



**NAGARJUNA**

**COLLEGE OF ENGINEERING & TECHNOLOGY**

*An Autonomous College under VTU*

## **DEPARTMENT OF CIVIL ENGINEERING**

### **VISION**

To transform the students as leaders in Civil Engineering to achieve professional excellence in the challenging future.

### **MISSION**

- M1:** To provide the Civil Engineering knowledge and skills for students through an excellent academic environment.
- M2:** Adopting innovative teaching techniques using modern engineering tools for designing, modeling and analyzing the societal and environmental problems.
- M3:** Developing Communication skill, leadership qualities through team work and skills for continuing education among the students.
- M4:** To inculcate moral, ethical and professional values among students to serve the society.
- M5:** Validate engineering knowledge through innovative research projects to enhance their employability and entrepreneurship skills.

## **III & IV Semesters**

### ***Scheme and Syllabus***

***With effect from Academic Year 2019-20***

**Third Semester B.E. - Scheme**

Sl. No.	Course Code	Course Name	Teaching Dept.	Total Credits	L:T:P:S (Hrs/week)	Marks
1	18CVM31	Integral Transforms And Fourier Series (IC)	Maths	4	3:0:2:0	100
2	18CVT32	Building Materials and Concrete Technology	CE	4	4:0:0:0	100
3	18CVT33	Strength of Materials	CE	4	3:2:0:0	100
4	18CVI34	Engineering Geology (IC)	CE	4	3:0:2:0	100
5	18CVT35X	Foundation Elective - I	CE	4	4:0:0:0	100
6	18CVL36	Basic Material Testing Laboratory	CE	2	1:0:2:0	100
7	18CVH37	Technical Report Writing & IRDP	S&H	2	1:0:2:0	100
8	18KAK38	Aadalitha Kannada / Vyavaharika Kannada	S&H	1	1:0:0:0	100
<b>TOTAL</b>				<b>25</b>	<b>20:2:8:0</b>	<b>800</b>

**Foundation Elective - I**

Sl. No.	Course Code	Course
1	18CVT351	Ecology and Environmental Impact Assessment
2	18CVT352	Building Services
3	18CVT353	Construction Techniques and Practices

**IC – Integrated Course****L – Lecture****T-Tutorials****P-Practical****S – Self Study**

**Fourth Semester B.E. - Scheme**

Sl. No.	Course Code	Course	Teaching Dept	Total Credits	L:T:P:S (Hrs/ week)	Marks
1	18CVM41	Calculus of Complex Functions And Probability Distributions(IC)	Maths	4	3:0:2:0	100
2	18CVI42	Surveying (IC)	CE	4	3:0:2:0	100
3	18CVT43	Structural Analysis - I	CE	3	3:0:0:0	100
4	18CVT44X	Foundation Elective - II	CE	3	3:0:0:0	100
5	18EET45X	Engineering Elective - III	CE	4	4:0:0:0	100
6	18CVI46	Building Planning and Drawing (IC)	CE	4	3:0:2:0	100
7	18CVH47	Career Skill Development Programme	S&H	2	1:2:0:0	100
8	18CPH48	Constitution of India , Professional Ethics and Human Rights	S&H	1	1:0:0:0	100
<b>TOTAL</b>				<b>25</b>	<b>21:2:6:0</b>	<b>800</b>

**Foundation Elective - II**

Sl. No.	Course Code	Course
1	18CVT441	Alternative Building Material And Technology
2	18CVT442	Advanced Concrete Technology
3	18CVT443	Green Buildings

**Engineering Elective - III**

Sl. No.	Course Code	Course
1	18EET451	Renewable Energy Resources
2	18EET452	Introduction to Cyber Security and Cyber Laws
3	18EET453	Management Information System
4	18EET454	Environmental Air Pollution

IC – Integrated Course

L – Lecture

T-Tutorials

P-Practical

S – Self Study

## Integral Transforms And Fourier Series (IC)

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVM31	3:0:2:0	4	CIE:50 SEE:50	3 Hours	BS

### Course Objectives:

This course will enable students to :

- Develop the knowledge of solving the engineering problems by using software.
- Obtain the knowledge of Integral Transforms in solving the engineering problem.
- Have the efficiency in expressing a periodic function in terms of infinite trigonometric series.

### Syllabus

#### Module – I

**Sci Lab:** Introduction to SciLab, General environment of SciLab and Console, Work space and Working directory, Basic calculations in SciLab, Matrix operations, Functions in SciLab, SciLab programming, plotting of graphs. **07 Hours**

#### Module – II

**Laplace Transform:** Laplace transform of elementary functions (Formulae only). Properties (without proof), transform of derivatives, multiplication by  $t^n$  and division by  $t$  (Statements only) - Problems. Laplace transforms of periodic functions, unit step functions and unit impulse function (without proof) –Problems. **08 Hours**

#### Module – III

**Inverse Laplace Transforms:** Inverse Laplace transforms of standard functions. (Formulae only). Inverse Laplace transform by using completing the squares, partial fractions, shifting property and differentiation - problems. Convolution theorem (statement only) - problems. Applications - solution of linear differential equations with initial conditions- problems. **08 Hours**

#### Module – IV

**Fourier Transforms:** Complex Fourier transforms, Properties (without proof), Fourier Sine and Cosine transforms and their inverse transforms. Finite Fourier Transforms - problems. **08 Hours**

**Module – V**

**Fourier Series :** Periodic functions, Dirichlet's conditions, Euler's Formulae (without proof), Fourier series of periodic functions of period  $2l$  and  $2\pi$ , Half range Fourier series - problems. **08 Hours**

**List of Sci Lab Experiments**

Expt. No.	Experiments
1	Introduction of Sci Lab and Basic operations in Sci Lab.
2	Simple numerical calculations.
3	Construction of vectors and matrices.
4	Matrix operations
5	Roots of polynomials and Solutions of system of equations
6	Plotting of graphs
7	Numerical methods
8	Numerical methods

**Course Outcomes:**

On completion of this course, the students are able to:

- Use the SCILAB in solving the various types of engineering problems.
- Find the Laplace transform of different types of functions.
- Use the Laplace transform and inverse Laplace Transform in solving various types engineering application problems.
- Use the Fourier Transform in solving various types engineering application problems.
- Find the Fourier series of periodic functions.

**Text Books:**

1. Dr. B.S. Grewal: "Higher Engineering Mathematics", (Chapters 10,21, 22), Khanna Publishers, New Delhi, 42<sup>nd</sup> Edition, 2012, ISBN:9788174 091955.
2. N.P. Bali and Dr. Manish Goyal: "A Text Book of Engineering Mathematics", (Chapters 10, 18, 20), Laxmi Publications (P) Ltd., New Delhi, 9<sup>th</sup> Edition, 2014, ISBN: 9788131808320.
3. SCILAB Group: "Introduction to SCILAB, A Users Guide" .

**Reference Books:**

1. Erwin Kreyszig: “Advanced Engineering Mathematics”, Wiley Pvt. Ltd. India, New Delhi, 9<sup>th</sup> Edition, 2011, ISBN 13: 9788126531356.
2. B.V. Ramana: “Higher Engineering Mathematics”, Tata Mc Graw – Hill Publishing company Limited, New Delhi, 2<sup>nd</sup> Reprint, 2007, ISBN 13: 978-0-07063417-0.
3. Stormy Attaway: “A practical introduction to programming and problem solving”, Elsevier, Boston, 2<sup>nd</sup> Edition.

**E-Resources:**

1. <http://bookboon.com/en/essential-engineering-mathematics-ebook>
2. <https://www.free-ebooks.net/ebook/essential-engineering-mathematics>
3. <https://www.scilab.org/resources/documentation/books>
4. <https://archive.org/details/AdvancedEngineeringMathematics10thEdition>
5. [https://mars.uta.edu/mae3183/simulation/introscilab\\_baudin.pdf](https://mars.uta.edu/mae3183/simulation/introscilab_baudin.pdf)



## Building Material and Concrete Technology

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVT32	4:0:0:0	4	CIE:50 SEE:50	3hours	FC

### Course Objectives:

The students will be able to:

- Achieve the basic knowledge of concrete.
- Understand the advances in construction materials.
- Learn the importance of materials used in concrete.
- Able to understand the properties of fresh concrete and admixtures.
- Utilise the Codal provisions for concrete mix design.

### Syllabus

#### Module – I

**Masonry**-Definition of terms used in Masonry, Classification of Masonry.

**Stone Masonry**-Classification, joints.

**Brick Masonry**-Manufacture of Bricks, Standard properties of brick, Field test.

**Foundation** -Importance and requirements of a good foundation, types of foundation, Preliminary investigation of soil, safe bearing capacity of soil, introduction to spread, combined, strap, and mat and pile foundations, design of strip combined footings.

**10 Hours**

#### Module – II

**Arches and Lintels:** Definition, Function and classification of lintels, Balconies, Chejja, Canopy, Stability of an Arch.

**Roofs** -Types of roofs and roofing materials, Flat roof (RCC), types of pitched roofs.

**Plastering Purposes of plastering,** Materials of Plastering, Methods of plastering, Defects in plastering,

**Painting** Introduction to paintings and types of painting, purpose of painting, defects in painting, Application of paints to new and old surfaces.

**10 Hours**

#### Module – III

**Cement** – Chemical composition, hydration of cement, types of cement, manufacture of OPC with flowcharts. Bogue's compound, Tests on cement – field and Lab test, Quality of mixing water

**Fine aggregate:** grading of aggregates, sieve analysis, specific gravity, bulking, and moisture content, deleterious materials.

**Coarse aggregate** importance of size, shape and texture, grading of aggregates, sieve analysis, specific gravity, flakiness and elongation index, crushing, impact and abrasion tests, Structure of aggregate phase, structure of hydrated cement paste, structure - property relationship in hydrated cement paste. **10 Hours**

#### Module – IV.

**Concrete** –Ingredients ,Manufacture of concrete

**Workability** – definition, factors affecting workability, measurement of workability by slump, compaction factor, vee-bee, flow tests. Segregation and bleeding, process of manufacture of concrete – batching. mixing, transporting, placing, compaction, curing of concrete.

**Admixtures**-Chemical and Mineral Admixtures

**10 Hours**

#### Module-V

**Shrinkage and creep**-Factors affecting Shrinkage, Drying and Plastic Shrinkage.

Factors affecting creep, effects of creep.

**Test on hardened concrete**- Compression, tensile, Flexural.

**Durability**-Definition, Permeability, sulphate attack, Chloride attack, Carbonation freezing and Thawing, factors contributing to cracks in concrete.

**Mix design**-Concept of mix design, procedure of mix design as per IS 10262-2019, numerical examples of mix design. **10 Hours**

#### Course Outcomes:

Students will be able to

- Recognise the materials used in construction
- Describe the physical and mechanical properties of a variety of construction materials.
- Identify the functional components of a building.
- Describe the construction process of various components of a building.
- Explain the fundamental principles and procedures in making concrete

#### Text Books:

1. M.S. Shetty, “Concrete Technology” - Theory and Practice Published by S. Chand and Company, New Delhi, 7<sup>th</sup> Edition, ISBN-13, 9788121900034
2. Neville A.M “Properties of Concrete”, ELBS, London, 4<sup>th</sup> Edition, ISBN 9780582230705



3. S K Duggal ,Building materials (4<sup>rd</sup> revised edition), New Age International publishers, India, ISBN 10: 81224337900
4. Rangawala P C “Engineering Materials” (Material Science), Charotar publishing house,India, 33<sup>rd</sup> EDITION-2015,ISBN : 978-93-85039-04-1.

