KARNATAK LAW SOCIETY'S

GOGTE INSTITUTE OF TECHNOLOGY

UDYAMBAG, BELAGAVI-590008

(An Autonomous Institution under Visvesvaraya Technological University, Belagavi)

(APPROVED BY AICTE, NEW DELHI)

Department of CIVIL ENGINEERING

Scheme and Syllabus

(2016 Scheme -Autonomous)

Semester III

CIVIL ENGINEERING

KLS GOGTE INSTITUTE OF TECHNOLOGY, UDYAMBAG, BELAGAVI-8

Proposed Scheme of Teaching (2016 Batch)

III Semester B.E.
[For Regular Students]

Sr. No.	Course Code	Course		Contact Hours			Total Contact Hours/week	Total Credits	Marks		
				L	T	P			CIE	SEE	Total
1	16MAT31	Statistical – Numerical – Fourier Techniques	**BS**	3	1	0	4	4	50	50	100
2	16CV32	Fluid Mechanics	**C**	3	1	0	4	4	50	50	100
3	16CV33	Strength of Materials	**C**	3	1	0	4	4	50	50	100
4	16CV34	Concrete Technology	**C**	3	1	0	4	4	50	50	100
5	16CV35	Basic Surveying	**C**	3	1	0	4	4	50	50	100
6	16CVL36	Strength of Materials Lab	**L**	0	0	2	2	1	25	25	50
7	16CVL37	Concrete Technology Lab	**L**	0	0	3	3	2	25	25	50
8	16CVL38	Basic Surveying Lab	**L**	0	0	2	2	1	25	25	50
9	16ECL39	Electronics And Computer Workshop Lab	**ES**	0	0	3	3	2	25	25	50
				15	**5**	**10**					
Total Academic Engagement and Credits				**30**			**30**	**26**	**350**	**350**	**700**

CIVIL ENGINEERING

KLS GOGTE INSTITUTE OF TECHNOLOGY, UDYAMBAG, BELAGAVI-8

Proposed Scheme of Teaching (2016 Batch)

III Semester B.E.

[For Lateral Entry Students]

Sr. No.	Course Code	Course		Contact Hours			Total Contact Hours/week	Total Credits	Marks		
				L	T	P			CIE	SEE	Total
1	16DIPMAT31	Calculus, Fourier Analysis and Linear Algebra	**BS**	4	1	0	5	5	50	50	100
2	16CV32	Fluid Mechanics	**C**	3	1	0	4	4	50	50	100
3	16CV33	Strength of Materials	**C**	3	1	0	4	4	50	50	100
4	16CV34	Concrete Technology	**C**	3	1	0	4	4	50	50	100
5	16CV35	Basic Surveying	**C**	3	1	0	4	4	50	50	100
6	16CVL36	Strength of Materials Lab	**L**	0	0	2	2	1	25	25	50
7	16CVL37	Concrete Technology Lab	**L**	0	0	3	3	2	25	25	50
8	16CVL38	Basic Surveying Lab	**L**	0	0	2	2	1	25	25	50
9	16ECL39	Electronics And Computer Workshop Lab	**ES**	0	0	3	3	2	25	25	50
				16	**5**	**10**					
Total Academic Engagement and Credits				**31**			**31**	**27**	**350**	**350**	**700**

SEMESTER III

Statistical – Numerical – Fourier Techniques

(Common to all Branches)

(For Regular Students)

Course Code	16MAT31	**Credits**	04
Course type	BS	**CIE Marks**	50
Hours/week: L-T-P	3-1-0	**SEE Marks**	50
Total Hours:	40	**SEE Duration**	3 Hours for 100 Marks

Course Learning Objectives (CLOs)

1. Learn numerical methods to solve algebraic, transcendental and ordinary differential equations.
2. Understand the concept of Fourier series and apply when needed.
3. Get acquainted with Fourier transforms and its properties.
4. Study the concept of Random variables and its applications.
5. Get acquainted with Joint Probability Distribution and Stochastic processes.

Pre-requisites:

1. Basic differentiation and integration
2. Basic probabilities
3. Basic statistics

UNIT I

Numerical Solution of Algebraic and Transcendental Equations

Method of false position, Newton- Raphson method (with derivation), Fixed point iteration method (without derivation).

Numerical Solution of Ordinary Differential Equations

Taylor's Series method, Euler and Modified Euler's method, Fourth order Runge–Kutta method

08 Hours

UNIT II

Fourier Series

Convergence and divergence of infinite series of positive terms (only definitions). Periodic functions. Dirichlet's conditions, Fourier series, Half range Fourier sine and cosine series. Practical examples, Harmonic analysis

08 Hours

UNIT III

Fourier transforms

Infinite Fourier transform and properties. Fourier sine and cosine transforms properties and problems.

08 Hours

UNIT IV

Probability

Random Variables (RV), Discrete and Continuous Random variables (DRV, CRV), Probability Distribution Functions (PDF) and Cumulative Distribution Functions (CDF), Expectations, Mean Variance. Binomial, Poisson, Exponential and Normal Distributions. Practical examples

08 Hours

UNIT V

Joint PDF and Stochastic Processes

Discrete Joint PDF, Conditional Joint PDF, Expectations (Mean, Variance and Covariance). Definition and classification of stochastic processes. Discrete state and discrete parameter stochastic process, Unique fixed probability vector, Regular Stochastic Matrix, Transition probability, Markov chain.

08 Hours

Text Books

1. B. S. Grewal, **"Higher Engineering Mathematics",** Khanna Publishers, 42nd Edition, 2012 onwards
2. P. N. Wartikar and J. N. Wartikar, **"Applied Mathematics (Volume I and II)"**, Pune Vidyarthi Griha Prakashan, 7th Edition 1994 onwards
3. B. V. Ramana, **"Higher Engineering Mathematics",** Tata McGraw-Hill Education Private Limited, Tenth reprint 2010 onwards

Reference Books:

1. Erwin Kreyszig, **"Advanced Engineering Mathematics",** John Wiley and Sons Inc., 9th Edition, 2006 onwards
2. Peter V. O' Neil, **"Advanced Engineering Mathematics",** Thomson Brooks/Cole, 7th Edition, 2011 onwards
3. Glyn James, **"Advanced Modern Engineering Mathematics"**, Pearson Education, 4th Edition, 2010 onwards

Course Outcomes (COs)

	At the end of the course, the student will be able to:	**Bloom's Level**
1.	**Use** Numerical methods and **solve** algebraic, transcendental and ordinary differential equations.	L3
2.	**Develop** frequency bound series from time bound functions using Fourier series.	L3
3.	**Summarize** Fourier transforms and its properties.	L2
4.	**Explain** the concept of Random variables, PDF, CDF and its applications	L2
5.	**Extend** the basic probability concept to Joint Probability Distribution, Stochastic processes.	L2
6.	**Apply** Joint Probability Distribution, stochastic processes to solve relevant problems.	L3

