analyticity, properties, Cauchy Riemann equations in Cartesian and polar coordinates, harmonic and conjugate harmonic functions, Milne – Thompson method.

UNIT – II

Complex Integration: Integration of complex functions – Line Integrals, Cauchy‟s Integral theorem, Cauchy‟s Integral Formula - Generalized Cauchy‟s Integral formula (without proofs).

UNIT – III

Complex power series and Residues: Complex power series-Taylor‟s Series and Laurent‟s Series, Singularities, Poles and Residues-Cauchy Residues theorem (without proof), evaluation of integrals of type $\int_{-\infty}^{\infty} f(x)dx$ and $\int_0^{2\pi} f(cos\theta, sin\theta)d\theta$ using Residue theorem.

UNIT – IV

First Order Partial Differential Equations: Formation of Partial differential equations by elimination of arbitrary constants and arbitrary functions– solutions of first order linear (Lagrange) equations and nonlinear equations-standard types

UNIT – V

Higher Order Partial Differential Equations and Applications: Solutions of Linear Partial differential equations with constant coefficients. RHS terms of the type $e^{ax + by}$, Sin(ax+by), Cos (ax+by), $x^m y^n$. Classification of second order partial differential equations-parabolic, elliptical and hyperbolic.

Method of Separation of Variables, Applications to wave equation, heat conduction equation in one dimensions and Laplace equation in two dimensions

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Ed., Wiley, 2012.

References:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganatham and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
3. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
4. S.KaleshaValli, G.VenkataRao and A.V.Papa Rao, Engineering Mathematics-I, Cengage Publications, 2018.

Course Outcomes:

After undergoing this course, students will be able to

1. Understand the differentiability and analyticity for complex variable functions and learn sufficient conditions for analyticity
2. Evaluate the integration of complex valued functions.
3. Expand the functions in power series, classify the singularities of complex function
4. Model first order linear and non-linear partial differential equations and solve analytically
5. Model higher order partial differential equations and solve analytically and physical problems of engineering like steady and unsteady heat conduction, vibration of string, etc.

Subject	STRENGTH OF MATERIALS - I				
Year/semester	II B.Tech/I Sem	L	T	P	C
Regulation year	R - 20	3	0	0	3

Course Learning Objectives:

The objective of this course is:

1. To impart preliminary concepts of Strength of Material and Principles of Elasticity and Plasticity Stress conditions and to develop diagrams of variation of various stresses across the length.
2. To give concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections
3. The concepts above will be utilized in measuring deflections in beams under various loading and support conditions
4. To classify cylinders based on their thickness and to derive equations for measurement of stresses across the cross section when subjected to external pressure.

SYLLABUS

UNIT – I

Simple Stresses and Strains: Elasticity and plasticity – Types of stresses and strains – Hooke‟s law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson‟s ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – stresses in composite bars – Temperature stresses.

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT – II

Shear Force and Bending Moment: Definition of beam – Types of beams – Concept of shear force and bending moment – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam; S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads.

UNIT – III

Flexural and shear Stresses in beams: Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R, Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections.

Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, I, T Angle sections.

UNIT – IV

Deflection of Beams: Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic curve of a beam – Double integration and Macaulay‟s methods – Determination of slope and deflection for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads. Mohr‟s theorems – Moment area method – application to simple cases of cantilever.

UNIT – V

Thin cylindrical shells: Derivation of formula for longitudinal and circumferential stresses - hoop, longitudinal and volumetric strains – changes in diameter, and volume of thin cylinders.

Thick cylinders: Introduction: Lames theory for thick cylinders, Derivation of Lames formulae, distribution of hoop and radial stresses across the thickness, compound cylinders-distribution of stresses.

Text books:

1. A Textbook of Strength of Materials, by R. K. Rajput, 7e (Mechanics of Solids) SI Units S. Chand & Co, New Delhi.
2. Strength of materials by R. K. Bansal, Lakshmi Publications.

References:

1. Mechanics of Materials- by R. C.Hibbler, Pearson publishers
2. Mechanics of Solids – E P Popov, Prentice Hall.

3. Strength of Materials by B.S.Basavarajaiah and P. Mahadevappa, 3rd Edition,Universities Press
4. Mechanics of Structures Vol – I by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd.