**Reference Books:**

1. Gambhir M.L : “Concrete Technology”, DhanpatRai& Sons, New Delhi,fourth edition, ISBN-978125906255
2. P. G. Varghese, “A Textbook Building Materials”, (Chapter 1, 3 & 19), PHI Learning publication, 2<sup>nd</sup> Edition, April 2015, ISBN: 81-203-2848-5.
3. IS:10262-2009,Recommended guidelines for concrete Mix design.

**e-Resources:**

1. [www.atozcivilengineering.com](http://www.atozcivilengineering.com) › Education
2. [www.actemirates.ae](http://www.actemirates.ae)
3. [www.advconcrete.com/contact-us](http://www.advconcrete.com/contact-us)
4. [www.act-course.co.uk](http://www.act-course.co.uk)
5. [www.labour.gov.hk/eng/public/os/D/Constructionsite.pdf](http://www.labour.gov.hk/eng/public/os/D/Constructionsite.pdf)



## Strength of Materials

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVT33	3:2:0:0	4	CIE:50 SEE:50	3 hours	FC

### Course Objectives:

- Study the behaviour of materials within elastic limit subjected to Flexure, Shear and Torsion.
- Describe the buckling behaviour of Columns.
- Evaluate the importance of deflection in beams.
- Understand the importance of Compound stresses.
- Analyze the major and minor principal stresses and their directions.

#### Module – I

**Simple Stress and Strain:** Introduction, Properties of Materials, Stress, Strain, Hooke's law, Poisson's Ratio, Stress – Strain diagram for structural steel and non-ferrous materials, Principle of superposition, Elastic constants, relationship among elastic constant. Stresses in Compound Bars & Temperature Stress problems. **10 Hours**

#### Module – II

**Bending Moment and Shear Force:** Introduction, Shearing force in beam, Bending moment, Sign convention, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, SFD and BMD with salient values for cantilever beams, simply supported beams and overhanging beams considering point loads, UDL, UVL and Moment. **10 Hours**

#### Module – III

**Bending stress in beams:** Introduction to Bending stress in beams, Assumptions in pure bending and derivation of Bending equation, Modulus of rupture, section modulus, Flexural rigidity.

**Shear Stress in Beams:** Expression for I shear stress in beam, Shear stress diagram for rectangular, symmetrical 'I' and 'T' section. **10 Hours**

#### Module – IV

**Deflection of beams:** Definitions of slope, deflection, Elastic curve, derivation of differential equation for deflection, Sign convention, Slope and deflection for standard loading cases using Macaulay's method for beams subjected to point loads, UDL and moment.

**Compound stresses:** Introduction, Stress components on inclined planes, General two dimensional stress system, Principal planes and stresses, Mohr's circle of stresses. **10 Hours**

**Module – V**

**Torsion of circular shafts:** Pure torsion, torsion equation of circular shafts, torsional rigidity and polar modulus, Power transmitted by shaft for solid and hollow circular shafts.

**Elastic stability of columns:** Short and long columns, Euler’s theory on long columns, Effective length slenderness ratio, radius of gyration, buckling load, Assumptions, derivations of Euler’s Buckling load for different end conditions, Limitations of Euler’s theory, Rankine’s formula. **10 Hours**

**Course Outcomes:**

Students will be able to

- Recognize the fundamental concepts of Stress and Strain under Elastic Limits.
- Draw SFD and BMD for beams.
- Design of Shafts to transmit required power and to determine the buckling loads of long
- Columns.
- Determine deflection in beams under different loading conditions.
- Analyze the bending and shear stress in the beams.

**Text Books:**

1. Dr. R. K. Bansal, “A Textbook of Strength of Materials”, (Chapter 1, 2, 3, 6, 7, 9 & 12), Laxmi Publisher, 5<sup>th</sup> Edition, 2012, ISBN: 978-8131808146.
2. S. Ramamrutham and R. Narayanan, “Strength of Materials”, (Chapter 1, 2, 5, 7 & 9), Dhanpat Rai Publishing Company, 14<sup>th</sup> Edition, 2011, ISBN: 9788187433545.

**Reference Books:**

1. S. S. Bhavikatti, “Strength of Materials”, (Chapter 1, 2, 4, 7, 8 & 10), S.Chand (G/L) & Company Ltd, 4<sup>th</sup> edition, 2013, ISBN: 978-9325971578.
2. Dr. B. C. Punmia, Dr. A. K. Jain, “Mechanics of Materials”, (Chapter 1, 2, 3, 4, 5, 7, 11 & 12), Fire wall media, 2002, ISBN: 9788170082156.



## Engineering Geology (IC)

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVI34	3:0:2:0	4	CIE:50 SEE:50	3 hours	FC

### Course Objectives:

To make students to learn

- The principles of Engineering Geology.
- Earth resource and their properties.
- Earth processes and natural hazards.
- Earths structures and their impact on engineering construction.
- Water resource management and conservation.

### Syllabus

#### Module – I

**Introduction :** Geology and its role in the field of civil engineering. Earth: Its internal structure and composition.

**MINERALOGY :** Description and identification of Rock forming minerals and Ores, based on physical and special properties;

Quartz and its varieties; Feldspar group; Mica group; carbonate group; Hornblende, Olivine, Asbestos, Talc, Gypsum, Garnet, Corundum.

Magnetite, Hematite, Limonite, Pyrite, Chalcopyrite, Pyrolusite, Psilomalane, Chromite, Galena, Bauxite.

**8 Hours**

#### Module – II

**GEOMORPHOLOGY :** Epigene and Hypgene geological agents; rock weathering and its types; Soil formation, types, erosion and remedial measures; Geological action of rivers with different drainage patterns; Geological action of wind. Coastal zones, coastal landforms, continental shelf, continental rise, continental slope, abyssal plain, mid-oceanic ridges, trenches, tsunamis. Landslides; causes effects and remedial measures.

**8 Hours**

#### Module – III

**PETROLOGY :** Rocks as fundamental units and building materials of the earth crust and their engineering applications: As building stones, road metals and stones for decoration, pavement, cladding, roofing, flooring, concreting and foundation engineering.

Igneous rocks: Origin, classification (chemical and textural), mode of occurrence; Identification and description of Granite, Syenite, Diorite, Gabbro, Dunite; Pegmatite, Porphiries, Dolerite; Rhyolite, Basalt and Pumice.

Sedimentary rocks: Origin, classification, primary structures and description of

Sandstones, Conglomerate, Breccia, Shale, Lime stones and Laterite.

Metamorphic rocks: Kinds of metamorphism, description of Gneiss, Quartzite, Marble, Slate, Phyllite and Schists. **8 Hours**

#### Module – IV

##### **ROCK MECHANICS AND ENGINEERING GEOLOGY:**

Deformational effects on different rocks; Out crop, Dip, strike and escarpment, Clinometer-compass- Joints, faults, folds and unconformities their effects on civil engineering structures. Earthquakes- seismic waves, seismograph, causes, effects, seismic zones, shield areas and seismic resisting structures.

Geotechnical investigations for civil engineering projects: Study of toposheets and geological maps, importance of lithological and structural features studies for the construction of Dams, Reservoirs, Tunnels, Bridges and Highways. **8 Hours**

#### Module – V

**HYDROGEOLOGY:** Hydrological cycle; distribution of ground water in the earth crust; properties of water bearing geological formation: Aquifers and their types; selection of sites for well locations and spacing of wells; geological, hydrological and geophysical investigations for ground water exploration; artificial recharge of groundwater methods and rainwater harvesting. Sea water intrusion and remedial measures. **8 Hours**

#### List of Geology Lab Experiment

1	Minerals & Rocks Differentiation Classification Of Minerals In To Different Groups Physical Properties Of Minerals, Minerals Identification- Quartz Group: And Its Varieties
2	Minerals Identification- Rock Forming Minerals- Feldspars, Micas, Pyroxenes, Amphiboles, Carbonates, Sulphate Groups, Garnet Group, Kaoline& Talc, Olivine Group, Corundum, Other Silicates
3	Minerals Identification- Ore Minerals: Iron Ores, Chromium Ores, Aluminum Ore, Mn Ores, Sulphide Group
4	Rocks – Textures& Structures, Classification Into Igneous, Sedimentary & Metamorphic; And Subgroups, Identification Of Individual Rocks Igneous Rocks: Granite, Syenite, Diorite, Gabbro, Dunite, Porphyries, Dolerite, Pegmatite, Basalt, Rhyolite And Pumice
5	Sedimentary Rocks: Sandstone, Limestone, Shale, Breccia, Conglomerate And Laterite
6	Metamorphic Rocks: Gneiss, Quartzite, Marble, Slate, Phyllite, Schists And Charnockite

7	Maps – Introduction, Profiling, Interpretation. Contour Maps – Simple, Profile, Interpretation
8	Geological Maps- Horizontal Beds, Profile And Interpretations
9	Geological Maps – Inclined Beds, Fold, Unconformity
10	Maps- Faulted, And Complicated
11	Study of Topo-Sheet.
12	Evaluation By Test (Model Lab Test)
13	Dip And Strike Problems
14	Dip And Strike Problems
15	Bore Hole Problems

**Text Books:**

- 1 Text book of Geology by P.K. Mukerjee, World Press Pvt.Ltd.Kolkatta. ISBN-13 9788187567547
2. Foundations of Engineering Geology, by Tony Waltham (3rdEd.) Universities Press.ISBN 9780415469609
3. Principles of Engineering Geology and Geotechnics by Dimitri P. Krynine and William R. Judd.ISBN 13: 9788123906034
4. Structural Geology (3rd Ed.) by M. P. Billings, Published by Prentice Hall of India Pvt. Ltd. New Delhi
5. Text of Engineering and General Geology by Parbin Singh, Published by S. K. Kataria and Sons, New Delhi. ISBN: 8188458511, 9788188458516.
6. A text book of Engineering Geology by Chenna Kesavulu, MacMillan India Ltd.

**Text Books for Lab:**

- T1. Satyanarayana Swamy B.S. (1985) Engineering Geology Laboratory Manual, Eurasia Publishing House, New Delhi
- T2. Dana, E.S & Ford, W.E. (1985), A Text Book of Mineralogy, WEL, Delhi
- T3. Goghale, N.W., 1987 Manual of Geological Maps, CBS Publishers, New Delhi
- T4. Reddy, Maruthesh, M.T. (2002), Engineering Geology Practicals, New Age International Pvt. Ltd. Publishers, New Delhi.

**Reference Books:**

1. Rock Mechanics for Engineers by Dr. B. P. Verma, Khanna Publishers, New Delhi.
2. Ground water geology by Todd D.K. John Wiley and Sons, New York.
3. Physical Geology by Arthur Holmes, Thomson Nelson and Sons, London.
4. Ground water assessment, development and management by K. R. Karanth, Tata McGraw Hills

**Reference Books for lab:**

- R1. Read, H.H. (1984) Rutley's Elements of Mineralogy, 26th ed., CBS, N. Delhi
- R2. Billings, Marland P (1987) Structural Geology, 3rd ed., PHI, Delhi
- R3. Mukherjee P.K. (1994), Text Book of Geology, World Press Pvt. Ltd., Calcutta
- R4. Singh, Parbin (2013), Engineering and General Geology, 8th ed., KatsonPublishing House, Ludhiana
- R5. Roy A. K., (1982) Introduction to the Study of the Geological Maps, World Press Limited, Kolkatta.