Program Outcomes (POs)

1	An ability to apply knowledge of mathematics, science and engineering.	PO 1
2	An ability to identify, formulate and solve engineering problems.	PO 5
3	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.	PO 11

Content Delivery/Assessments methods and Scheme of Evaluation

Course delivery methods	**Assessment methods**
1. Black board teaching	1. Internal assessment test
2. Power point presentation	2. Assignment
3. Scilab/Matlab/ R-Software	3. Quiz

Scheme of Continuous Internal Evaluation (CIE):

Components	Average of best two IA tests out of three	Average of Assignments (Two)/ Mathematical/ Computational/ Statistical tools	Quiz	Class Participation	Total Marks
Maximum Marks: 50	25	10	5	10	50
➢ Two IA tests are compulsory. ➢ Minimum marks required to qualify for SEE: Minimum IA test marks (average) 10 out of 25 and total CIE marks 20 out of 50.					

Scheme of Semester End Examination (SEE):

1. SEE will be conducted for 100 marks and scaled down to 50 marks for the calculation of SGPA and CGPA.
2. Minimum marks required in SEE to pass: 40 out of 100
3. Question paper contains 08 questions, each carrying 20 marks. Students have to answer FIVE full questions. SEE question paper will have two compulsory questions (from any TWO UNITS) and choice will be given in the remaining three units.

Calculus, Fourier Analysis and Linear Algebra

(Common to all Branches)

(For Lateral Entry Students)

Course Code	16DIPMAT31	**Credits**	05
Course type	BS	**CIE Marks**	50
Hours/week: L-T-P	4–1– 0	**SEE Marks**	50
Total Hours:	50	**SEE Duration**	3 Hours for 100 Marks

Course Learning Objectives (CLOs)

1. Learn the concept of series expansion using Taylor's and Maclaurin's series and get acquainted with the polar curves and partial differentiation.
2. Learn differential equations of first order and higher order and apply them.
3. Get acquainted with Fourier transforms and its properties.
4. Learn numerical methods to solve algebraic, transcendental and ordinary differential equations.
5. Explain and interpret the system of equations and various solutions.

Pre-requisites:

1. Basic differentiation and integration
2. Trigonometry
3. Matrix and determinant operations
4. Vector algebra

UNIT I

Differential Calculus

Taylor's and Maclaurin's theorems for function of one variable (statement only) - problems. Angle between polar curves, partial differentiation: Definition and problems. Total differentiation- problems. Partial differentiation of composite functions- problems

10 Hours

UNIT II

Differential Equations

Linear differential equation, Bernoulli's equation, Exact differential equation (without reducible forms) - problems and applications (Orthogonal Trajectories, Electrical circuits and derivation of escape velocity). Linear differential equation with constant coefficients - Solution of second and higher order differential equations, inverse differential operator method and problems

10 Hours

UNIT III

Fourier Analysis

Fourier series: Fourier series, Half Range Fourier - sine and cosine series. Practical examples. Harmonic analysis

Fourier Transforms: Infinite Fourier transform and properties. Fourier sine and cosine transforms - properties and problems.

10 Hours

UNIT IV

Numerical Techniques

Numerical solution of algebraic and transcendental equations: Method of false position, Newton- Raphson method (with derivation), Fixed point iteration method (without derivation). Numerical solution of ordinary differential equations: Taylor's series method, Euler and Modified Euler's method, Fourth order Runge–Kutta method (without derivation).

10 Hours

UNIT V

Linear Algebra

Rank of a matrix by elementary transformation, solution of system of linear equations-Gauss Jordan method and Gauss-Seidal method. Eigen values and Eigen vectors – Rayleigh's Power method.

10 Hours

Text Books:

1. B. S. Grewal, **"Higher Engineering Mathematics"**, Khanna Publishers, 42nd Edition, 2012 onwards.
2. P. N. Wartikar and J. N. Wartikar, **"Applied Mathematics (Volume I and II)",** Pune Vidyarthi Griha Prakashan, 7th Edition, 1994 onwards.
3. B. V. Ramana, **"Higher Engineering Mathematics",** Tata McGraw-Hill Education Private Limited, Tenth reprint, 2010 onwards.

Reference Books:

1. Erwin Kreyszig, **"Advanced Engineering Mathematics",** John Wiley and Sons Inc., 9th Edition, 2006 onwards.
2. Peter V. O' Neil, **"Advanced Engineering Mathematics",** Thomson Brooks/Cole, 7th Edition, 2011 onwards.
3. Glyn James, **"Advanced Modern Engineering Mathematics",** Pearson Education, 4th Edition, 2010 onwards

Course Outcomes (COs)

	At the end of the course, the student will be able to:	Bloom's Level
1.	**Develop** the Taylors and Maclaurins series using derivative concept.	L3
2.	**Demonstrate** the concept and use of partial differentiation in various problems.	L2
3.	**Classify** differential equations of first and higher order and **apply** them to solve relevant problems**.**	L1, L3
4.	**Develop** frequency bound series from time bound functions using Fourier series.	L3
5.	**Use** Numerical methods and **solve** algebraic, transcendental and ordinary differential equations	L3
6.	**Interpret** the various solutions of system of equations and **solve them.**	L2

Program Outcomes (POs)

1.	An ability to apply knowledge of mathematics, science and engineering.	PO 1
2.	An ability to identify, formulate and solve engineering problems.	PO 5
3.	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.	PO 11

Content Delivery/Assessments methods and Scheme of Evaluation

Course delivery methods	Assessment methods
1. Black board teaching	1. Internal assessment tests
2. Power point Presentation	2. Assignments
3. Scilab/ Matlab/ R-Software	3. Quiz

Scheme of Continuous Internal Evaluation (CIE):

Components	Average of best two IA tests out of three	Average of two Assignments/ Mathematical/Computational/ Statistical tools	Quiz	Class Participation	Total Marks
Maximum Marks: 50	25	10	5	10	50

- Two IA tests are compulsory.
- Minimum marks required to qualify for SEE : Minimum IA test marks (average) 10 out of 25 and total CIE marks 20 out of 50

Scheme of Semester End Examination (SEE):

1. SEE will be conducted for 100 marks and scaled down to 50 marks for the calculation of SGPA and CGPA.
2. Minimum marks required in SEE to pass: 40 out of 100
3. Question paper contains 08 questions, each carrying 20 marks. Students have to answer FIVE full questions. SEE question paper will have two compulsory questions (from any TWO UNITS) and choice will be given in the remaining three units.