Course Outcomes:

1. The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions
2. The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces
3. The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions
4. The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame‟s equation.

Subject	FLUID MECHANICS				
Year/semester	II B.Tech/I Sem	L	T	P	C
Regulation year	R - 20	3	0	0	3

Course Learning Objectives:

1. To understand the properties of fluids and fluid statics
2. To derive the equation of conservation of mass and its application
3. To solve kinematic problems such as finding particle paths and streamlines
4. To use important concepts of continuity equation, Bernoulli‟s equation and turbulence, and apply the same to problems
5. To analyze laminar and turbulent flows
6. To understand the various flow measuring devices
7. To study in detail about boundary layers theory

SYLLABUS

UNIT - I

Introduction: Dimensions and units – Physical properties of fluids - specific gravity, viscosity, surface tension, vapour pressure and their influences on fluid motion, pressure at a point, Pascal‟s law, Hydrostatic law -atmospheric, gauge and vacuum pressures- measurement of pressure. Pressure gauges, Manometers: Differential and Micro Manometers.

Hydrostatics: Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure.

UNIT – II

Fluid Kinematics: Description of fluid flow, Stream line, path line and streak line and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent,rotational and irrotational flows – Equation of continuity for one, two, three dimensional flows – stream and velocity potential functions, flow net analysis.

Fluid Dynamics: Surface and body forces – Euler‟s and Bernoulli‟s equations for flow along a stream line - Momentum equation and its application – forces on pipe bend.

UNIT – III

Laminar Flow and Turbulent Flows: Reynold‟s experiment – Characteristics of Laminar & Turbulent flows, Shear and velocity distributions, Laws of Fluid friction, Hagen-Poiseulle Formula, Flow between parallel plates, Flow through long tubes, hydro-dynamically smooth and rough flows.

Closed Conduit Flow: Darcy-Weisbach equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line, variation of friction factor with Reynold‟s number – Moody‟s Chart, Pipe network problems, Hazen-Williams formula, Hard-Cross Method.

UNIT – IV

Measurement of Flow: Pitot tube, Venturi meter and Orifice meter – classification of orifices, small orifice and large orifice, flow over rectangular, triangular, trapezoidal and Stepped notches, Broad crested weirs and Ogee weirs.

UNIT – V

Boundary Layer Theory: Boundary layer (BL) – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarman momentum integral equation, laminar and turbulent Boundary layers (no deviations)- BL in transition, separation of BL, Control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

Text Books:

1. Modi P.N and Seth S.M. (2018), “Fluid mechanics”, Standard book house, New Delhi
2. A textbook of Fluid mechanics and hydraulic machines, R.K.Bansal-Laxmi Publications (P) ltd., New Delhi.

References:

1. K.Subramanyam, Fluid mechanics and hydraulic machines Mcgraw hill education, IInd edition.
2. Fluid Mechanics and Machinery, C.S.P. Ojha, R. Berndtsson and P.N. Chandramouli, Oxford Higher Education.
3. Principle of fluid mechanics and fluid machines III edition, university press.

Course Outcomes:

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

1. Understand the various properties of fluids and their influence on fluid motion and analyse a variety of problems in fluid statics and dynamics.
2. Calculate the forces that act on submerged planes and curves.
3. Ability to analyse various types of fluid flows.
4. Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes and ducts in order to predict relevant pressures, velocities and forces.
5. Able Measure the quantities of fluid flowing in pipes, tanks and channels.

Subject	SURVEYING				
Year/semester	II B.Tech/I Sem	L	T	P	C
Regulation year	R - 20	3	0	0	3

Course Objectives:

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

1. To demonstrate the basic surveying skills
2. To use various surveying instruments.
3. To perform different methods of surveying
4. To compute various data required for various methods of surveying.

SYLLABUS

UNIT - I

Introduction And Basic Concepts: Introduction, Objectives, classification and principles of surveying.