**E-Resources:**

- 1. [https://books.google.co.in/books/about/Textbook\\_of\\_Engineering\\_Geology.html?id=W-aXSbdjB1cC](https://books.google.co.in/books/about/Textbook_of_Engineering_Geology.html?id=W-aXSbdjB1cC)
- 2. [https://books.google.co.in/books/about/Engineering\\_Geology.html?id=ViNDDAAAQBAJ&redir\\_esc=y](https://books.google.co.in/books/about/Engineering_Geology.html?id=ViNDDAAAQBAJ&redir_esc=y)
- 3. [https://books.google.co.in/books/about/Engineering\\_Geology.html?id=lzm6IUVDBcUC&redir\\_esc=y](https://books.google.co.in/books/about/Engineering_Geology.html?id=lzm6IUVDBcUC&redir_esc=y)
- 4. <https://nptel.ac.in/courses/105105106/>



## Ecology and Environmental Impact Assessment

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVT351	4:0:0:0	4	CIE:50 SEE:50	3 Hours	FE

### Course Objectives:

The students will be able to :

- Different ecological factors influencing environment.
- Frame work of Impact Assessment and various development projects.
- Assessment and Impact prediction on various features like air, water.
- Public Interest in Environmental Decision making.
- Salient Features of various Project Activity.

### Syllabus

#### Module - I

**Ecology:** Development and evolution of ecosystems – Principles and concepts, Classification of Ecosystems, Structure and Function of Ecosystems, Energy flow in Ecosystems, Ecological Niche and succession, Bio-geo-chemical cycles, Ecological Pyramids.

**Aquatic and Terrestrial Ecosystems:** Diversity and dominance Indices, Ecosystem Models.

Lake Ecosystem: Trophic levels, nutrient loading, nutrient enrichment, Leibig's Law, control eutrophication. **08 Hours**

#### Module - II

**Environmental Impact Assessment:** Definition, Objectives, Development Activity and Ecological Factors EIA. Types—Rapid and Comprehensive EIA, EIS, FONSI. Step-by-step procedure for conducting EIA and Limitations of EIA, Prevention of Significant Deterioration (PSD) Programme. Carrying capacity concept. **08 Hours**

#### Module - III

Frame work of Impact assessment: Scope and contents of EIA, methodologies and techniques of EIA. Frame work of Impact Assessment. Development Projects—Environmental Setting, Objectives and Scope, Contents of EIA.

**Prediction and Assessment:** Assessment and Prediction of Impacts on Attributes Air, Water, Noise, Land Ecology, Soil, Cultural and Socio-economic Environment. EIA guidelines for Development Projects, Rapid and Comprehensive EIA. **08 Hours**

#### Module – IV

**Guidelines for Development:** EIA guidelines for Development Projects, Rapid and Comprehensive EIA. Public Participation in Environmental Decision making. Practical Considerations in preparing Environmental Impact Assessment and Statements.



Salient Features of the Project Activity-Environmental Parameter Activity Relationships- Matrices. **08 Hours**

### Module - V

**EIA On Projects:** EIA for Water resource developmental projects, Highway projects: Nuclear-Power plant projects, Mining project (Coal, Iron ore), Thermal Power Plant, Infrastructure Construction Activities. Case studies with present scenario. **08 Hours**

### Course Outcomes:

On completion of this course, the students are able to :

- Identify various ecological components influencing environment.
- Distinguish different methodologies, outlook of Impact assessment and development of many projects.
- Predict the impact of many components on environment.
- Assess the Public Interest in Environmental Decisions.
- Examine important features of different project activities.

### Text Books:

1. A.K Srivastava: “Environmental Impact Assessment”, APH publications.
2. R. Rajagopalan: “Environment and Ecology”, Oakbridge publication.

### Reference Books:

1. Guidelines for EIA of developmental Projects Ministry of Environment and Forests, GOI.
2. LarryW.Canter:“EnvironmentImpactAssessment”, McGrawHillPublication.
3. Kormondy:“Concepts of Ecology”, Prentice Hall Publication, New Jersey.
- 4 Odum: “Fundamentals of Ecology”, Addison Co.

### E-Resources:

1. [https://en.wikipedia.org/wiki/Environmental\\_impact\\_assessment](https://en.wikipedia.org/wiki/Environmental_impact_assessment)
2. <https://scholar.google.co.in/scholar>.
3. <https://www.epa.gov/international-cooperation/technical-review-guidelines-environmental-impact-assessments-tourism>.
4. <https://www.nptel.ac.in/courses/120108004>



## Building Services

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVT352	4:0:0:0	4	CIE:50 SEE:50	3 hours	FE

### Course Objectives:

- Identify different water supply system for multistory building.
- Understand principle of drainage, house drainage system and fixtures.
- Analyze electrical supply for building.
- Demonstrate design of visual light and electrical layout.
- Summarize concept of HVAC and thermal insulation.

### Syllabus

#### Module – I

**Water Supply:** Water requirements for different types of buildings, simple method of removal of impurities, water saving practices and their potential Service connection from mains, sump and storage tank, types and sizes of pipes, special installation in multistoried buildings. Material, types of fixtures and fitting for a contemporary bathroom, taps, quarter turn, half turn, ceramic, foam flow etc, hot water mixer, hand shower Rainwater harvesting to include roof top harvesting, type of spouts, sizes of rainwater pipes and typical detail of a water harvesting pit. **08 Hours**

#### Module – II

**Drainage:** Principles of drainage, surface drainage, shape and sizes of drains and sewers, storm water over flow chambers, methods of laying and construction of sewers.

**Traps:** Shapes, sizes, types, materials and function, Inspection chambers - sizes and construction.

**Ventilation of House drainage:** Anti siphonage pipe, system of plumbing - single stack, one pipe system, one pipe partially ventilating system and two pipe system, grey water recycling and dual plumbing.

**Types of fixtures and materials:** sinks, shower tray, shower temple, bath tub, Jacuzzi, water closets, flushing cisterns, urinals, sinks, washbasins, bidet, etc. **08 Hours**

#### Module – III

**Electrical Services: Electrical systems:** Basic of electricity- Single/Three phase supply, Protective devices in electrical installation, Earthing for safety, Types of earthing, ISI Specifications. Electrical installations in buildings, Types of wires, Wiring systems and their choice, Planning electrical wiring for building, Main and distribution boards, Principles of illumination. **08 Hours**

#### Module – IV

**Illumination and Lighting Design:** Visual tasks, Factors affecting visual tasks. Modern theory of light and colour, synthesis of light, Additive and subtractive synthesis of

colour, Luminous flux, Candle, Solid angle illumination, Utilization factor, Depreciation factor, MSCP, MHCP, Laws of illumination.

**Electrical Layout of Simple Buildings:** Electrical layout of a simple residential, school. **08 Hours**

### Module – V

**Heat Ventilation and Air Conditioning (HVAC):** Behaviour of heat propagation, thermal insulating materials and their co-efficient of thermal conductivity.

**General methods of thermal insulation:** Thermal insulation of roofs, exposed walls. **Ventilation:** Definition and necessity, system of ventilation. Principles of air conditioning Air cooling, Different systems of ducting and distribution, Essentials of air-conditioning system. **08 Hours**

### Course Outcomes:

On completion of this course, students will be able to :

- Analyze of water supply, water purifying techniques, different types of storages of water in multi-storeyed building.
- Adopt the principles of drainage, different types of traps, ventilation of house drainage and types of fixtures and materials.
- Apply the basic electrical system.
- Demonstrate the illumination and lighting design and electrical layout for different type of structures.
- Apply the concept of HVAC.

### Text Books:

1. E.R.Ambrose: “Heat pumps and Electric Heating”, John and Wiley and Sons Inc., New York, 1968.
2. R.G.Hopkinson, J.D.Kay: “The Lighting of Buildings”, Faber, and Faber, London, 1969.

### Reference Books:

1. Charangith Shah: “Water supply and sanitary engineering”, Galgotia publishers.
2. A. Kamala, D L Kanth Rao: “Environmental Engineering”, Tata McGraw-Hill publishing company limited.
3. Technical Teachers Training Institute (Madras): “Environmental Engineering”, Tata McGraw Hill publishing company limited.
4. National Building Code 2005

### E-Resources:

1. [https://en.wikipedia.org/wiki/Building\\_services\\_engineering](https://en.wikipedia.org/wiki/Building_services_engineering)
2. <https://en.wikipedia.org/wiki/HVAC>
3. [https://en.wikipedia.org/wiki/Building\\_services\\_engineering](https://en.wikipedia.org/wiki/Building_services_engineering)
4. [https://en.wikipedia.org/wiki/Architectural\\_lighting\\_design](https://en.wikipedia.org/wiki/Architectural_lighting_design)

## Construction Techniques and Practices

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVT353	4:0:0:0	4	CIE:50 SEE:50	3 hours	FE

### Course Objectives:

- To study the various construction techniques and structural systems.
- To understand techniques and practices of masonry construction, flooring and roofing.
- To have a depth knowledge of sub - structure construction.
- For studying various techniques in the construction of super structures.
- To master the knowledge required for maintaining and operating hand and power tools and various equipments used in building construction sites.

### Syllabus

#### Module – I

**CONSTRUCTION TECHNIQUES:** Load Bearing Structure - Framed Structure - Load transfer mechanism – floor system - Development of construction techniques.

**Construction methods** - Natural Buildings - Passive buildings - Intelligent(Smart) buildings - Meaning - Building automation -Case studies of residential, office buildings and other buildings in each zones. **08 Hours**

#### Module – II

**CONSTRUCTION PRACTICES** : Specifications, details and sequence of activities and construction co-ordination – Site Clearance – Marking – Earthwork - masonry – stone masonry – Bond in masonry - concrete hollow block masonry – flooring – damp proof courses – construction joints – movement and expansion joints – pre cast pavements – Building foundations – basements – temporary shed – centering and shuttering – slip forms – scaffoldings – de-shuttering forms – Fabrication and erection of steel trusses – frames – braced domes – laying brick — weather and water proof – roof finishes – acoustic and fire protection. **08 Hours**

#### Module – III

**SUB STRUCTURE CONSTRUCTION** : Techniques of Box jacking – Pipe Jacking -under water construction of diaphragm walls and basement-Tunneling techniques – Piling techniques - well and caisson - sinking cofferdam - cable anchoring and grouting - driving diaphragm walls, sheet piles - shoring for deep cutting - well points -Dewatering and stand by Plant equipment for underground open excavation. **08 Hours**

**Module – IV**

**SUPER STRUCTURE CONSTRUCTION:** Launching girders, bridge decks, off shore platforms – special forms for shells - techniques for heavy decks – in-situ pre-stressing in high rise structures, Material handling - erecting light weight components on tall structures - Support structure for heavy Equipment and conveyors - Erection of articulated structures, braced domes and space decks. **08 Hours**

**Module – V**

**CONSTRUCTION EQUIPMENT :** Selection of equipment for earth work - earth moving operations - types of earthwork equipment - tractors, motor graders, scrapers, front end loaders, earth movers – Equipment for foundation and pile driving. Equipment for compaction, batching, mixing and concreting - Equipment for material handling and erection of structures – types of cranes - Equipment for dredging, trenching, tunneling. **08 Hours**

**Course Outcomes:**

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

- know the different construction techniques and structural systems
- Understand various techniques and practices on masonry construction, flooring, and roofing.
- Plan the requirements for substructure construction.
- Know the methods and techniques involved in the construction of various types of super structures
- Select, maintain and operate hand and power tools and equipment used in the building construction sites.

**Text Books:**

1. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., “Construction Planning, Equipment and Methods”, 5th Edition, McGraw Hill, Singapore, 1995.
2. Arora S.P. and Bindra S.P., “Building Construction, Planning Techniques and Method of Construction”, DhanpatRai and Sons, 1997.
3. Varghese, P.C. “Building construction”, Prentice Hall of India Pvt. Ltd, New Delhi.