FLUID MECHANICS

Course Code	16CV32	**Credits**	04
Course type	C	**CIE Marks**	50
Hours/week: L-T-P	3-1-0	**SEE Marks**	50
Total Hours	40	**SEE Duration**	3 Hours for 100 Marks

Course learning objectives (CLOs)

1. Describe the properties of fluids, apply the concepts to solve related problems on Newtonian fluids and analyze problems related to fluid at rest including practical applications.
2. Illustrate the basic concepts of pressure and its measurements and demonstrate the principles of mathematics to represent kinematic concepts related to fluid flow.
3. Apply the concept of conservation of mass, conservation of linear momentum, Bernoulli's principle for practical application and outline the various methods of flow measurements
4. Outline the concepts of dynamics of fluid flow in pipes and evaluate the effects of water hammer.
5. Describe the concept of Dimensional analysis and model studies and apply to practical problems.

Pre-requisites:

1. Engineering Mechanics

UNIT I

Basic properties of fluids

Introduction, Definition of fluid, Systems of units, properties of fluid: Mass density, Specific weight, Specific gravity, Specific volume, Viscosity, Cohesion, Adhesion, Vapour pressure, Bulk modulus of Elasticity and Compressibility, Surface tension and Capillarity.

Pressure and its measurement

Definition of pressure, Variation of pressure in a fluid, Pressure at a point, Pascal's law, Types of pressure – Atmospheric pressure, Absolute pressure, Gauge and Vacuum pressure. Measurement of pressure using simple, differential and inclined manometers (theory and problems)

08 Hours

UNIT II

Hydrostatic pressure on surfaces

Total pressure and centre of pressure, total pressure on plane surfaces- horizontal, vertical and inclined surfaces, Pressure diagram, Total pressure on curved surfaces and problems

Kinematics of flow

Introduction, methods of describing fluid motion, types of fluid flow, streamline, pathline, streamtube. Three dimensional, two dimensional and one dimensional continuity equation in Cartesian Coordinates (derivation and problems). Velocity and acceleration of fluid particles, Velocity potential and Stream function- problems. Concept of flownet

08 Hours

UNIT III

Dynamics of fluid flow

Introduction, Energy possessed by a fluid body. Euler's equation of motion along a streamline, Bernoulli's equation. Assumptions and limitations of Bernoulli's equation. Applications of Bernoulli's equation (with and without losses). Introduction to Kinetic energy correction factor. Concept of momentum equation for pipe bends.

Discharge measurements

Introduction, Venturimeter, Orificemeter, Pitot tube, Venturiflume, Triangular notch, Rectangular notch, Cipolletti notch, Ogee weir, Broad crested weir, Small orifices- Problems, Mouthpiece

08 Hours

UNIT IV

Pipe flow

Introduction, losses in pipe flow, Darcy-Weisbach equation for head loss due to friction in a pipe. Minor losses in pipe flow, equation for head loss due to sudden expansion and sudden contraction- problems. Pipes in series and pipes in parallel, equivalent pipe-problems.

Water hammer

Water hammer in pipes, equation for pressure rises due to gradual valve closure and sudden closure for rigid and elastic pipes and problems.

Self Learning Topics: Hydraulic gradient and Energy gradient. **08 Hours**

UNIT V

Dimensional analysis

Introduction, Dimensions, Dimensional Homogeneity of an equation. Analysis- Rayleigh's method, Buckingham's Π theorem- problems

Model studies

Model Studies, Similitude – Types of similarity, Non-dimensional numbers: Problems on Froude model law and Reynolds model law. Types of models: Undistorted and Distorted models, Problems. Scale effect.

08 Hours

Text books:

1. Modi P. N. and Seth S. M., **"Hydraulics and Fluid Mechanics"**, Standard Book House, New Delhi. 2009 Edition.
2. Rajput R. K., **"A Text Book of Fluid Mechanics and Hydraulic Machines"**-, S. Chand and Co, New Delhi, 2006 Edition.
3. Bansal R. K., **"Text Book of Fluid Mechanics and Hydraulic Machines",** Laxmi Publications, New Delhi, 2008 Edition.
4. Narayana Pillai N., "**Principles of Fluid Mechanics and Fluid Machines"**, Universities Press (India), Hyderabad, 2009 Edition.

Reference books:

1. Bruce R. Munson, Donald F. Young, Theodore H. Okiishi**, "Fundamentals of Fluid Mechanics"**, Wiley India, New Delhi, 2009 Edition.
2. Edward J. Shaughnessy, Jr. Iram. Katz, James P. Schaffer**, "Introduction to Fluid Mechanics",** Oxford University Press, New Delhi, 2005 Edition.
3. Streeter Wylie ,**"Fluid Mechanics"**, Bedford New Delhi, 2008 Edition

4. Madan Mohan Das, **"Fluid Mechanics and Turbo-machines",** PHI Learning Pvt. Limited, New Delhi. 2009 Edition.

Course Outcomes (COs)

	At the end of the course, students will be able to:	**Bloom's Level**
1.	**Identify** the properties of fluid as a continuum	L3
2.	**Solve** problems on hydrostatics, including practical applications	L3, L5
3.	**Demonstrate** the principles of mathematics to represent kinematic concepts related to fluid flow	L2
4.	**Apply** the fundamental laws of fluid mechanics - conservation of mass, conservation of linear momentum, and the Bernoulli's principle for practical application	L3
5.	**Outline** and **Propose** the methods of flow measurements	L2, L6
6.	**Apply** the concept of Dimensional analysis and model studies and **Solve** practical problems	L3, L6

Program Outcomes (POs)

1.	Graduates shall be able to understand and apply the basic mathematical and scientific concepts	PO 1
2.	Graduates shall be able to design and conduct experiments and interpret the results as per the current research	PO 4
3.	Graduates shall possess critical thinking abilities, problem solving skills and familiarity with the necessary computational tools and procedures	PO 5
4.	Graduates shall possess effective oral and written communication skills	PO 10

Content Delivery/Assessments methods and Scheme of Evaluation

Course delivery methods	**Assessment methods**
1. Lecture and Board	1. Assignments and Open Book Assignments
2. NPTEL/ Edusat	2. Quizzes
3. Power Point Presentation	3. Internal Assessment Tests
4. Videos	4. Semester End Examination

Scheme of Continuous Internal Evaluation (CIE)

Components	Average of best two IA tests out of three	Average of assignments (Two) / activity	Quiz	Class participation	Total Marks
Maximum Marks: 50	25	10	05	10	50

- Two IA tests are compulsory.
- Minimum marks required to qualify for SEE: Minimum IA test marks (average) 10 out of 25 and total CIE marks 20 out of 50.

Self Study topics shall be evaluated during CIE (Assignments and IA tests) and 10% weightage shall be given in SEE question paper.

