Course No.	Course Name	L-T-P - Credits	Year of Introduction
MA201	LINEAR ALGEBRA AND COMPLEX ANALYSIS	3-1-0-4	2016

Prerequisite : Nil

Course Objectives

COURSE OBJECTIVES

- To equip the students with methods of solving a general system of linear equations.
- To familiarize them with the concept of Eigen values and diagonalization of a matrix which have many applications in Engineering.
- To understand the basic theory of functions of a complex variable and conformal Transformations**.**

Syllabus

Analyticity of complex functions-Complex differentiation-Conformal mappings-Complex integration-System of linear equations-Eigen value problem

Expected outcome .

At the end of the course students will be able to
(i) solve any given system of linear equations
(ii) find the Eigen values of a matrix and how to diagonalize a matrix
(iii) identify analytic functions and Harmonic functions.
(iv)evaluate real definite Integrals as application of Residue Theorem
(v) identify conformal mappings(vi) find regions that are mapped under certain Transformations

Text Book:

Erwin Kreyszig: Advanced Engineering Mathematics, 10th ed. Wiley

References:

1.Dennis g Zill&Patric D Shanahan-A first Course in Complex Analysis with Applications-Jones&Bartlet Publishers
2.B. S. Grewal. Higher Engineering Mathematics, Khanna Publishers, New Delhi.
3.Lipschutz, Linear Algebra,3e **(** Schaums **Series)**McGraw Hill Education India 2005
4.Complex variables introduction and applications-second edition-Mark.J.Owitz-Cambridge Publication

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Complex differentiation Text 1[13.3,13.4] Limit, continuity and derivative of complex functions	3	
	Analytic Functions	2	
	Cauchy–Riemann Equation(Proof of sufficient condition of analyticity & C R Equations in polar form not required)-Laplace's Equation	2	
	Harmonic functions, Harmonic Conjugate	2	15%
II	Conformal mapping: Text 1[17.1-17.4] Geometry of Analytic functions Conformal Mapping,	1	
	Mapping $w = z^2$ conformality of $w = e^z$.	2	15%

	The mapping $w = z + \frac{1}{z}$ Properties of $w = \frac{1}{z}$ Circles and straight lines, extended complex plane, fixed points Special linear fractional Transformations, Cross Ratio, Cross Ratio property-Mapping of disks and half planes Conformal mapping by $w = \sin z$ & $w = \cos z$ (Assignment: Application of analytic functions in Engineering)	1 3 3	
FIRST INTERNAL EXAMINATION			
III	Complex Integration. Text 1[14.1-14.4] [15.4&16.1] Definition Complex Line Integrals, First Evaluation Method, Second Evaluation Method Cauchy's Integral Theorem(without proof), Independence of path(without proof), Cauchy's Integral Theorem for Multiply Connected Domains (without proof) Cauchy's Integral Formula- Derivatives of Analytic Functions(without proof)Application of derivative of Analytical Functions Taylor and Maclaurin series(without proof), Power series as Taylor series, Practical methods(without proof) Laurent's series (without proof)	2 2 2 2 2	15%
IV	Residue Integration Text 1 [16.2-16.4] Singularities, Zeros, Poles, Essential singularity, Zeros of analytic functions Residue Integration Method, Formulas for Residues, Several singularities inside the contour Residue Theorem. Evaluation of Real Integrals (i) Integrals of rational functions of $\sin\theta$ and $\cos\theta$ (ii)Integrals of the type $\int_{-\infty}^{\infty} f(x)dx$ (Type I, Integrals from 0 to ∞) (Assignment : Application of Complex integration in Engineering)	2 4 3	15%
SECOND INTERNAL EXAMINATION			
V	Linear system of Equations Text 1(7.3-7.5) Linear systems of Equations, Coefficient Matrix, Augmented Matrix Gauss Elimination and back substitution, Elementary row operations, Row equivalent systems, Gauss elimination-Three possible cases, Row Echelon form and Information from it.	1 5	20%

	Linear independence-rank of a matrix Vector Space-Dimension-basis-vector space $\mathbf{R}^3$ Solution of linear systems, Fundamental theorem of non-homogeneous linear systems(Without proof)-Homogeneous linear systems (Theory only	2 1	
VI	Matrix Eigen value Problem Text 1.(8.1,8.3 &8.4) Determination of Eigen values and Eigen vectors-Eigen space Symmetric, Skew Symmetric and Orthogonal matrices –simple properties (without proof) Basis of Eigen vectors- Similar matrices Diagonalization of a matrix-Quadratic forms- Principal axis theorem(without proof) (Assignment-Some applications of Eigen values(8.2))	3 2 4	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks : 100 Exam Duration: 3 hours

The question paper will consist of 3 parts.