Measurement of Distances and Directions

Linear Distances- Approximate methods, Direct Methods-Accessories in chain surveying- Chains- Tapes, ranging, Tape corrections.

Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination, and dip – W.C.B systems and Q.B. system of locating bearings.

UNIT - II

Plane Table: Accessories and methods of plane table surveying.

Levelling: Concept and Terminology, Levelling Instruments and their Temporary and permanent adjustments- method of levelling.

Contouring: Characteristics and Uses of contours- methods of conducting contour surveys. And their plotting.

UNIT - III

Theodolite Surveying: Types of Theodolites, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometric leveling when base is accessible and inaccessible.

Tacheometric Surveying: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

UNIT - IV

Curves: Types of curves and their necessity, elements of simple, compound, reverse curves.

Computation Of Areas and Volumes: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two-level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

UNIT - V

Modern Field Survey Systems: Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Total Station – Parts of a Total Station – Accessories, Advantages and Applications, Errors in Total Station Survey, Introduction to Global Positioning Systems- Principle - Advantages and Disadvantages- Applications – Segments.

Text Books:

1. Arora, K.R., Surveying, Vol-I, II and III, Standard Book House, 2015.
2. Madhu, N, Sathikumar, R and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.
3. B.C.Punmia, Surveying, Vol-I, II and III, Laxmi Publications.
4. Advance Surveying, Satish Gopi, R. Sathi Kumar and N. Madhu, Pearson Publications.
5. Text book of Surveying, C. Venkataramaiah, University press, India Limited.
6. Surveying and levelling, R. Subramanian, Oxford University press.

References:

1. Bhavikatti, S.S., Surveying and Levelling, Vol. I and II, I.K. International, 2010
2. Anji Reddy, M., Remote sensing and Geographical information system, B.S. Publications, 2001.
3. Manoj, K. Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, 2011
4. Text book of Surveying, S.K. Duggal (Vol No. 1&2), Tata McGraw Hill Publishing Co. Ltd. New Delhi.
5. Text book of Surveying, Arora (Vol No. 1&2), Standard Book House, Delhi.

Course Outcomes:

Course will enable the student to:

1. Apply the knowledge to calculate angles, distances and level
2. Identify data collection methods and prepare field notes
3. Understand the working principles of survey instruments, measurement errors and corrective measures
4. Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and methodologies

Subject	HIGHWAY ENGINEERING				
Year/semester	II B.Tech/I Sem	L	T	P	C
Regulation year	R - 20	3	0	0	3

Course Objectives:

The objectives of this course are:

1. To impart different concepts in the field of Highway Engineering.
2. To acquire design principles of Highway Geometrics and Pavements
3. To acquire design principles of Intersections

SYLLABUS

UNIT - I

Highway Planning and Alignment: Highway development in India; Classification of Roads; Road Network Patterns; Necessity for Highway Planning; Different Road Development Plans– First, second, third road development plans, road development vision 2021, Rural Road Development Plan – Vision 2025; Planning Surveys; Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT – II

Highway Geometric Design: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements-Stopping sight Distance, Overtaking Sight Distance and Intermediate Sight Distance- Design of Horizontal Alignment-Design of Super elevation and Extra widening- Design of Transition Curves- Design of Vertical Alignment-Gradients- Vertical curves.

UNIT – III

Traffic Engineering: Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies; Speed studies –spot speed and speed & delay studies; Parking Studies; Road Accidents-Causes and Preventive measures - Condition Diagram and Collision Diagrams; PCU Factors, Capacity of Highways – Factors Affecting; LOS Concepts; Road Traffic Signs; Road markings;

Types of Intersections; At-Grade Intersections – Design of Plain, Flared, Rotary and Channelized Intersections; Design of Traffic Signals –Webster Method –IRC Method.

UNIT – IV

Highway Materials: Subgrade soil: classification –Group Index – Subgrade soil strength – California Bearing Ratio – Modulus of Subgrade Reaction. Stone aggregates: Desirable properties – Tests for Road Aggregates – Bituminous Materials: Types – Desirable properties – Tests on Bitumen – Bituminous paving mixes: Requirements – Marshall Method of Mix Design.