Scheme of Semester End Examination (SEE):

1. SEE will be conducted for 100 marks and scaled down to 50 marks for the calculation of SGPA and CGPA.
2. Minimum marks required in SEE to pass: 40 out of 100
3. Question paper contains 08 questions, each carrying 20 marks. Students have to answer FIVE full questions. SEE question paper will have two compulsory questions (from any TWO UNITS) and choice will be given in the remaining three units.

STRENGTH OF MATERIALS

Subject Code	16CV33	**Credits:**	04
Course Type	C	**CIE Marks:**	50
Hours/week: L – T – P	3-1-0	**SEE Marks:**	50
Total Hours	40	**SEE Duration:**	3 Hours for 100 marks

Course Learning Objectives (CLOs)

1. Define stresses, strains and elastic constants and relationship between them.
2. Determine the shear force and bending moment in statically determinate beams.
3. Evaluate the bending stresses and shear stresses and plot the stress distribution diagrams.
4. Determine the slope and deflection for beams subjected to various loads.
5. Evaluate the buckling strength of columns and explain the concept of torsion.

Pre-requisites:

1. Engineering Mechanics

UNIT I

Stresses and Strains

Introduction to stresses and strains, Hooke's law, Elastic constants, Relationship among Elastic constants, Stress – Strain relationship for structural steel, volumetric strain, composite sections, thermal stresses, Compound stresses- general two-dimensional stress system, principal planes and stresses, Mohr's circle

09 Hours

UNIT II

Axial Force, Shear Force and Bending Moment in Beams

Axial force, Shear Force and Bending Moment, Relationship between loading, shear force and bending moment, Plotting the AFD, SFD and BMD for cantilever, simply supported and overhanging beams subjected to point loads, UDL, UVL and external moment

09 Hours

UNIT III

Bending stresses and Shear stresses in Beams

Theory of bending, Derivation of equation for bending, Bending stresses in beams, Modulus of Rupture, Section Modulus, Flexural Rigidity, bending stress distribution across the depth of beam.

Shear stresses in beams, Shear Stress distribution diagrams for rectangular, symmetrical 'I' and 'T' sections

08 Hours

UNIT IV

Deflection of Beams

Equation for elastic curve, Slope and Deflection for prismatic beams (Simply supported, Overhanging and Cantilever beams) subjected to point loads, UDL and external moment- using Double Integration method and Macaulay's method

07 Hours

UNIT V

Elastic Stability of Columns

Euler's theory for columns, Effective length, Slenderness ratio, Euler's buckling load for standard case (both ends hinged case), Discussion of buckling loads for other end conditions using effective length concept, Rankine's formula.

Torsion of Circular Shafts

Assumptions, Derivation of torsion equation for circular shafts, Torsional Rigidity

Self Learning Topic: Euler's buckling load for eccentric loading. **07 Hours**

Text Books

1. Bhavikatti S. S., **"Strength of Materials",** Vikas Publishing house Pvt. Ltd, New Delhi
2. Bansal R. K., **"Strength of Materials**", Laxmi Publications, New Delhi
3. Beer and Johnston, **"Mechanics of Materials",** Tata McGraw Hill

Reference Books:

1. Timoshenko and Young, **"Elements of Strength of Materials",** Affiliated East-West Press
2. Basavarajaiah B. S., Mahadevappa P. **"Strength of Materials in SI Units**", University Press (India) Pvt. Ltd., 3rd Edition, 2010
3. James M. Gere, **"Mechanics of Materials",** Thomson Learning
4. Popov E. P., **"Engineering Mechanics of Solids",** Prentice Hall of India, 2nd Edition

Course Outcomes (COs)

At the end of the course, students will be able to:	Bloom's Level
1. **Explain** the types of stresses, strains and elastic constants and relation among them	L2
2. **Evaluate** shear force, axial force and bending moment and draw SFD, AFD and BMD	L3, L4
3. **Evaluate** the bending and shear stresses and plot the stress distribution diagrams	L3, L4
4. **Analyse** the beams subjected to various loads for Slope and Deflection	L4
5. **Evaluate** the buckling strength of columns and explain the concept of torsion	L3, L4

Program Outcomes (POs)

1. Graduates shall be able to understand and apply the basic mathematical and scientific concepts that underlie the field of Civil Engineering	PO 01
2. Graduates shall possess critical thinking abilities, problem solving skills and familiarity with the necessary computational tools and procedures.	PO 05

Content Delivery/Assessments methods and Scheme of Evaluation

Course delivery methods	Assessment methods
1. Lecture and Board	1. Assignments and Open Book Assignment
2. NPTEL/ Edusat	2. Quizzes
3. Power Point Presentation	3. Internal Assessment Tests
4. Videos	4. Semester End Examination

Scheme of Continuous Internal Evaluation (CIE)

Components	Average of best two IA tests out of three	Average of assignments (Two) / activity	Quiz	Class participation	Total Marks
Maximum Marks: 50	25	10	05	10	50
➢ Two IA tests are compulsory. ➢ Minimum marks required to qualify for SEE : Minimum IA test marks (average) 10 out of 25 and total CIE marks 20 out of 50.					

Self Study topics shall be evaluated during CIE (Assignments and IA tests) and 10% weightage shall be given in SEE question paper.

Scheme of Semester End Examination (SEE):

1. SEE will be conducted for 100 marks and scaled down to 50 marks for the calculation of SGPA and CGPA.
2. Minimum marks required in SEE to pass: 40 out of 100
3. Question paper contains 08 questions, each carrying 20 marks. Students have to answer FIVE full questions. SEE question paper will have two compulsory questions (from any TWO UNITS) and choice will be given in the remaining three units.

CONCRETE TECHNOLOGY

Course Code	16CV34	**Credits**	04
Course Type	C	**CIE Marks**	50
Hours/week: L – T – P	3-1-0	**SEE Marks**	50
Total Hours	40	**SEE Duration**	3 Hours for 100 Marks

Course Learning Objectives (CLOs)

1. To study the properties of different types of cements and chemical admixtures used for construction.
2. To classify the aggregates and study their physical and mechanical properties.
3. To explain the properties of fresh concrete, mix design and quality control.
4. To examine the properties of hardened concrete and illustrate non destructive testing.
5. To illustrate process of concreting, form work for concrete, Guniting, Shotcreting

Pre-requisites: NIL

UNIT I

Cement

Cement- Manufacture of Portland cement, types of cement and its chemical composition, hydration of cement, testing of cement: Normal consistency, fineness test, setting time, soundness, strength.

Special cements, Construction chemicals

07 Hours

UNIT II

Aggregates

Classification of aggregates according to the source, aggregate size and shape, properties of aggregate: physical properties- specific gravity, bulk density, porosity and absorption, moisture content, bulking of sand, mechanical properties- crushing value, abrasion value, impact value

Sieve analysis- fineness modulus and grading curve, combining aggregates, grading requirements as per IS specifications, recycled aggregates

08 Hours

UNIT III

Fresh concrete

Properties- factors affecting fresh concrete properties. Tests on fresh concrete- slump, flow tests, compaction factor test and Vee-bee test.