**Reference Books:**

1. Jha J and Sinha S.K., “Construction and Foundation Engineering”, Khanna Publishers, 1999.
2. Sharma S.C. “Construction Equipment and Management”, Khanna Publishers New Delhi, 2002.
3. Deodhar, S.V. “Construction Equipment and Job Planning”, Khanna Publishers, New Delhi, 2012.
4. Mahesh Varma, “Construction Equipment and its Planning and Application”, Metropolitan Book Company, New Delhi, 1983.

## Basic Material Testing Laboratory

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVL36	1:0:2:0	2	CIE:50 SEE:50	3 hours	FC

### Course Objectives:

- Ability to apply the knowledge of Mathematics and Engineering in calculating the mechanical properties of Structural Materials.
- Expertise in functioning on multi-disciplinary teams in the area of materials testing.
- Understand the techniques, skills and modern engineering tools required for testing of materials.
- Gain knowledge about professional and ethical responsibility in the area of material testing.
- Communicate effectively about the mechanical properties of materials like tensile strength, compressive strength, bending strength, and shear strength, hardness of mild steel, cast iron, wood and other construction materials.

### Syllabus

1. Tests on Fine aggregates—Specific gravity, Sieve analysis and Bulking.
2. Tests on Coarse aggregates—Specific gravity and Sieve analysis.
3. Tension test on Mild steel bars.
4. Compression test on Cast iron.
5. Torsion test on Mild Steel circular sections.
6. Bending test on Wood Under two point loading.
7. Shear Test on Mild steel.
8. Impact test on Mild Steel (Charpy and Izod).
9. Hardnesstestsonferrousandnon-ferrousmetals—Brinell’s, RockwellandVicker’s.
10. Test on Bricks and Tiles.

### Course Outcomes:

On completion of this course, the students are able to :

- Classify the materials and their materialistic properties like specific gravity, Gradation and Bulking modulus.
- Illustrate the knowledge of basic properties of materials.
- Interpret basic knowledge of mathematics, science and engineering in finding the strength in tension, compression, shear and torsion.
- Identify and solve engineering problems of structural elements subjected to flexure.

- Decide the techniques, skills, and modern engineering tools necessary for engineering applications.

**Text Books:**

1. Dr.B.CPunmia:“MechanicsofMaterialsVolume-I”,(Chapters1-3,7),Lakshmi Publications, 1<sup>st</sup>Edition, 2014, ISBN:978-81-318-0646-3.
2. F. P. Beer and E. R. Johnston: “Vector Mechanics for Engineers – Volume I- Statics”, (Chapters 1-5,7,9), Tata McGraw Hill, 9<sup>th</sup>Edition, 2011, ISBN: 0-07- 058828-7.

**E-Resources:**

1. [www.eng.mu.edu/CEEN162-Lab1-S09-Sieve-SpecificGravity.pdf](http://www.eng.mu.edu/CEEN162-Lab1-S09-Sieve-SpecificGravity.pdf)
2. [www.reviewmylife.co.uk/blog/compression-of-cast-iron-experiment](http://www.reviewmylife.co.uk/blog/compression-of-cast-iron-experiment)
3. [www.madinpoly.com/pdf/1/CE-Material%20Testing%20Lab.pdf](http://www.madinpoly.com/pdf/1/CE-Material%20Testing%20Lab.pdf)
4. [www.santarosa.edu/~yataiia/E45/Bend%20Test%20of%20wood.pdf](http://www.santarosa.edu/~yataiia/E45/Bend%20Test%20of%20wood.pdf).



## Technical Report Writing & IRDP

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVH37	1:0:2:0	2	CIE:50 SEE:50	3 hours	HSS

### Course Objectives:

The students will be able to :

- Improve the communication skills.
- Develop the art of presentation and writing effectively.
- Enhance the technical knowledge.

### Syllabus

To improve the communication and presentation skills, every student has to give a seminar on technical topics assigned by the supervisors. Each course coordinator/faculty members will be assigned with few students to guide and monitor the presentation. The presentation shall be for 15 minutes. A brief report on the seminar has to be submitted by the student to the concerned department after completion of the seminar. The report shall be signed by the supervisor and the Head of the concerned department.

The objective of the seminar is to introduce students to the major constituent of technology that is concerned with critically reading, understanding, summarizing, explaining and presenting existing technical topics. Students have to refer one or more topics that are assigned to them by their supervisors. The idea behind the seminar system is to familiarize student more extensively with the methodology of their chosen subject, allow them to develop presentation skills, and also interact with example of practical problems.

### Course Outcomes:

On completion of this course, the students are able to :

- Overcome stage fear and answer questions from audience.
- Communicate confidently and fluently.
- Comprehend and prepare reports effectively.





## Aadalitha Kannada

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18KAK38 / 18KVK38	1:0:0:0	1	CIE:50 SEE:50	1 Hours	S&H

### ಆಡಳಿತ ಕನ್ನಡ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು

- ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಆಡಳಿತ ಕನ್ನಡದ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
- ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಕನ್ನಡ ಭಾಷೆಯ ವ್ಯಾಕರಣದ ಬಗ್ಗೆ ಅರಿವು ಮೂಡಿಸುವುದು.
- ಕನ್ನಡ ಭಾಷಾ ರಚನೆಯಲ್ಲಿನ ನಿಯಮಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
- ಕನ್ನಡ ಭಾಷಾ ಬರಹದಲ್ಲಿ ಕಂಡುಬರುವ ದೋಷಗಳು ಹಾಗೂ ಅವುಗಳ ನಿವಾರಣೆ ಮತ್ತು ಲೇಖನ ಚಿಹ್ನೆಗಳನ್ನು ಪರಿಚಯಿಸುವುದು.
- ಸಾಮಾನ್ಯ ಅರ್ಜಿಗಳು, ಸರ್ಕಾರಿ ಮತ್ತು ಅರೆ ಸರ್ಕಾರಿ ಪತ್ರ ವ್ಯವಹಾರದ ಬಗ್ಗೆ ಅರಿವು ಮೂಡಿಸುವುದು.
- ಭಾಷಾಂತರ ಮತ್ತು ಪ್ರಬಂಧ ರಚನೆ ಬಗ್ಗೆ ಅಸಕ್ತಿ ಮೂಡಿಸುವುದು.
- ಕನ್ನಡ ಭಾಷಾಭ್ಯಾಸ ಮತ್ತು ಸಾಮಾನ್ಯ ಕನ್ನಡ ಹಾಗೂ ಆಡಳಿತ ಕನ್ನಡದ ಪದಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

### ಪರಿವಿಡಿ (ಪಠ್ಯಪುಸ್ತಕದಲ್ಲಿರುವ ವಿಷಯಗಳ ಪಟ್ಟಿ)

ಅಧ್ಯಾಯ - 1

ಕನ್ನಡಭಾಷೆ - ಸಂಕ್ಷಿಪ್ತ ವಿವರಣೆ.

ಅಧ್ಯಾಯ - 2

ಭಾಷಾ ಪ್ರಯೋಗದಲ್ಲಾಗುವ ಲೋಪದೋಷಗಳು ಮತ್ತು ಅವುಗಳ ನಿವಾರಣೆ.

ಅಧ್ಯಾಯ - 3

ಲೇಖನ ಚಿಹ್ನೆಗಳು ಮತ್ತು ಅವುಗಳ ಉಪಯೋಗ.

ಅಧ್ಯಾಯ - 4

ಪತ್ರ ವ್ಯವಹಾರ.

ಅಧ್ಯಾಯ - 5

ಆಡಳಿತ ಪತ್ರಗಳು.

ಅಧ್ಯಾಯ - 6

ಸರ್ಕಾರದ ಆದೇಶ ಪತ್ರಗಳು.

ಅಧ್ಯಾಯ - 7

ಸಂಕ್ಷಿಪ್ತ ಪ್ರಬಂಧ ರಚನೆ (ಪ್ರಿಸೈಸ್ ರೈಟಿಂಗ್), ಪ್ರಬಂಧ ಮತ್ತು ಭಾಷಾಂತರ.

ಅಧ್ಯಾಯ - 8

ಕನ್ನಡ ಶಬ್ದಸಂಗ್ರಹ.

**ಅಧ್ಯಾಯ - 9**

ಕಂಪ್ಯೂಟರ್ ಹಾಗೂ ಮಾಹಿತಿ ತಂತ್ರಜ್ಞಾನ.

**ಅಧ್ಯಾಯ - 10**

ಪಾರಿಭಾಷಿಕ ಆಡಳಿತ ಕನ್ನಡ ಪದಗಳು ಮತ್ತು ತಾಂತ್ರಿಕ / ಕಂಪ್ಯೂಟರ್ ಪಾರಿಭಾಷಿಕ ಪದಗಳು.

**ಆಡಳಿತ ಕನ್ನಡ ಕಲಿಕೆಯ ಫಲಿತಾಂಶಗಳು**

- ಆಡಳಿತ ಭಾಷೆ ಕನ್ನಡದ ಪರಿಚಯವಾಗುತ್ತದೆ.
- ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಕನ್ನಡ ಭಾಷೆಯ ವ್ಯಾಕರಣದ ಬಗ್ಗೆ ಅರಿವು ಮೂಡುತ್ತದೆ.
- ಕನ್ನಡ ಭಾಷಾ ರಚನೆಯಲ್ಲಿನ ನಿಯಮಗಳು ಮತ್ತು ಲೇಖನ ಚಿಹ್ನೆಗಳು ಪರಿಚಯಿಸಲ್ಪಡುತ್ತವೆ.
- ಸಾಮಾನ್ಯ ಅರ್ಜಿಗಳು, ಸರ್ಕಾರಿ ಮತ್ತು ಅರೆ ಸರ್ಕಾರಿ ಪತ್ರವ್ಯವಹಾರದ ಬಗ್ಗೆ ಅರಿವು ಮೂಡುತ್ತದೆ.
- ಭಾಷಾಂತರ ಮತ್ತು ಪ್ರಬಂಧ ರಚನೆ ಬಗ್ಗೆ ಅಸಕ್ತಿ ಮೂಡುತ್ತದೆ.
- ಕನ್ನಡ ಭಾಷಾಭ್ಯಾಸ ಮತ್ತು ಸಾಮಾನ್ಯ ಕನ್ನಡ ಹಾಗೂ ಆಡಳಿತ ಕನ್ನಡದ ಪದಗಳು ಪರಿಚಯಿಸಲ್ಪಡುತ್ತವೆ.

**ಪರೀಕ್ಷೆಯ ವಿಧಾನ :**

1. ನಿರಂತರ ಆಂತರಿಕ ಮೌಲ್ಯಮಾಪನ - CIE (Continuous Internal Evaluation):
2. ಕಾಲೇಜು ಮಟ್ಟದಲ್ಲಿಯೇ ಆಂತರಿಕ ಪರೀಕ್ಷೆಯನ್ನು 100 ಅಂಕಗಳಿಗೆ ವಿಶ್ವವಿದ್ಯಾಲಯದ ನಿಯಮಗಳು ಮತ್ತು ನಿರ್ದೇಶನದಂತೆ ನಡೆಸತಕ್ಕದ್ದು.

**ಪಠ್ಯಪುಸ್ತಕ :**

1. ಆಡಳಿತ ಕನ್ನಡ ಪಠ್ಯ ಪುಸ್ತಕ (Kannada for Administration), ಸಂಪಾದಕರು : ಡಾ.ಎಲ್. ತಿಮ್ಮೇಶ, ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ,

**ಪ್ರಕಟಣೆ :**

1. ಪ್ರಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

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## Vyavaharika Kannada

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18KAK38 / 18KVK38	1:0:0:0	1	CIE:50 SEE:50	1 Hours	S&H

### Course Objectives:

- The course will enable the students to understand Kannada and communicate in Kannada language.