UNIT – V

Design of Pavements: Types of pavements; Functions and requirements of different components of pavements; Design Factors

Flexible Pavements: Design factors – Flexible Pavement Design Methods – CBR method – IRC method – Burmister method – Mechanistic method – IRC Method for Low volume Flexible pavements.

Rigid Pavements: Design Considerations – wheel load stresses – Temperature stresses – Frictional stresses – Combination of stresses – Design of slabs – Design of Joints – IRC method – Rigid pavements for low volume roads – Continuously Reinforced Cement Concrete Pavements – Roller Compacted Concrete Pavements.

Text Books:

1. Highway Engineering, Khanna S. K., Justo C. E. G and Veeraragavan A, Nem Chand Bros., Roorkee.
2. Traffic Engineering and Transportation Planning, Kadiyali L. R, Khanna Publishers, New Delhi.

References:

1. Principles of Highway Engineering, Kadiyali L. R, Khanna Publishers, New Delhi
2. Principles of Transportation Engineering, Partha Chakroborthy and Animesh Das, PHI Learning Private Limited, Delhi.

Course Outcomes:

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

1. Plan highway network for a given area.
2. Determine Highway alignment and design highway geometrics.
3. Design Intersections and prepare traffic management plans
4. Judge suitability of pavement materials and design flexible and rigid pavements.

Subject	CONCRETE TECHNOLOGY LAB				
Year/semester	II B.Tech/I Sem	L	T	P	C
Regulation year	R - 20	0	0	3	1.5

Course Objectives:

1. To study basic properties ingredients of concrete, fresh and hardened concrete properties

List of Experiments: At least 10 experiments must be conducted (at least one for each property)

1. Determination of normal Consistency and fineness of cement.
2. Determination of initial setting time and final setting time of cement.
3. Determination of specific gravity and soundness of cement.
4. Determination of compressive strength of cement.
5. Determination of grading and fineness modulus of Coarse aggregate by sieve analysis.
6. Determination of specific gravity of coarse aggregate
7. Determination of grading and fineness modulus of fine aggregate (sand) by sieve analysis
8. Determination of bulking of sand.
9. Design a Concrete Mix for any one grade of Concrete
10. Determination of workability of concrete by compaction factor method.
11. Determination of workability of concrete by slump test
12. Determination of workability of concrete by Vee-bee test.
13. Determination of compressive strength of cement concrete and its young‟s modulus
14. Non-Destructive testing on concrete (for demonstration)

List of Equipment:

1. Standard set of sieves for coarse aggregate and fine aggregate
2. Vicat‟s apparatus
3. Specific gravity bottle.
4. Lechatlier‟s apparatus.
5. Slump Test Apparatus.
6. Compaction Factor Test Apparatus.
7. Vee- Bee test apparatus
8. Longitudinal compresso-meter
9. Universal testing Machine (UTM)/Compression Testing Machine (CTM).
10. Rebound hammer, Ultrasonic pulse velocity machine, micro cover meter etc.

Reference:

1. Concrete Manual by M.L.Gambhir.

Course Outcomes:

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

1. Determine consistency and fineness and setting times of cement.
2. Determine specific gravity, soundness of cement and compressive strength of cement.
3. Determine workability of cement concrete by compaction factor, slump and Vee–Bee tests
4. Determine specific gravity of coarse aggregate and fine aggregate by Sieve analysis.
5. Determine flakiness and elongation index of aggregates.
6. Determine bulking of sand.
7. Understand non-destructive testing procedures on concrete.

Subject	HIGHWAY ENGINEERING LAB				
Year/semester	II B.Tech/I Sem	L	T	P	C
Regulation year	R - 20	0	0	3	1.5

Course Objectives:

The objectives of this course are:

1. To test crushing value, impact resistance, specific gravity and water absorption, attrition value, abrasion value, flakiness index and elongation index for the given road aggregates.
2. To know penetration value, ductility value, softening point, flash and fire point, viscosity and stripping for the given bitumen grade.
3. To test the stability for the given bituminous mix
4. To carry out surveys for traffic volume, speed and parking.