Mix Design- Principles of mix design, grades of concrete, methods of proportioning, trial mixes, Design of concrete mixes using IS: 10262-2009, quality control.

10 Hours

UNIT IV

Hardened concrete

Test on hardened concrete- compressive strength, split-tensile strength, flexural strength; Factors affecting the strength of hardened concrete, Modulus of elasticity, Durability of concrete- Permeability, water absorption.

Self Learning Topics: Non-destructive testing. **07 Hours**

UNIT V

Concreting operations

Process and manufacturing of concrete, Mixing, transporting, placing, compacting and finishing; Curing- methods of curing, cold-weather concreting, hot-weather concreting, pre-packed concrete, form work for concrete, Form work for concrete, Guniting, Shotcreting.

08 Hours

Text Books

1. Shetty M. S., **"Concrete Technology-Theory and Practice",** S. Chand and Company Ltd., New Delhi, 2006.
2. Neville A. M., **"Properties of Concrete",** Longman Scientific and Technical, England, 2000.
3. SanthaKumar A. R., **"Concrete Technology"**, Oxford University Press, New Delhi, 2007

References

1. Krishnaraju N., **"Design of Concrete Mixes",** Sehgal Educational Consultants and Publishers Pvt. Ltd., Faridabad, 2002.
2. Gambhir M. L., **"Concrete Technology –Theory and Practice",** McGraw Hill Education 5th Edition, 2013
3. Varshney. R. S., **"Concrete Technology",** Oxford and IBH Publishers, 1982
4. IS: 10262-2009, **"Recommended Guidelines for Concrete Mix Design"**, 2009

Course Outcomes (COs)

	At the end of the course, students will be able to:	Bloom's Level
1.	**Explain** the properties and tests on cement and aggregates**.**	L2
2.	**Summarize** the properties of fresh concrete, concrete mix design and quality control tests	L2, L3
3.	**Explain** the properties of hardened concrete	L2
4.	**Illustrate** the process of concreting, form work for concrete	L2

Program Outcomes (POs)

1.	Graduates shall possess the ability to review the research literature and analyze complex engineering problems.	PO 2
2.	Graduates shall possess the ability to identify and address the societal needs and meaningfully contribute, keeping in mind the health, environmental, safety and cultural issues.	PO 3
3.	Graduates shall be able to design and conduct experiments and interpret the results as per the current research.	PO 4
4.	Graduates shall possess critical thinking abilities, problem solving skills and familiarity with the necessary computational tools and procedures.	PO 5

Content Delivery/Assessments methods and Scheme of Evaluation

Course delivery methods	Assessment methods
1. Lecture and Board	1. Assignments and Open Book Assignment
2. NPTEL/ Edusat	2. Quizzes
3. Power Point Presentation	3. Internal Assessment Tests
4. Videos	4. Semester End Examination

Scheme of Continuous Internal Evaluation (CIE)

Components	Average of best two IA tests out of three	Average of assignments (Two) / activity	Quiz	Class participation	Total Marks
Maximum Marks: 50	25	10	05	10	50
➢ Two IA tests are compulsory. ➢ Minimum marks required to qualify for SEE : Minimum IA test marks (average) 10 out of 25 and total CIE marks 20 out of 50.					

Self Study topics shall be evaluated during CIE (Assignments and IA tests) and 10% weightage shall be given in SEE question paper.

Scheme of Semester End Examination (SEE):

1. SEE will be conducted for 100 marks and scaled down to 50 marks for the calculation of SGPA and CGPA.
2. Minimum marks required in SEE to pass: 40 out of 100
3. Question paper contains 08 questions, each carrying 20 marks. Students have to answer FIVE full questions. SEE question paper will have two compulsory questions (from any TWO UNITS) and choice will be given in the remaining three units.

BASIC SURVEYING

Subject Code	16CV35	**Credits**	04
Course Type	C	**CIE Marks**	50
Hours/week: L – T – P	3– 1 – 0	**SEE Marks**	50
Total Hours	40	**SEE Duration**	3 Hour for 100 Marks

Course Learning Objectives (CLOs)

1. Explain the principles of surveying.
2. Discuss the fundamentals of topographical map.
3. Comprehend the steps and computations involved in surveying.
4. Explain the characteristics of contour and methods of contouring.
5. Compute the areas and volumes for civil engineering works.

Pre-requisites: NIL

UNIT I

Introduction

Definition of surveying, Primary divisions of surveying, Basic principles of Surveying, Classification of surveying, Basic Surveying equipments and their application in surveying (Chain, Tape, Arrows, Ranging rod, Offset rod). Units of measurements, Precision and accuracy, Map, Plan, Scale, Direct and Indirect ranging, Setting out of right angles, Types of Chain and Tape, Measurement of distances over sloping ground, Chain and Tape corrections (only linear corrections.)

06 Hours

UNIT II

Compass Surveying

Types of compass, Principle and working of prismatic compass, Comparison between prismatic compass and surveyor's compass, WCB and RB, Types of Meridians and Bearings, Determination of included angles of closed and open traverses.

Compass Traversing

Local attraction- determination and correction, Latitude and Departure, Dependent and Independent coordinates, Checks for closed traverse and determination of closing error and its direction.

10 Hours

UNIT III

Leveling

Definition, Objective, Temporary adjustment of dumpy level, Types of levels, Curvature and Refraction corrections, Type of leveling- Differential leveling, Profile leveling, Cross sectioning, Fly leveling and Fly back leveling, Reciprocal leveling, Booking of levels, Rise and Fall method and Height of Instrument method-Numerical problems, Errors in Leveling.

10 Hours

UNIT IV

Contours

Contours and their characteristics, direct and indirect methods, Interpolation techniques, Uses of contours, Capacity contours. Numerical problems, Study of topographic maps.

06 Hours

UNIT V

Areas and Volumes

Calculation of area from cross staff surveying, Methods of determining areas by trapezoidal and Simpson rules, Measurement of volume by prismoidal and trapezoidal formulae.