### Syllabus

#### Module - 1

Vyavaharika kannada – Parichaya (Introduction to Vyavaharika Kannada).

#### Module - 2

Kannada Aksharamale haagu uchcharane ( Kannada Alfabets and Pronunciation).

#### Module - 3

Sambhashanegaagi Kannada Padagalu (Kannada Vocabulary for Communication).

#### Module - 4

Kannada Grammar in Conversations (Sambhashaneyalli Kannada Vyakarana).

#### Module - 5

Activities in Kannada.

### Course Outcomes:

- At the end of the course, the student will be able to understand Kannada and communicate in Kannada language.



## Calculus of Complex Functions And Probability Distributions (IC)

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVM41	3:0:2:0	4	CIE:50 SEE:50	3 Hours	BS

### Course Objectives:

This course will enable students to:

- Develop the knowledge of solving the statistics and probability problems by using software.
- Acquire the knowledge of calculus of complex functions.
- Obtain the knowledge of probability distributions, Markov's chains and statistical inference.

### Syllabus

#### Module – I

**R- LAB :** Introduction to R, Basic Data types, vector operations, matrix construction, lists, data frames, Elementary statistics with R- Qualitative and Quantitative data, Numerical measures, probability distributions. **07 Hours**

#### Module – II

#### Complex Variables:

Complex variables: Functions of a complex variable, derivative of complex functions. Analytic functions, Cauchy's-Riemann equations in Cartesian and polar forms (statements only), Harmonic functions, construction of analytic functions by using Milne-Thomson method - problems.

(No problems by using limits).

Complex integration: Line integrals - problems. Statements of Cauchy Theorem (No problems on verification of the theorem) and Cauchy's integral formula - problems.

**08 Hours**

#### Module – III

**Random Variables and Probability Distributions:** Discrete and continuous Random Variables, Probability density function and distributions. Binomial, Poisson, Exponential and Normal distributions. (No derivations for mean and variance)

**08 Hours**

#### Module – IV

**Joint Probability and Markov's Chains :** Joint Probability distribution of two discrete random variables. Expectations, covariance and correlation.

Probability vectors, stochastic matrices, fixed point matrices, regular stochastic matrices, Markov's Chains, higher transition probabilities, stationary distribution of regular Markov's Chains. **08 Hours**

**Module – V****Sampling and inference:**

Sampling Distribution, Testing of hypothesis, level of significance, confidence limits, test of significance of large samples, sampling of variables, Central limit theorem, confidence limits for unknown means, Students t-distribution and Chi-square tes.

**08 Hours****List of R-Lab Experiments**

Expt. No.	Experiments
1	Introduction of R-Lab and Basic operations in R-Lab.
2	Vectors Operations.
3	Matrix Operations.
4	List and Data Frame.
5	Frequency distribution of Qualitative data.
6	Frequency distribution of Quantitative data.
7	Numerical measures of frequency distributions.
8	Probability distributions.

**Course Outcomes:**

On completion of this course, the students are able to :

- Use the R- Lab to solve the various types statistical and probability problems in engineering.
- Use the concepts of analytic functions and complex integration in engineering application problems.
- Apply probability distributions in analyzing the probability models arising in engineering field.
- Apply Joint probability distributions and Markov's chains in analyzing the probability models arising in engineering field.
- Use the concept of sampling analysis in analyzing the statistical models arising in engineering field.

**Text Books:**

1. Dr. B.S. Grewal: "Higher Engineering Mathematics", (Chapters 20,26,27), Khanna Publishers, New Delhi, 42<sup>nd</sup> Edition, 2012, ISBN: 9788174091955.
2. N.P. Bali and Dr. Manish Goyal: "A Text Book of Engineering Mathematics", (Chapters : 19,21), Laxmi Publications (P) Ltd., New Delhi, 9<sup>th</sup> Edition, 2014, ISBN: 9788131808320.
3. Seymour Lipschutz and Marc Lars Lipson: "Probability", ( Chapters: 5 and 8), McGraw Hill Education (India) Private Limited, Chennai, Special Indian Edition, 2010, ISBN: 978-0-07-014622-8.

4. W.N.Venables, D.M.Smith : “An introduction to R”.

**Reference Books:**

1. Erwin Kreyszig: “Advanced Engineering Mathematics”, Wiley Pvt. Ltd., India, New Delhi, 9<sup>th</sup> Edition, 2011, ISBN 13: 9788126531356.
2. B.V. Ramana: “Higher Engineering Mathematics”, Tata McGraw – Hill Publishing Company Limited, New Delhi, 2<sup>nd</sup> Reprint, 2007, ISBN 13: 978-0-07063417-0.
3. John Verzani: “Using R for introductory Statistics”, Champan and Hall/ CRC, New York, Washington D.C., ISBN: 978-1-59327-384-2.

**E-Resources:**

1. <http://www.zums.ac.ir/ebooks/mathematics/essential-engineering-mathematic>.
2. <https://archive.org/details/AdvancedEngineeringMathematics10thEdition>
3. <https://www.r-project.org/>



## Surveying (IC)

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVI42	3:0:2:0	4	CIE:50 SEE:50	3 hours	FC

### Course Objectives:

The students will be able to:

- Learn basics of surveying and expose different technics of surveying.
- Acquire the knowledge of levelling and its methods.
- Understand the principles of tacheometry, geodetic surveying and GPS.
- Understand the concept of curve setting and its importance.
- Compute areas and volumes and use of total station.

### Syllabus

#### Module – I

**Introduction to Surveying** : Introduction to Surveying, Definition of surveying, Classification of surveying, Units of measurement, Basic principles of surveying, Precision and Accuracy.

**Chain and tape measurement** : Chain and types, Ranging of lines, Direct and indirect, Chain and tape corrections, Numerical Problems. **08 Hours**

#### Module – II

**Compass Surveying** : Meridians and bearing - Principle, working and use of Prismatic compass, Traverse – open and closed traverse, WCB and Reduced bearing, computation of included angles given the bearings of legs of a closed traverse.

**Introduction to levelling** : Principles and basic Definitions, Types of adjustments and objectives, Temporary adjustments of a dumpy level, booking of levels, Rise and Fall method and Height of Instrument method, Differential levelling, longitudinal & cross section levelling, refraction & curvature correction, reciprocal levelling. **08 Hours**

#### Module – III

**Theodolite surveying** : Theodolites and types, Uses of Theodolite, temporary and permanent adjustment, Measurement of Horizontal and Vertical angle.

**Tacheometry** : Basic principle, Types of tachometric survey, Tacheometric equation for horizontal line of sight in fixed hair method. Contouring, characteristics of contour, methods of contouring. **08 Hours**

**Module – IV**

**Curve Setting** : Simple Curves - Necessity, types, Definitions, designation of curve, elements of simple curve - settings of simple circular curve by linear method, setting out of simple curves by Rankines deflection angle method. compound and reverse curve- transition curve – Introduction to vertical curves. **08 Hours**

**Module – V**

**Areas and Volumes** : Calculation of area from cross staff surveying, Calculation of area of a closed traverse by coordinates method. Planimeter – principle of working and use of planimeter to measure areas, Computations of volumes by trapezoidal and prismatic rule.

**Total station** : Introduction to total station, uses of total station , advantages of total station. **08 Hours**

**List of Surveying Lab Experiments**

SI No.	Name of the Experiment
1.	To measure distance between two points using direct ranging.
2.	To set out perpendiculars at various points on given line using Chain, tape, cross staff and optical square.
3.	To set out rectangles, pentagon, hexagon, using tape /chain and compass.
4.	To determine difference in elevation between two points using simple and differential leveling technique. Booking of levels using both HI and Rise and Fall methods.
5.	To conduct profile leveling for water supply /sewage line and to draw the longitudinal section to determine the depth of cut and depth of filling for a given formation level.
6.	Measurement of horizontal angles with method of repetition using theodolite.
7.	Measurement of vertical angles using theodolite.
8.	To set out simple curves using linear methods – perpendicular offsets from long Chord.
9.	To set out simple curves using Rankine's deflection angles method.
10.	Exposure to use of total Station.

**Course Outcomes:**

Students will be able to

- Identify the basics involved in different types of surveying like tape, compass, levelling and Theodolite (total station).



- Recognize the skills in performing measurement of distance, angles, levelling, and curve setting.
- Develop skill to carry out tachometry, geodetic surveying wherever situation demands.
- Apply error adjustment to the recorded reading to get an accurate surveying output.
- Estimate distance between given points, area of a given plot and earthwork involved in cuttings and fillings.

**Text Books:**

1. DrBCPunmia, “SurveyingVolumel”,(Chapter1,2,3,4,6,7,9,10,11,12,13,16,18&22), Lakshmi Publications Pvt Ltd, 6<sup>th</sup> Edition, 2005,ISBN 978-81-700-8853-0
2. Dr B C Punmia, “Surveying Volume II”, (Chapter 1, 2, 3, 4, 6, 7 & 15), Lakshmi Publications Pvt Ltd, 6<sup>th</sup> Edition, 2005,ISBN 978-81-700-8853-0

**Reference Books:**

1. C Venkatramaiah,“ Text Book of Surveying”, (Chapter 1, 2, 3, 4, 5,7, 8 ,9,10,11& 12), Universities Press (India) Pvt. Ltd, 5<sup>th</sup> Edition, 1996.
2. S.K. Roy, “Fundamentals of Surveying”, (Chapter 1, 3& 19),Prentice-Hall Of India Pvt. Limited, 2004, 2<sup>nd</sup> Edition, ISBN: 81-20-312-60-0.

**e-Resources:**

1. [http://lib.uniten.edu.my/libsite/index.php?option=com\\_joomd&view=item&layout=detail&typeid=2&id=202&Itemid=790](http://lib.uniten.edu.my/libsite/index.php?option=com_joomd&view=item&layout=detail&typeid=2&id=202&Itemid=790)
2. <http://ascelibrary.org/journal/jsued2>
3. [www.survivorlibrary.com/.../engineers\\_surveying\\_instruments\\_1892.pdf](http://www.survivorlibrary.com/.../engineers_surveying_instruments_1892.pdf)



## Structural Analysis - I

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVT43	3:0:0:0	3	CIE:50 SEE:50	3 Hours	FC

### Course Objectives:

The students will be able to

- Understand the concept of different structural systems.
- Learn the analysis of arches and cables.
- Get an exposure to deformation of different structural elements.
- Learn the concept bending moment in any continuous beam and fixed beam.
- Understand strain energy method for analysis of deflection of beam and truss.

### Syllabus

#### Module - I

Introduction: Forms of structures, Conditions of equilibrium, Degree of freedom, one, two and three dimensional structural systems, Determinate and indeterminate structures, Degree of Indeterminacy.

Analysis of trusses: Method of joints and Method of sections. **08 Hours**

#### Module - II

Arches and Cables: Three hinged parabolic arches - Determination of Radial shear, normal thrust and bending moment. Two hinged parabolic arches, Analysis of cables under point load and UDL. **08 Hours**

#### Module - III

Deflection: Moment area method and Conjugate beam method applied for beams. **08 Hours**

#### Module – IV

Analysis of beams: Fixed beams, Clapeyron's theorem of three moments for continuous beams with different end conditions. **08 Hours**

#### Module - V

Deflection: Strain energy method applied to beams and trusses. **08 Hours**

### Course Outcomes:

On completion of this course, the students are able to :

- Identify different structural systems.
- Analyze the trusses by different methods.
- Determine forces and moments in arches and cables under different loading conditions.