Part A will have 3 questions of 15 marks each uniformly covering modules I and II. Each question may have two sub questions.

Part B will have 3 questions of 15 marks each uniformly covering modules III and IV. Each question may have two sub questions.

Part C will have 3 questions of 20 marks each uniformly covering modules V and VI. Each question may have three sub questions.

Any two questions from each part have to be answered.

Course No.	Course Name	L-T-P – Credits	Year of Introduction
CE201	MECHANICS OF SOLIDS	3-1-0-4	2016

Pre requisite: BE 100 Engineering Mechanics

Course Objectives: To enable the students to calculate stresses and strains generated in material due to external loads for various types of loading conditions

Syllabus: Concept of stress. Concept of strain. Stress-strain relations. Calculating internal forces (Normal force, shear force and bending moment diagrams) Behavior of axially loaded members. Behavior of members subjected to bending moments. Behavior of circular members subjected to Torsion. Shear stresses in beams. Transformation of plane stresses. Mohr circle. Concept of design of beams. Buckling of columns. Indeterminacy.

Expected outcome .

1. Ability to calculate internal forces in members subject to axial loads, shear, torsion and bending and plot their distributions
2. Ability to calculate normal, shear, torsion and bending stresses and strains
3. Ability to transform the state of stress at a point and determine the principal and maximum shear stresses using equations as well as the Mohr's circle
4. Understanding of column buckling and ability to calculate critical load and stress

Text Books:

1. Timoshenko , Strength of Materials Vol. I & Vol. II , CBS Publishers & Distributers, New Delhi
2. Rattan, Strength of Materials 2e McGraw Hill Education India 2011

Data Book (Approved for use in the examination): Nil

References:

1. Crandall, An Introduction to Mechanics of Solids 3e McGraw Hill Education India 2014
2. Egor P Popov , Mechanics of solids, Prentice Hall of India, New Delhi
3. M.L. Gambhir, Fundamentals of structural Mechanics and analysis, Prentice Hall India
4. Stephen H Crandall, N C Dahi, Thomas J L, M S Sivakumar, an introduction to Mechanics of Solids , McGraw hill Education, 3rd edition
5. Cheng, Statics and Strength of Materials 2e McGraw Hill Education India 2013
6. Hearn E.J., *Mechanics of Materials*, Pergamon Press, Oxford
7. Nash W A, Strength of Materials (SIE) (Schaum's Outline Series) 5e McGraw Hill Education India 2010
8. Rajput R.K. Strength of Materials, S.Chand&company Ltd., New Delhi
9. James M Gere & Stephen P Timoshenko , Mechanics of Materials , CBS Publishers & Distributers, New Delhi
10. Punmia B. C., A. K. Jain and A. K. Jain, Mechanics of Materials, Laxmi Publications(P) Ltd, New Delhi