Self Learning Topics: Field applications of Area and Volume calculations. **08 Hours**

Text Books

1. Punmia B. C., **"Surveying Vol–1"**, Laxmi Publications, New Delhi
2. Subramanian R., **"Surveying and Leveling"**, Oxford University Press (2007)
3. Venkataramiah C., **"Text Book of Surveying"** Universities Press.(2009 Reprint)
4. Rethaliya R. P, **"Surveying"**, Atul Prakashan, Gandhi road, Ahmadabad
5. Kanetkar T. P and Kulkarni S.V, **"Surveying and Leveling Part- I"**, Pune Vidyarthi Ghrih Prakashan

References

1. Milton O. Schimidt, **"Fundamentals of Surveying"**, Wong, Thomson Learning
2. Roy S. K., **"Fundamentals of Surveying"**, Prentice Hall of India.
3. Duggal S. K., **"Surveying Vol. I"**, Tata McGraw Hill – Publishing Co. Ltd., New Delhi.
4. Maps, Survey of India Publication

Course Outcomes (COs)

	At the end of the course, students will be able to:	Bloom's Level
1.	**Identify** problems and mistakes occurring in field measurements for linear and angular instrument	L 3
2.	**Distinguish** between source and types of errors present in surveying measurement and their significance.	L 4
3.	**Identify** the different types of leveling in civil engineering work	L3
4.	**Identify** the area and volumes using contours for different civil engineering projects	L3
5.	**Demonstrate** applications of Linear and Angular surveying instruments	L2

Program Outcomes (POs)

1.	Graduates shall be able to understand and apply the basic mathematical and scientific concepts that underlie the field of Civil Engineering	PO 1
2.	Graduates shall possess critical thinking abilities, problem solving skills and familiarity with the necessary computational tools and procedures	PO 5

Content Delivery/Assessments methods and Scheme of Evaluation

	Course delivery methods		Assessment methods
1.	Lecture and Board	1.	Assignments and Open Book Assignment
2.	NPTEL/ Edusat	2.	Quizzes
3.	Power Point Presentation	3.	Internal Assessment Tests
4.	Videos	4.	Semester End Examination

Scheme of Continuous Internal Evaluation (CIE)

Components	Average of best two IA tests out of three	Average of assignments (Two) / activity	Quiz	Class participation	Total Marks
Maximum Marks: 50	25	10	05	10	50
➢ Two IA tests are compulsory. ➢ Minimum marks required to qualify for SEE: Minimum IA test marks (average) 10 out of 25 and total CIE marks 20 out of 50.					

Self Study topics shall be evaluated during CIE (Assignments and IA tests) and 10% weightage shall be given in SEE question paper.

Scheme of Semester End Examination (SEE):

1. SEE will be conducted for 100 marks and scaled down to 50 marks for the calculation of SGPA and CGPA.
2. Minimum marks required in SEE to pass: 40 out of 100
3. Question paper contains 08 questions, each carrying 20 marks. Students have to answer FIVE full questions. SEE question paper will have two compulsory questions (from any TWO UNITS) and choice will be given in the remaining three units.

STRENGTH OF MATERIALS LAB

Subject Code	16CVL36	**Credits**	01
Course Type	L	**CIE Marks**	25
Hours/week: L – T – P	0-0-2	**SEE Marks**	25
Total Hours	26	**SEE Duration**	3 Hours for 50 Marks

Course Learning Objectives (CLOs)

1. To illustrate the behavior of the structural steel under the applied loads and study stress-strain behavior and highlight practical applications.
2. To enable students to have hands-on experience on testing and characterize the important building materials by conducting appropriate tests in conformity with the specified IS code procedures.
3. To equip the students to analyze and interpret the results, draw suitable inferences in conformity with specifications, acceptability and utility of the results.
4. Function as a team member to conduct experiments in groups.

List of Experiments

Exp. No.	Experiments
1	Tension test on Mild steel
2	Tension test on HYSD bar
3	Bend-Rebend test on Mild steel
4	Torsion test on Mild steel
5	Single Shear test on Mild steel/ Aluminium
6	Double Shear test on Mild steel/ Aluminium
7	Charpy Impact Test on Mild steel
8	Izod Impact Test on Mild steel
9	Rockwell Hardness test on Mild steel/ Aluminium
10	Brinell Hardness test on Mild steel/ Aluminium
11	Bending test on Timber under two-point loading
12	Compression test on Bricks
13	Water Absorption test on Bricks
14	Flexural test on Tiles
15	Abrasion test on Tiles

References:

1. Davis, Troxell and Hawk, **"Testing of Engineering Materials"**, International Student Edition - McGraw Hill Book Co. New Delhi
2. Fenner, **"Mechanical Testing of Materials"**, George Newnes Ltd, London
3. Kukreja C. B., Kishore K., **"Material Testing Laboratory Manual"**, Ravi Chawla Standard Publishers and Distributors 1996
4. Holes K. A., **"Experimental strength of Materials"**, English Universities Press Ltd. London
5. Suryanarayana A. K., **"Testing of Metallic Materials"**, Prentice Hall of India Pvt. Ltd. New Delhi
6. Relevant IS Codes (as applicable for each test).

Course Outcomes (COs)

At the end of the course, students will be able to:	Bloom's Level
1. **Get acquainted with** the behavior of the structural steel.	L4
2. **Get acquainted with** the behavior of the wooden member subjected to bending and compression.	L3, L5
3. **Characterize** the important building materials by conducting appropriate tests in conformity with the specified IS code procedures.	L2
4. **Ascertain** the suitability and applicability of construction materials.	L3, L5

Program Outcomes (POs)

1. Graduates shall be able to understand and apply the basic mathematical and scientific concepts that underlie the field of Civil Engineering.	PO 01
2. Graduates shall be capable of working productively in team with meaningful contribution as a member and with leadership attributes.	PO 09

Content Delivery/Assessments methods and Scheme of Evaluation:

1. Continuous evaluation of conduct of Practical and Journals
2. Viva voce

Scheme of Continuous Internal Evaluation (CIE)

Conduct of Lab	Journal submission	Total Marks
10	15	25

 # Minimum CIE marks required for eligibility for SEE: 13 out of 25
 # Submission of Journals and certification is compulsory for eligible to SEE

Scheme of Semester End Examination (SEE):

1. Lab examination will be conducted for 50 marks and scaled down to 25 marks for the calculation of SGPA and CGPA.
2. Only ONE experiment needs to be conducted; Individual viva voce shall be taken.
3. Minimum marks required in SEE to pass: 20 out of 50.

Initial write up	10 marks
Conduct of experiment	20 marks
Viva voce	20 marks

CONCRETE TECHNOLOGY LABORATORY

Course Code	16CVL37	**Credits**	02
Course Type	L	**CIE Marks**	25
Hours/week: L – T – P	0 – 0 – 3	**SEE Marks**	25
Total Hours	39	**SEE Duration**	3 Hours for 50 Marks

Course Learning Objectives (CLOs)

1. To prepare the students effectively link laboratory tests with construction practices and comprehend the underlying theoretical principles
2. To conduct tests on hardened concrete
3. To design and test concrete mix for the given workability and strength.
4. To conduct tests on fresh concrete
5. To equip the students with capability to conduct of experiments, analyze and interpret the results, draw suitable inferences in conformity with IS specifications.