- Compute the deflection of structural elements by different methods.
- Determine support moments for beams under different support conditions.

**Text Books:**

1. SSBhavikatti: “StructuralAnalysis-Vol.I”,(Chapters1,7,8,12),VikasPublishing House, 4<sup>th</sup> Edition, 2009, ISBN:9788125927907.
2. S Ramamrutham and R Narayan: “Theory of Structures”, (Chapters 1,4,6,9), DhanpatRai Publishing Company Private Limited, New Delhi, 9<sup>th</sup> Edition, 2014, ISBN:978-9384378103.

**Reference Books:**

1. V. N Vazirani: “Analysis Of Structures Vol. 1: Analysis, Design And Details Of Structures”, (Chapters 1,6,9), International Student Edition, Mcgraw Hill Book Co., New York, 2008, ISBN:978-8174091406.
2. ReddyC.S:“Basic Structural Analysis”,(Chapters 1,6,8),Tata Mc Graw Hill, New Delhi, 3<sup>rd</sup> Edition, 2010, ISBN:9780070702769.

**E-Resources:**

1. <http://elearning.vtu.ac.in/elcmys/13/enotes/eceem/gr.pdf>
2. [http://elearning.vtu.ac.in/elcmys/e-con/stru\\_ana/ch5/html/0004.htm](http://elearning.vtu.ac.in/elcmys/e-con/stru_ana/ch5/html/0004.htm)
3. [http://elearning.vtu.ac.in/elcmys/p2/cv42/Chapters\\_05/html/0004.htm](http://elearning.vtu.ac.in/elcmys/p2/cv42/Chapters_05/html/0004.htm)
4. <http://elearning.vtu.ac.in/elcmys/struana.html>



## Alternative Building Material and Technology

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVT441	3:0:0:0	3	CIE:50 SEE:50	3 Hours	FE

### Course Objectives:

The students will be able to:

- Understand the concept of energy, environmental and cost effectiveness in buildings.
- Identify characteristics of alternate materials.
- Recognize the technologies applied in building construction.
- Understand the masonry strength concepts.
- Recognize equipment's required for manufacture of alternate building materials.

### Syllabus

#### Module - I

Introduction: Energy in building materials, Environmental issues concerned to building materials, Global warming and construction industry, Environmental friendly and cost effective building technologies, Requirements for building of different climatic regions, Traditional building methods and vernacular architecture. **08 Hours**

#### Module - II

Alternative Building Materials: Characteristics of building blocks for walls, Stones and Laterite blocks, Bricks and hollow clay blocks, Concrete blocks, Stabilized blocks: Mud Blocks, Steam Cured Blocks, Fal-G Block sand Stone Masonry Block. **08 Hours**

#### Module - III

Alternative Building Technologies: Alternative for wall construction, Ferrocement and ferroconcrete building components, Composite beam panel roofs, Masonry vaults and domes, Alternative roofing systems, Fillerslabs. **08 Hours**

#### Module - IV

Structural Masonry: Compressive strength of masonry elements, Factors affecting compressive strength, Strength of units, prisms / wallet's and walls, Effect of brick work bond on strength, Bond strength of masonry : Flexure and shear, Elastic properties of masonry material sand masonry. **08 Hours**

#### Module - V

Equipment for Production of Alternative Materials: Machines for manufacture of concrete, Equipments for production of stabilized blocks, Moulds and methods of production of precast elements. **08 Hours**

**Course Outcomes:**

On completion of this course, the students are able to :

- Identify material properties (physical, structural) for most common and advanced building materials.
- Explain typical and potential applications of alternative building materials.
- Discuss relationship between material properties and structural form.
- Identify crucial problem areas in manufacture and applications of building materials.
- Evaluate the importance of experimental verification of material properties.

**Text Books:**

1. Alternative building methodologies for Engineers and architects, lecture notes edited: K.S.Jagadish and B.V.Venkatarama Reddy,(Chapters1-12)Indian Institute of Science, Bangalore, published by Garland Science, Edition: 4<sup>th</sup>Edition, ISBN:978-81-224-2037-1.
2. Arnold W. Hendry: "Structural Masonry",(Chapters1-5), Palgrave Macmillan, 2<sup>nd</sup> Edition, ISBN: 9780333733097.

**Reference Books:**

1. Relevant IS Codes.
2. Alternative building materials and technologies.
3. Proceedings of workshop on Alternative building material and technology, 19<sup>th</sup> to 20<sup>th</sup> December 2003@BVBCollege of Engineering and Tech.,Hubli.

**E-Resources:**

1. <http://elearning.vtu.ac.in>
2. [www.hebel.arch.ethz.ch/alternative-building-materials](http://www.hebel.arch.ethz.ch/alternative-building-materials)
3. [https://en.wikipedia.org/wiki/Alternative\\_natural\\_materials](https://en.wikipedia.org/wiki/Alternative_natural_materials)



## Advanced Concrete Technology

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVT442	3:0:0:0	3	CIE:50 SEE:50	3 hours	FE

### Course Objectives:

- To prepare the graduates as best civil engineers with an excellent comprehension of fundamentals of concrete structure at micro and macro levels .
- To study the properties of concrete making materials, tests, mix design, special concretes and various methods for making concrete.
- To study the various types of concrete and applications of different types of cement and concretes, besides keeping them abreast with latest developments in concrete technology at the National and International levels.
- To give them all inputs required to help them attain professional expertise and establish themselves as renowned concrete technologists.
- To enable them develop interest in concrete technology area and pursue academic/research assignments by providing information regarding innovative developments on special concretes, eco-friendly and smart concretes, sustainable development and bacterial concretes in concrete technology.

### Syllabus

#### Module – I

CHEMICAL ADMIXTURES AND MINERAL ADMIXTURE- Introduction, Mechanism of chemical admixture, Plasticizers and super Plasticizers and their effect on concrete property in fresh and hardened state, Marsh cone test for optimum dosage of super plasticizer, retarder, accelerator, Air-entraining admixtures, new generation super plasticiser, Fly ash, Silica fume, GCBS, and their effect on concrete property in fresh state and hardened state. **08 Hours**

#### Module – II

MIX DESIGN - Factors affecting mix design, design of concrete mix by BIS method using IS10262. Provisions in revised IS 10262-2009. **08 Hours**

#### Module – III

DURABILITY OF CONCRETE - Introduction, Permeability of concrete, chemical attack, acid attack, efflorescence, Corrosion in concrete. Thermal conductivity, thermal diffusivity, specific heat. Alkali Aggregate Reaction, IS456-2000 requirement for durability, RMC Concrete - manufacture, transporting, placing, precautions, Methods of concreting- Pumping, under water concreting, shotcrete, High volume fly ash concrete concept, properties, typical mix. **08 Hours**

**Module – IV**

SELF COMPACTING AND FIBER REINFORCED CONCRETE – Introduction, materials, tests, properties, application and Typical mix, Fibers types and properties, Behavior of FRC in compression, tension including pre-cracking stage and post-cracking stages, behavior in flexure and shear, Ferro cement - materials, techniques of manufacture, properties and application. **08 Hours**

**Module – V**

LIGHT WEIGHT CONCRETE AND TEST ON HARDENED CONCRETE-materials properties and types. Typical light weight concrete mix High density concrete and high performance concrete-materials, properties and applications, typical mix ,Effect of end condition of specimen, capping, H/D ratio, rate of loading, moisture condition. Compression, tension and flexure tests. Tests on composition of hardened concrete-cement content, original w/c ratio. NDT tests concepts-Rebound hammer, pulse velocity methods. **08 Hours**

**Course Outcomes:**

After the completion of this course the students are able to :

- Recognize substitute materials in the development of concrete
- Design different types of concrete
- Discuss the importance of durability of concrete
- Explain the basic knowledge of new emerging concrete
- Knowledge of different tests on concrete.

**Text Books:**

1. Neville, A.M - Properties Of Concrete, Longman Ltd., London, 5<sup>th</sup> Edition, Isbn 978-81-317-9107-3
2. M.S. Shetty- Concrete Technology, M.S. Shetty, S.Chand, 2005, Isbn 8121900034, 9788121900034
3. Concrete Technology- A.R. Santha kumar,-Oxford University Press.
4. Advanced Concrete Technology Processes- John Newman, Ban Seng Choo, - London.

**Reference Books:**

1. Concrete Technology- M.L Gambhir- Tata Mc Graw Hill education Pvt. Ltd New Delhi.
2. Concrete Technology- A.M Naville-JJ Brook, Pearson Education,Ltd, ISBN 81-7808-647-6



## Green Buildings

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CV443	3:0:0:0	3	CIE:50 SEE:50	3 hours	FE

### Course Objectives:

This course will enable students to :

- Understand the global and local environmental problems connected to the built environment.
- Obtain knowledge about the material embodied energy and tool for green building assessment.
- Recognize about life cycle assessment of building materials and products and thermal comfort.
- Provide the importance and utilization of solar energy in building construction.
- Obtain knowledge about the non-renewable energy with minimal intrusion to the environments, waste ,management, water consumption and water quality assessment.

### Syllabus

#### Module – I

**Introduction:** Environmental implications of buildings energy, carbon emissions, High performance green buildings; Building materials: sources, methods of production and environmental implications. Embodied Energy in Building Materials: Transportation Energy for Building Materials; Maintenance Energy for Buildings. **08 Hours**

#### Module – II

**Implications of Building Technologies Embodied Energy of Buildings:** Framed Construction, Masonry Construction. Resources for Building Materials, Alternative concepts. Recycling of Industrial and Buildings Wastes. Biomass Resources for buildings. Methods and tools for building assessment: LEED, Green globe, living building challenge. **08 Hours**

#### Module – III

**Building energy and strategies:** Low energy buildings, renewable energy systems. Economic issues and analysis, Life cycle assessment.

**Comforts in Building:** Thermal Comfort in Buildings- Issues; Heat Transfer Characteristic of Building Materials and Building Techniques. Incidence of Solar Heat on Buildings-Implications of Geographical Locations. **08 Hours**



### Module – IV

**Solar buildings:** Utility of Solar energy in buildings concepts of Solar Passive Cooling and Heating of Buildings. Low Energy Cooling. Case studies of Solar Passive Cooled and Heated Buildings. **08 Hours**

### Module – V

**Green Composites for buildings:** Concepts of Green Composites. Water Utilisation in Buildings, Low Energy Approaches to Water Management. Management of Solid Wastes. Management of Sullage Water and Sewage. Urban Environment and Green Buildings. Green Cover and Built Environment. **08 Hours**

#### Text Books:

1. K.S.Jagadish, B. U. Venkatarama reddy, K. S. Nanjunda rao: "Alternative Building Materials and Technologies", (Chapters 1-4,6), 2<sup>nd</sup> Edition, New Age International, 2007, ISBN: 978-93-859-2387-6 ,
2. Peavy, Tchobanoglous: "Environmental Engineering", Volume-2, (Chapters 6,10-12), ISBN: 0-07-049134-8.

#### Reference books:

1. Osman Attmann: "Green Architecture Advanced Technologies and Materials", (Chapters 2,4,6-9) McGraw Hill, 2010, ISBN: 9780071625012.
2. Jerry Yudelson: "Green building Through Integrated Design", (Chapters 5-7) McGraw Hill, 2009, ISBN: 9780071546010.
3. Walker, B, W. Steffen: "Global change and terrestrial ecosystems", International geosphere-biosphere programme book series, Cambridge University Press, 1996, ISBN-13: 9780521578103.