SYLLABUS

I. ROAD AGGREGATES:

1. Aggregate Crushing value Test
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption Test
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS:

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.
5. Stripping Test
6. Viscosity Test.

III. BITUMINOUS MIX:

1. Marshall Stability test.

LIST OF EQUIPMENT:

1. Apparatus for aggregate crushing test.
2. Aggregate Impact testing machine.
3. Pycnometers.
4. Los angles Abrasion test machine.
5. Deval‟s Attrition test machine.
6. Elongation and thickness gauges
7. Bitumen penetration test setup.
8. Bitumen Ductility test setup.
9. Ring and ball apparatus.
10. Viscometer.
11. Marshal Mix design apparatus.

Text Books:

1. „Highway Material Testing Manual‟ by S.K. Khanna, C.E.G Justo and A.Veeraraghavan, NemChand Brothers, New Chand Publications, New Delhi.
2. Highway Material Testing & Quality Control by Rao Wiley India pvt. Ltd., Noida, New Delhi.

Reference:

1. IRC Codes of Practice.
2. Asphalt Institute of America Manuals.
3. Code of Practice of B.I.S.

Course Outcomes:

At the end of the course, the student will be able to

1. Test aggregates and judge the suitability of materials for the road construction
2. Test the given bitumen samples and judge their suitability for the road construction
3. Obtain the optimum bitumen content for Bituminous Concrete

Subject	SURVEYING FIELD WORK (Lab)				
Year/semester	II B.Tech/I Sem	L	T	P	C
Regulation year	R - 20	0	0	3	1.5

Course Objectives:

1. To learn usage of different surveying instruments and methods of surveying.

List of Field Works:

1. Measurement of distance by ranging and chaining.
2. Locating various objects by chain & cross staff surveying.
3. Determination of area of polygon by chain and cross staff survey.
4. Measurement of bearings of sides of traverse with prismatic compass and computation of correct included angle.
5. Correction for Local Attraction by Prismatic Compass.
6. Plane table survey; finding the area of a given boundary by the method of radiation.
7. Plane table survey; finding the area of a given boundary by the method of intersection.
8. Finding the area of the given boundary using compass (Closed Traverse).
9. Determination of elevation of various points with dumpy level by collimation plane method and rise & fall method.
10. Fly levelling: Height of the instrument method (differential levelling).
11. Fly levelling (differential levelling).
12. Two exercises on contouring.

Note: Any 10 field work assignments must be completed.

Course Outcomes:

At the end of the course, the student will be able to

1. Apply the principles of surveying in field.
2. Identify data collection methods and prepare field notes
3. Handle basic survey instruments
4. Determine the area of a plot by using different methods

Subject	BUILDING AND EARTH SCIENCE				
Year/semester	II B.Tech/I Sem	L	T	P	C
Regulation year	R - 20	1	0	2	2

Course Objectives:

1. To study basic techniques of brick masonry, testing of bricks.
2. To study about minerals, rocks, topographical maps and geo-physical exploration.

List of Experiments:

1. Brick Masonry: Masonry 3‟ height with the following bonds and different thickness.
    a. Stretcher bond
    b. Header bond
    c. English bond and
    d. Flemish bond
2. Tests on Bricks:
    a. Shape and size of supplied brick.
    b. Water absorption of brick.
    c. Compressive strength of bricks.
3. Study and observations of physical properties of minerals.
4. Study and observations of physical properties of rocks.
5. Interpretation of Topographical maps.
6. Drawing of conventional signs of Topographical maps.
7. Electrical Resistivity method (Demo).
8. Seismic refraction method (Demo).

Course Outcomes:

At the end of the course, the student will be able to

1. Apply various techniques of brick masonry.
2. Identify different tests required to assess the quality of bricks.
3. Understand physical properties of various minerals and rocks
4. Interpret topographical maps and various conventional signs in it.
5. Understand geophysical exploration techniques.

Subject	CONSTITUTION OF INDIA				
Year/semester	II B.Tech/I Sem	L	T	P	C
Regulation year	R - 20	2	0	0	0

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.

The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India"s legacy of "diversity". It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be "static" and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

Course content:

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation

7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21