List of Experiments:

Exp. No.	Experiments
	Tests on Cement
1	Normal Consistency and setting times (Initial and Final)
2	Specific Gravity of Cement
3	Fineness of cement by Blaine's air permeability test and sieve test
4	Compressive strength of Cement
	Tests on Coarse Aggregates
5	Specific gravity, water absorption and bulk density
6	Sieve analysis of Coarse aggregates for fineness modulus and gradation
	Tests on Fine aggregates
7	Specific gravity, water absorption, bulk density and bulking of sand
8	Sieve analysis of Fine aggregates for fineness modulus and gradation
	Tests on fresh concrete
9	Workability tests: Slump cone, Compaction factor, Vee–Bee Consistometer and Flow table tests.
	Tests on Hardened concrete
10	Concrete mix design using IS Code
11	Compression test on Concrete Cube
12	Split tensile strength test on Concrete Cylinder
13	Flexural Strength test on Concrete Beam
	Demonstration Experiments
14	On site NDT (using rebound hammer) with short report
15	Site visit to study advances in Concrete technology (like RMC, pumped concrete)

References:

1. Gambhir M. L., **"Concrete manual"**, Dhapat Rai and Co.
2. Shetty M. S., **"Concrete Technology-Theory and Practice",** S. Chand and Company Ltd., New Delhi, 2006.

3. IS 383:1970, **"Specification for coarse aggregates and fine aggregates from natural sources for concrete"**
4. IS 650: 1991, **"Specification for standard sand for testing of cement"**
5. IS 2386 (Part 3) 1963, **"Methods of test for aggregates for concrete- specific gravity, density, voids, absorption and bulking"**
6. IS 4031 (Part I) 1996, **"Determination of fineness by dry sieving of cement"**
7. IS 10262: 2009, **"Concrete Mix design procedure"**

Course Outcomes (COs)

At the end of the course, students will be able to:	**Bloom's Level**
1. **Conduct** the experiments on cement, coarse aggregates, fine aggregates, fresh cement concrete and hardened cement concrete.	L3
2. C**ompare** the results obtained with relevant IS codes and write the **Conclusion**	L4
3. **Examine** the on-site strength of concrete using NDT	L4

Program Outcomes (POs)

1. Graduates shall be able to design and conduct experiments and interpret the Results as per the current experiment.	PO 04
2. Graduates shall imbibe the professional and ethical responsibilities of their Profession.	PO 08
3. Graduates shall be capable of working productively in team with meaningful Contribution as a member and with leadership attributes.	PO 09
4. Graduates shall possess effective oral and written communication skills	PO 10

Content Delivery/Assessments methods and Scheme of Evaluation:

1. Continuous evaluation of conduct of Practical and Journals
2. Viva voce

Scheme of Continuous Internal Evaluation (CIE)

Conduct of Lab	Journal submission	Total Marks
10	15	25

 # Minimum marks required for eligibility for SEE: 13 out of 25
 # Submission of Journals and certification is compulsory for eligible to SEE

Scheme of Semester End Examination (SEE):

1. Lab examination will be conducted for 50 marks and scaled down to 25 marks for the calculation of SGPA and CGPA.
2. Only ONE experiment needs to be conducted; Individual viva voce shall be taken.
3. Minimum marks required in SEE to pass: 20 out of 50.

Initial write up	10 marks
Conduct of experiment	20 marks
Viva voce	20 marks

BASIC SURVEYING LABORATORY

Course Code:	16CVL38	**Credits:**	01
Course Type:	L	**CIE Marks:**	25
Hours/week: L – T – P	0 – 0 – 2	**SEE Marks:**	25
Total Hours:	26	**SEE Duration:**	3 Hours for 50 marks

Course Learning Objectives (CLOs)

1. Demonstrate the Linear and Angular surveying instruments used in field work
2. To determine the Reduced Level by rise and fall method and Height of instrument.
3. To Measure distance between Inaccessible points using plane table
4. Demonstrate the Minor Linear, Angular instrument and Area Measurement instrument

List of Experiments:

Exp. No.	Experiments
	Chain Surveying
1	To measure distance between two points using direct ranging.
2	To set out perpendiculars at various points on given line using cross staff, optical square, Chain and tape
	Compass surveying
3	To determine the distance between two inaccessible points using chain/tape and compass
4	Measurement of bearing of the sides of a closed traverse and adjustment of closing error by Bowditch method and Transit method
	Leveling
5	To determine difference in elevation between two points using differential leveling and Booking of levels using both HI and Rise and Fall methods
6	To determine difference in elevation between two points using Fly leveling, conduct fly back leveling and Booking of levels using HI methods
7	To conduct profile leveling for water supply /sewage line and to draw the longitudinal section and to determine the depth of cut and depth of filling for a given formation level
8	To conduct Block Leveling for an area and plot contours
	Study of Map
9	Study of Topographic sheets: Survey of India topographical Maps and their numbering, Scale, Map components and Calculation of area and volume of contours.
	Demonstration of Minor Instruments
10	Minor instruments – Clinometers, Ceylon ghat tracer, Hand level, Box sextant, Planimeter and Pantagraph
11	Demonstration of plane table surveying with accessories
	Mini Project
12	To conduct profile leveling and cross section leveling for road project, draw the longitudinal and cross sections and determine the depth of cutting and filling for a given formation level.

References:

1. Punmia B. C., **"Surveying Vol–1",** Laxmi Publications, New Delhi, 16th edition, 2005
2. Subramanian R., **"Surveying and Leveling",** Oxford University Press, Third edition, 2007
3. Venkataramiah C., "**Text Book of Surveying",** Universities Press, Second edition, 2011
4. Rethaliya R. P.**, "Surveying",** Atul Prakashan, Gandhi road, Ahmadabad.
5. Kanetkar T. P and Kulkarni S.V., **"Surveying and Leveling Part- I",** Vidyarthi Ghrih Prakashan Pune, 24th edition 2010.

Course Outcomes (COs)

At the end of the course, students will be able to:	Bloom's Level
1. **Get acquainted** with the behavior of the structural steel.	L4
2. **Get acquainted** with the behavior of the wooden member subjected to bending and compression	L3, L5
3. **Characterize** the important building materials by conducting appropriate tests in conformity with the specified IS code procedures.	L2
4. **Ascertain** the suitability and applicability of construction materials.	L3, L5

Program Outcome (POs)

1. Graduates shall be able to understand and apply the basic mathematical and scientific concepts that underlie the field of Civil Engineering.	PO 1
2. Graduates shall be able to design and conduct experiments and interpret the results as per the current research	PO 4
3. Graduates shall possess critical thinking abilities, problem solving skills and familiarity with the necessary computational tools and procedures	PO 5

Content Delivery/Assessments methods and Scheme of Evaluation

1. Continuous evaluation of conduct of Practical and Journals
2. Viva voce

Scheme of Continuous Internal Evaluation (CIE)

Conduct of Lab	Journal submission	Total Marks
10	15	25

 # Minimum marks required for eligibility for SEE: 13 out of 25

 # Submission of Journals and certification is compulsory for eligible to SEE

Scheme of Semester End Examination (SEE):

1. Lab examination will be conducted for 50 marks and scaled down to 25 marks for the calculation of SGPA and CGPA.
2. Only ONE experiment needs to be conducted; Individual viva voce shall be taken.
3. Minimum marks required in SEE to pass: 20 out of 50.