## Renewable Energy Resources

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18EET451	4:0:0:0	4	CIE:50 SEE:50	3 Hours	EE

### Course Objectives:

The students will be able to :

- Provide detailed information of the present energy scenario and the available Renewable Energy Resources.
- Get a detailed insight knowledge in basics of solar radiation geometry and various measurement techniques.
- Understand the solar energy through solar thermal devices, PV conversion and their performance analysis.
- Gain the conceptual knowledge about the various energy conversion method such as Wind, Tidal, OTEC and Geothermal.
- Give introduction to Energy from Biomass, Hydrogen energy and their impact on environment and sustainability.

### Syllabus

#### Module - I

Introduction: Energy source, India's production and reserves of commercial energy sources, need for non-conventional energy sources.

Solar Radiation : Extra-Terrestrial radiation, spectral distribution of extraterrestrial radiation, solar constant, solar radiation at the earth's surface, beam, diffuse and global radiation, solar radiation data.

Measurement of Solar Radiation: Pyrometer, shading ring pyrheliometer, sunshine recorder, schematic diagrams and principle of working. **10 Hours**

#### Module - II

Solar Radiation Geometry: Flux on a plane surface, latitude, declination angle, surface azimuth angle, hour angle, zenith angle, solar altitude angle expression for the angle between the incident beam and the normal to a plane surface (No derivation), local apparent time. Apparent motion of sun, day length, numerical examples.

Radiation Flux on a Tilted Surface: Beam, diffuse and reflected radiation, expression for flux on a tilted surface (no derivations), numerical examples.

Solar Thermal Conversion : Collection and storage, thermal collection devices, liquid flat plate collectors, solar air heaters concentrating collectors (cylindrical, parabolic, paraboloid) (Quantitative analysis). **10 Hours**

#### Module - III

Performance Analysis of Liquid Flat Plate Collectors: General description, collector geometry, selective surface (qualitative discussion) basic energy-balance equation,

stagnation temperature, transmissivity of the cover system, transmissivity – absorptivity product, numerical examples. The overall loss coefficient, correlation for the top loss coefficient, bottom and side loss coefficient, problems (all correlations to be provided). Temperature distribution between the collector tubes, collector heat removal factor, collector efficiency factor and collector flow factor, mean plate temperature, instantaneous efficiency (all expressions to be provided). Effect of various parameters on the collector performance; collector orientation, selective surface, fluid inlet temperature, number covers dust. **10 Hours**

#### Module - IV

Photovoltaic Conversion: Description, principle of working and characteristics, applications.

Wind Energy: Properties of wind, availability of wind energy in India, wind velocity and power from wind; major problems associated with wind power, wind machines; Types of wind, machines and their characteristics, horizontal and vertical axis windmills.

Tidal Power: Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, limitations.

Ocean Thermal Energy Conversion: Principle of working, Rankine cycle.

Geothermal Energy Conversion: Principle of working, types of geothermal station with schematic diagram. **10 Hours**

#### Module - V

Energy from Bio Mass: Photosynthesis, photosynthetic oxygen production, energy plantation, bio gas production from organic wastes by anaerobic fermentation, description of bio-gas plants, transportation of bio-gas, problems involved with bio-gas production, application of bio-gas, application of bio-gas in engines, advantages.

Hydrogen Energy: Properties of Hydrogen with respected to its utilization as a renewable form of energy, sources of hydrogen, production of hydrogen, electrolysis of water, thermal decomposition of water, thermo chemical production bio-chemical production. **10Hours**

#### Course Outcomes:

Upon the completion of the course, the students will be able to,

- Explain the present energy scenario and the available Renewable Energy Resources.
- Describe the basics of solar radiation geometry and various measurement techniques.
- Analyze the knowledge gained in tapping the solar energy through solar thermal devices, pvc on version and their performance analysis.
- Demonstrate the various energy conversion methods such as Wind, Tidal, OTEC and Geothermal.

- Apply knowledge of Biomass and Hydrogen energy and their impact on environment and sustainability.

**Text Books:**

1. G D Rai: "Non-Conventional Energy Sources", (Chapters 1-3,6-9,11), Khanna Publishers, 5<sup>th</sup> Edition, 2011, ISBN-13:9788174090737.
2. John Twidell and Tony Weir: "Renewable Energy Resources", (Chapters 2,5,6,7,9-14),Routledge Publisher, 3<sup>rd</sup> Edition,2015,ISBN-13:978041558437.
3. N K Bansal, "Non-Conventional Energy Resources", (Chapters 1-3,9,10,12,13), Vikas Publishing, 2014, 1<sup>st</sup> Edition, ISBN-13:978935978577

**Reference Books:**

1. BHKhan:"Non-Conventional Energy Resources",(Chapters4-10),Tata McGraw-Hill Pub., 2<sup>nd</sup> Edition, 2006, ISBN - 13: 9780070142763.
2. SPSukhatme, JKNayak:"Solar Energy",(Chapters 3,4),Tata McGraw-Hill Pub., 3<sup>rd</sup> Edition, 2008, ISBN-13:9780070260641.



# INTRODUCTION TO CYBER SECURITY AND CYBER LAWS

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18EET452	04:0:0:0	04	CIE:50 SEE:50	3 Hours	EE

## Course Objectives:

This course will enable students to :

- Understand the area of cyber security.
- Know and understand the technological aspects of Information Security.
- Understand various cyber threats.
- Understand and recognize the cyber forensics.
- Know Legal Perspectives in cyber security.

## Syllabus

### Module - I

**Introduction to Cyber crime and Information Security :** Cyber crime: Definition and Origins of the Word, Who are Cyber criminals? Classifications of Cyber crimes, Introduction to information security, Need for Information security, Threats to Information Systems. Cyber Offenses: How Criminals Plan Them: How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cyber crimes, Botnets: The Fuel for Cyber crime, Attack Vector, Cloud Computing. **11 Hours**

### Module – II

**Tools and Methods Used in Cyber crime :** Introduction, Proxy Servers , Key loggers and Spy wares, Back doors, Steganography, SQL Injection, Buffer Overflow, Attacks on Wireless Networks. Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft). Security Technology - Firewall and VPNs, Intrusion Detection, Access Control. **10 Hours**

### Module – III

**Cyber Threats :** -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail viruses, Macro viruses, Malicious Software, Network and Denial of Services Attack, DDOS, Security Threats to E-Commerce- Electronic Payment System, e- Cash, Credit/Debit Cards. Digital Signature, Public Key Cryptography. **10 Hours**

### Module – IV

**Understanding Computer Forensics :** Digital Forensics Science, The Need for Computer Forensics, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Setting up a Computer Forensics Laboratory: Understanding the Requirements, Relevance of the OSI 7 Layer Model to Computer Forensics, Challenges in Computer Forensics,

### Module – V

**Security Policies :** Security Policies, Why Policies should be developed, WWW policies, Email Security policies, Policy Review Process-Corporate policies-Sample Security Policies, Publishing and Notification Requirement of the Policies. Information Security Standards-ISO, IT Act, Copyright Act, Patent Law, IPR. Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law: Copy Right Law, Software License.

10 Hours

#### Course outcomes :

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

- Understand the basics of cyber security.
- Explain the functionalities of cyber/information security.
- Be aware of various cyber threats.
- Understanding cyber forensics.
- Describe IT Act, Suggest appropriate security countermeasures for the given scenario.

#### Text Books :

1. Sunit Belapure and Nina Godbole, “Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives”, Wiley India Pvt Ltd, ISBN: 978-81-265-21791, Publish Date 2013
2. V.K. Pachghare, “Cryptography and information Security”, PHI Learning Private Limited, Delhi India.

#### Reference Books :

1. Dr. Surya Prakash Tripathi, Ritendra Goyal, Praveen kumar Shukla ,”Introduction to Information Security and Cyber Law” Willey Dreamtech Press.
2. Thomas J. Mowbray, “Cybersecurity: Managing Systems, Conducting Testing, and Investigating Intrusions”, Copyright © 2014 by John Wiley & Sons, Inc, ISBN: 978-1-118 - 84965 -1.

#### E-Resources :

1. <https://slideplayer.com/slide/12803493/>



Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18EET453	4:0:0:0	4	CIE:50 SEE:50	3 Hours	EE

### Course Objectives:

This course will enable students to :

- Effectively use and administrate information systems in different business applications.
- Understand problem solving techniques to model information system solutions for business problems.
- Understand the usage of intranet and extranets in management information systems.
- Analyze the principles of Transaction Processing Systems.
- Understand the business and professional responsibilities related to the use of information system in Organizations.

### Syllabus

#### Module – I

**Foundations of information systems in business:** Introduction to Information Systems in Business: Why study Information Systems?, What you need to know, A global Information society, Success and Failure with IT, Why Businesses need Information Technology. Fundamentals of Information Systems: Fundamental Information System concepts: System concepts, Components of an Information System, Information System Resources, Information System activities, Overview of Information Systems: The expanding Role of Information Systems, Operations support Systems, Management support Systems, Other classifications of Information Systems.

**10 Hours**

#### Module – II

**Solving Business Problems with Information Systems:** A Systems Approach to problem Solving: The Systems approach, Defining problems and opportunities, Developing alternative solutions, Evaluating Alternative solutions, Selecting the best solution, Using the Systems approach. Developing Information System Solutions: The system development cycle, Starting the Systems Development process, Systems Analysis, Systems Design, Prototyping, Implementing a new Information System, Maintenance of Information System, Computer Aided Systems Engineering, End user development. Business applications –I The Internet, Electronic Commerce and Business: Introduction, Business use of the Internet, Interactive marketing, Business value of the Internet, Customer value and the Internet. Fundamentals of Electronic Commerce: Introduction, Foundations and applications of e-commerce, Business to Consumer and Business to Business com-merce, Electronic payments and security.

## 10 Hours

### Module – III

**Intranets, Extranets, and Enterprise Collaboration:** Intranets and Extranets in Business: Business Value, Applications and Technologies for Intranets, Role of Extranets, Enterprise Collaboration Systems: Enterprise Collaboration, Group Ware, Electronic communication and Conferencing tools, collaborative work management tools. Information Systems for Business Operations: Business Information Systems: Cross Functional Marketing, Manufacturing, Human Resources, Accounting and Financial Information Systems. **10 Hours**

### Module – IV

**Transaction Processing Systems:** Transaction Processing, Data entry, Batch and Real-time processing, Database maintenance, Document and Report generation, Inquiry processing.

#### **Business applications -II**

**Information Systems for Strategic Advantage:** Introduction, Competitive strategy, Strategic Roles for Information System, Breaking Business Barriers, Value chain and strategic Information System, Strategic Applications and Issues in information Technology, Re-engineering Business process, Improving Business quality, Becoming an agile competitor. Creating a virtual Company, Building the knowledge-creating company, Using the Internet Strategically. **11 Hours**

### Module – V

**Managing information technology:** Enterprise and global Management: Managing Information Resources and Technologies: Information Technology Architecture, Managers and Information Technology, Organizations and Information Technology, Information Resource Management, Strategic Management Operational Management, Resource Management, Technology Management, Global Information Technology Management: The International Dimension, Global IT Management, Cultural, Political and Geo-Economic challenges, The global company, Global Business and IT strategies, Global Business and IT applications, Global IT Platforms, Global data Issue, Global Systems development, You and Global IT Management, Planning. Implementing change: Planning for Business change with IT: Organizational planning, Information System planning Methodologies, The scenario approach, planning for competitive advantage, Critical success factors, Business Systems Planning, Computer Aided Planning tools, implementing business change. **11 Hours**

#### **Course Outcomes:**

On completion of this course, students will able to:



- Describe the roles and functionalities of information system.
- Analyze types of solutions for business and its applications.
- Analyze the usage of Intranet and Extranet in business applications.
- Describe database management and competitive strategic approach of information systems in business applications.
- Describe various approaches in managing information technology.