Initial write up	10 marks
Conduct of experiment	20 marks
Viva voce	20 marks

ELECTRONICS AND COMPUTER WORKSHOP LAB

Course Code	16ECL39	**Credits**	02
Course type	ES	**CIE Marks**	25
Hours/week: L-T-P	0 – 0 – 3	**SEE Marks**	25
Total Hours:	36	**SEE Duration**	3 Hours for 50 Marks

Course Learning Objectives (CLOs)

1. To understand various electronics components and its applications.
2. To understand electronics circuit design
3. To understand various computer hardware and their operation.
4. To understand disassembling and assembling of computer system.
5. To study various networking components.

List of Experiments:

Exp. No.	Experiments
	Part A: Electronics Experiments
	I. Study of basic passive and active electronics components
1	Introduction to various electrical passive components such as R, C, L, transformers, relays, switches, bread board, universal printed circuit board and electronic devices such as rectifying diode, Zener diode, light emitting diode, transistor, seven segment displays, LCD panel, Integrated circuit chip (with different packages and functionalities, both digital and analog) and Surface mount devices/chips. Acquaintance with ratings, specifications, packages of components and devices listed above, using data-sheets.
	II. Introduction to various DC regulated power supplies, Cathode Ray Oscilloscope (CRO), Function Generators, and different Electronic Measuring Meters
2	Exposure to usual electronic equipment/instruments such as Multi-meter, Oscilloscope, Function generator, IC tester and Power supply, Information about their front panels, Demonstrations on their working, Hands-on for measurement of component values and DC voltage using multi-meter, AC mains voltage/ 1 KHz Square wave/any small signal from function generator on Oscilloscope, Testing of sample digital ICs using IC tester.
	III. Construction and testing of basic electronics circuits
3	Circuit building practice on standard bread board using simple ICs, components and single strand wires, performing cold test and functionality verification wherever possible.
4	Building and testing regulated DC power supply, (Fullwave rectifier), voltage divider circuits using resistors, relay driver using transistors and building burglar alarm circuit
	IV. Simple PCB design and testing
5	The single sided printed circuit board (PCB) shall be designed manually.
6	The designed circuit layout should be transferred to copper clad laminate board and etched using Hydrochloric Acid
7	After soldering the components and devices onto the PCB, the design should be

	tested and demonstrated for intended functionality
8	Sample Examples of Circuits for BUILD and TEST projects: 1. IC 555 based timer and square wave generator 2. OP-amp IC 741 based analog computer(adder/subtractor/integrator/Differentiator) 3. FM remote lock for vehicle 4. Digital Clock 5. Temperature sensor and display
	Part B: Computer Workshop
	I. Introduction to basic computer hardware
9	Name and identify various PC hardware components: USB Mouse, PS/2 Mouse, Keyboard, LCD/LED Monitor, VGA, HDMI, CAT5, CAT6, server, routers, fiber cable, Hard disk, RAM, CMOS battery, SMPS, cache, ROM, BIOS
10	To assemble and disassemble computer hardware
11	To install different operating systems with dual boot: Install any two operating systems on a PC making it dual boot, including latest version of Ubuntu Linux, Windows 7/8
	II Introduction to computer networks and it's components
12	Network Hub (4/8 ports), CAT6 cables network tool kit (Network crimper, Cable Tester, Wire stripper)
13	Connect 2-4 computers together using a network hub to create a LAN

Text Books

1. Allen Mottershed, **"Electronic devices and circuits"**, Prentice Hall Inc
2. Robert L Boylestead. **" Electronic devices and Circuit theory"**, PEARSON
3. Ron Glister. **"PC Hardware: A Beginner's Guide"**, Osborne/ McGraw –Hill Education
4. BehrouzA.Forouzan. **"Data Communication and Networking"**, McGraw –Hill Education

References

1. Satish Jain , **"Electronics Components And PC Hardware"**, BPB Publication
2. Ramakant A. Gayakwad, **"Op-amp and Linear Integrated circuits"**, Prentice Hall Inc
3. Nurul Sarkar, **"Tools for Teaching Computer Networking And Hardware Concepts"**, Infosci Publication

Course Outcomes (COs)

At the end of the course, the student will be able to:	Bloom's Level
1. **Distinguish** various electronics components**.**	L4
2. **Analyze** and **design** electronics application circuits.	L4, L6
3. **Identify** various parts computer hardware.	L3
4. **Testing** of a computer model.	L4
5. **Analyze** computer networking.	L4

Program Outcome (POs)

1.	**Fundamentals of Engineering:** Graduates shall be able to understand and apply the basic mathematical and scientific concepts in the field of Electronics and Communication Engineering.	PO 1
2.	**Design of Experiments:** Graduates shall possess the ability to design and conduct experiments, analyze and interpret data.	PO 2
3.	**Engineering Cognizance:** Graduates shall be able to stay abreast with recent developments in the field of Electronics and Communication Engineering	PO 4
4.	**Modern tool Usage:** Graduates shall possess critical thinking abilities, problem solving skills and familiarity with the necessary computational tools and procedures	PO 5
5.	**Self motivated Learning:** Graduates shall continue to upgrade the skills and possess the motivation for continuing education and professional growth	PO 12

Content Delivery/Assessments methods and Scheme of Evaluation

Assessment methods

1. Internal Test
2. Quiz
3. Activity
4. Viva-Voce
5. Mini Project/ Course Activity

Scheme of Continuous Internal Evaluation (CIE):

Components	Conduct of the lab	Journal submission	Total Marks
Maximum Marks: 25	10	15	25

 # Minimum marks required for eligibility for SEE: 13 out of 25

 # Submission of Journals and certification is compulsory for eligible to SEE

Scheme of Semester End Examination (SEE):

1. Lab examination will be conducted for 50 marks and scaled down to 25 marks for the calculation of SGPA and CGPA.
2. Only ONE experiment needs to be conducted; Individual viva voce shall be taken.
3. Minimum marks required in SEE to pass: 20 out of 50.

Initial write up	10 marks
Conduct of experiment	20 marks
Viva voce	20 marks