**Text Books:**

1. James O'Brien, George Marakas: "Management Information System", 10th Edition, McGraw Hill Education, 2010, ISBN-13: 978-0-07-337681-3, ISBN: 0-07337681-7.
2. M V Gandhi, B S Thomson: "Smart Materials and Structures", (Chapters 13-75), 1st Edition, Chapman and Hall Pub., 1992, ISBN-13: 9780412370106.

**Reference Books:**

1. Kenneth C. Laudon and Jane P. Laudon: "Management Information System, Managing the Digital Firm", 11th Edition, Pearson Education, 2006.
2. Steven Alter: "Information Systems-The Foundation of E-Business", 4th Edition, Pearson Education, 2002.

**E-Resources:**

1. [https://books.google.co.in/books/about/Management\\_Information\\_System.html](https://books.google.co.in/books/about/Management_Information_System.html).
2. <http://www.pearsoned.co.uk/bookshop>



## **Environmental Air Pollution**

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18EET454	4:0:0:0	4	CIE:50 SEE:50	3 Hours	EE

### Course Objectives:

- The fundamentals of air pollution with a background on historical perspective on air pollution and current air quality policies and standards.
- Major air pollutants, their sources and their effects (environmental, economic and health) and how emissions are estimated from road traffic and industrial sources.
- Dispersion of air pollutants in the atmosphere.
- To analyze and present outputs of air quality models to a wide range of audiences.
- Different air quality monitoring equipments.

### Syllabus

#### Module - I

Introduction: Definition – Classification and Characterization of Air Pollutants, Emission Sources, Behaviour and Fate of air pollutants, Chemical Reactions in the Atmosphere, Photo-chemical Smog, Coal-induced Smog.

Effects of Air Pollution: On Human Health, Animals, Plants and Materials – Major Environmental Air Pollution Episodes–London Smog, Los Angeles Smog and Bhopal Gas Tragedy.

**08 Hours**

#### Module - II

Meteorology: Introduction – Meteorological Variables, Primary and Secondary Lapse Rate, Inversions, Stability Conditions, Windrose, General Characteristics of Stack Plumes, Meteorological Models. Factors to be considered in Industrial Plant Location and Planning, Noise pollution sources, measurement units, effects and control.

**10 Hours**

#### Module - III

Sampling, Analysis and Control: Sampling and Measurement of Gaseous and Particulate matter, Stack Sampling, Analysis of Air Pollutants, Smoke and Smoke Measurement.

Air Pollution Control Methods: Particulate, Emission Control, Gravitational Settling Chambers, Cyclone Separators, Fabric Filters, Electrostatic Precipitators, Wet Scrubbers, Selection of a Particulate Collecting Equipment.

**10 Hours**

#### Module - IV

Control of Gaseous Emissions, Adsorption by Liquids, Adsorption by Solids,

Combustion Odors and their control.

Air Pollution due to Automobiles: Air Pollution due to Gasoline Driven and Diesel Driven Engines, Effects, Direct and Indirect Methods of control. **10 Hours**

### Module - V

Burning Environmental Issues: Acid Rain, Global Warming, Ozone Depletion in Stratosphere, Indoor Air Pollution.

Environmental Legislation: Environmental Policy, Environmental Acts, Water, Air and Noise Pollution Standards. **10 Hours**

### Course Outcomes:

On completion of this course, the students are able to :

- Examine emission standards for industrial and other sources.
- Identify air pollution concentrations as a function of emission, meteorology, topography and the built environment.
- Discuss impact of air pollution on health of humans, animals, plants and materials.
- Identify different equipments for air quality monitoring and control.
- Distinguish between global and local effects of air pollution as well to recognize the legal aspects associated with air pollution.

### Text Books:

1. Rao M.N. and Rao H.V.N: "Air Pollution", (Chapters 1-6), Tata- McGraw- Hill Publishing Company Ltd., New Delhi, India, 2011, ISBN 13: 978-0074518717.
2. Anjaneyulu Y: "Air Pollution and control Technologies", (Chapters 2-5), Allied Publishers, Delhi, 2012, ISBN- 13: 9788177641844.
3. Rao C.S: "Environmental Pollution Control Engineering", (Chapters 2-6), New age International Publishers, New Delhi, 2<sup>nd</sup> Edition, 2013, ISBN- 13: 978-8122418354.

### References Books:

1. Gilbert M Masters: "Introduction To Environmental Engineering and Science", (Chapters 1-4), Pearson Education, 3<sup>rd</sup> Edition, 2007, ISBN-13: 978-0131481930.
2. Mahajan.S.P: "Pollution Control in Process Industries", (Chapters 1-5), Tata McGrawHill Publishing Co., New Delhi, 2010, ISBN-13: 978-0074517727.

### E-Resources:

1. <http://nptel.ac.in/courses/105102089/>
2. <http://nptel.ac.in/courses/105104099/>
3. [nptel.ac.in/courses/103107084/module1/lecture1/lecture1.pdf](http://nptel.ac.in/courses/103107084/module1/lecture1/lecture1.pdf)

## Building Planning And Drawing(IC)

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVI46	3:0:2:0	4	CIE:50 SEE:50	3 hours	FC

### Course Objectives:

Students will be able to :

- Understand the principles of planning and bylaws.
- Draw plan, Elevation and section of Residential building.
- Study the functional planning of school building, office building etc.
- Prepare detailed working drawing for doors, windows, footing, staircase etc.
- Understand Electrical, water supply and sanitary services for a residential building.

### Syllabus

#### Module – I

**Conventions and symbols :** Convention as per IS 962:1989, symbols for different materials such as earthwork, brickwork, stone work, concrete, woodwork and glass used in civil engineering. Symbols for doors and windows, abbreviations, symbols for sanitary and electrical installation.

**Scales :** Types of scales, criteria for proper selection for scales for various types of drawing.

**Foundation :** Definition of technical terms, R.C.C isolated column footing and stepped wall footing - drawings. **08 Hours**

#### Module – II

**Stairs, Doors And Windows :** Definition of technical terms, Requirements of ground stair, Types of Stairs, Geometrical design of RCC Dog legged and open well stairs. Location of doors and windows, Definition of technical terms, Types of Doors, Types of windows, Varieties of materials for doors and windows & their properties. **08 Hours**

#### Module – III

**Functional Design Of Building :** Design of Residential, Public and Industrial, positioning of various components of buildings, orientation of buildings, building standards, bye laws, set back distances and calculation of carpet area, plinth area and floor area ratio. **08 Hours**

#### Module – IV

Development of plan, elevation, section and schedule of openings from the given

line diagram of buildings using Auto CAD i) Single storied building ii) Two storey building iii) Office building. iv) primary school building. **08 Hours**

### Module – V

For a given single line diagram, preparation of water supply, sanitary and electrical layouts. **08 Hours**

### List of experiments

Sl No	Name of the Experiments
1	Basics of AUTOCAD.
2	Stepped wall Footing.
3	R.C.C Column Footing.
4	Plan, Elevation & Section of Doors.
5	Plan, Elevation & Section of Windows.
6	Plan, Elevation & Section of Dog Legged staircase.
7	Plan, Elevation & Section of Single roomed building.
8	Plan , Elevation & Section of 2BHK Residential Building.
9	Plan , Elevation & Section of Public Building.

### Course Outcomes:

On completion of the course the students will be able

- Illustrate the knowledge of symbols and foundations.
- Recognize principles of planning and bylaws used for building planning
- Develop plan for School Building, College canteen.
- Develop plan, elevation and section for various residential buildings.
- Illustrate the knowledge of electrical, water supply and sanitary services for a residential building.

### Text Book:

1. “Building Drawing”, Shah M.H and Kale C.M, Tata McGraw Hill Publishing co. Ltd., New Delhi.

### Reference Books:

1. “Building Construction”, Gurucharan Singh, Standard Publishers & distributors, New Delhi.
2. National Building Code, BIS, New Delhi.

### e-Resources:

1. [http://bbmp.gov.in/documents/10180/504904/Zoning\\_Regulations\\_RMP2015f](http://bbmp.gov.in/documents/10180/504904/Zoning_Regulations_RMP2015f).

pdf/0a916060-b198-4903-b7cd-d18db7096ebdhttp://moud.gov.in/model-building bye laws bbmp.

2. <https://www.jntubook.com/building-planning-drawing-textbook-free-download>
3. <http://www.avlib.in/ebook/title/building-drawing-by-shah-and-kale.html>
4. <http://pdfsu.com/book.php?q=Two%20Storey%20Autocad%20Building%20Drawing%20-%20clumagz.info>



## Career Skill Development Programme

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CVH47	1:2:0:0	2	CIE:50 SEE:50	2 Hours	HSS

### Course Objectives:

The students will be able to :

- Improve the communication skills.
- Develop the art of presentation and writing effectively.
- Enhance the technical knowledge.

### Syllabus

To improve the communication and presentation skills, every student has to give a seminar on technical topics assigned by the supervisors. Each course coordinator/faculty members will be assigned with few students to guide and monitor the presentation. The presentation shall be for 15 minutes. A brief report on the seminar has to be submitted by the student to the concerned department after completion of the seminar. The report shall be signed by the supervisor and the Head of the concerned department.

The objective of the seminar is to introduce students to the major constituent of technology that is concerned with critically reading, understanding, summarizing, explaining and presenting existing technical topics. Students have to refer one or more topics that are assigned to them by their supervisors. The idea behind the seminar system is to familiarizes tu dent more extensively with theme t of their chosen subject, allow them to develop presentation skills, and also interact with example of practical problems.

### Course Outcomes:

On completion of this course, the students are able to :

- Over come stage fear and answer questions from audience.
- Communicate confidently and fluently.
- Comprehend and prepare reports effectively.



## **Constitution of India, Professional Ethics & Human Rights**

Course Code	L:T:P:S	Credits	Exam marks	Exam Duration	Course Type
18CPH48	1:0:0:0	1	CIE:50 EE:50	3 hours	HSS

### **Course Objectives:**

The students will be able to :

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.
3. To understand human rights and its implications

### **Syllabus**

#### **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 & its limitations.

#### **Module - 2**

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

#### **Module -3**

State Executives – Governor Chief Minister, State Legislature High Court of State.

Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th & 91st Amendments.

#### **Module -4**

Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India Powers and functions of Municipalities, Panchyats and Co - Operative Societies.

#### **Module - 5**

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



### Course Outcomes:

On completion of this course, the students are able to :

- Have general knowledge and legal literacy and thereby to take up competitive examinations
- Understand state and central policies, fundamental duties
- Understand Electoral Process, special provisions
- Understand powers and functions of Municipalities, Panchayats and Co-operative Societies, and
- Understand Engineering ethics and responsibilities of Engineers.

### Text Books:

1. Durga Das Basu: **“Introduction to the Constitution on India”**, (Students Edn.) Prentice –Hall EEE, 19<sup>th</sup> / 20<sup>th</sup> Edn., 2001
2. Charles E. Haries, Michael S Pritchard and Michael J. Robins **“Engineering Ethics”** Thompson Asia, 2003-08-05.

### Reference Books:

1. M.V.Pylee, **“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. Brij Kishore Sharma, **“Introduction to the Constitution of India”**, PHI Learning Pvt. Ltd., New Delhi, 2011.
4. Latest Publications of Indian Institute of Human Rights, New Delhi.