Course Plan			
Module	**Contents**	**Hours**	**Sem. Exam Marks**
I	**Review of Statics** Types of external loads - internal stresses - normal and shear stresses - strain - Hooke's law - working stress - stress strain diagrams - Poisson's ratio - relationship between elastic constants	9	15%
II	Elongation of bars of constant and varying sections – statically indeterminate problems in tension and compression –Temperature effects – strain energy and complementary energy-strain energy due to tension, compression and shear	9	15%
FIRST INTERNAL EXAMINATION			
III	**Bending Moment & Shear force:** Different types of beams- various types of loading –Relationship connecting intensity of loading , shearing force and bending moment- shear force and bending moment diagrams for cantilever beams and Simply supported beams for different types of loading.	9	15%
IV	**Stresses in beams of symmetrical cross sections:** Theory of simple bending –assumptions and limitations – Normal stresses in beams- Moment of resistance - beams of uniform strength - beams of two materials – strain energy due to bending - shearing stresses in beams.	9	15%
SECOND INTERNAL EXAMINATION			
V	**Analysis of stress and strain on oblique sections:** Stress on inclined planes for axial and biaxial stress fields - principal stresses - Mohr's circle of stress **Thin and Thick Cylinders:** Stresses in thin cylinders – thick cylinders - Lame's equation – stresses in thick cylinders due to internal and external pressures **Torsion:** Torsion of solid and hollow circular shafts.-Pure shear- strain energy in pure shear and torsion. **Springs**: Close coiled and open coiled helical springs.	9	20%
VI	**Deflection of statically determinate beams:** Differential equation of the elastic curve - Method of successive integration, Macaulay's method, Method of superposition, moment area method. **Theory of columns:** Direct and bending stresses in short columns- Kern of a section. Buckling and stability-Euler's buckling/crippling load for columns with different end conditions- Rankine's formula	11	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN (End semester exam)

Maximum Marks: 100 Exam Duration: 3 Hrs

The question paper shall have three parts.

Part A -Module I & II : Answer 2 questions out of 3 questions (15 marks each)

Part B - Module III & IV: Answer 2 questions out of 3 questions (15 marks each)

Part C - Module V & VI: Answer 2 questions out of 3 questions (20 marks each)

Note: 1.Each part should uniformly cover the two modules in that part.

2. Each question can have a maximum of 4 subdivisions (a,b,c,d), if needed.

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Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE203	FLUID MECHANICS - I	3-1-0-4	2016

Pre requisite : Nil

Course Objectives

1. To understand the basic properties of the fluid, fluid statics, kinematics, and fluid dynamics so as to analyse and appreciate the complexities involved in solving the fluid flow problems.
2. To give an introduction to the fundamentals of fluid flow and its behavior so as to equip the students to learn related subjects and their applications in the higher semesters.
3. To develop the skill for applying the fluid statics, kinematics and dynamics of fluid flow concepts for solving civil engineering problems.

Syllabus

Fluid Statics, Fluid pressure, Buoyancy and floatation, Fluid Kinematics, Dynamics of fluid flow, Flow through orifice and notches, Flow through pipes, Boundary layer, Drag and lift on Immersed bodies

Course Outcomes:

1. Students will be able to get a basic knowledge of fluids in static, kinematic and dynamic equilibrium, so as to solve real life problems in fluid mechanics.
2. Students will gain the knowledge of the applicability of physical laws in addressing problems in hydraulics.

Text Books

1. Modi P. N. and S. M. Seth, Hydraulics & Fluid Mechanics, S.B.H Publishers, New Delhi, 2002.
2. Subramanya K., Theory and Applications of Fluid Mechanics, Tata McGraw-Hill, 1993.

References

1. Streeter.V.L. Fluid Mechanics, Mc Graw Hill Publishers.
2. Bruce R Munson, Donald F Young . Fundamentals of Fluid Mechanics, John Wiley & sons, 2011.
3. Jain A. K., Fluid Mechanics, Khanna Publishers, Delhi, 1996.
4. Joseph Katz, Introductory Fluid Mechanics, Cambridge University Press, 2015
5. Arora.K.R. Fluid Mechanics, Hydraulics and Hydraulic Machines, Standard Publishers, 2005.
6. Narasimhan S., A First Course in Fluid Mechanics, University Press (India) Pvt. Ltd., 2006.
7. Frank.M.White, Fluid Mechanics, Mc Graw Hill, 2013.
8. Mohanty.A.K. Fluid Mechanics, Prentice Hall, New Delhi, 2011
9. Narayana Pillai,N. Principles of Fluid Mechanics and Fluid Machines, University Press, 2011.
10. Kumar.D.N. Fluid Mechanics and Fluid power Engineering, S.K.Kataria & sons, 2013.

COURSE PLAN			
Module	**Contents**	**Hours**	**Sem. Exam Marks %**
I	Fluid properties - density – specific gravity - surface tension and capillarity - vapour pressure - viscosity and compressibility - Classification of Fluids (No questions to be asked) . Fluid statics: Fluid pressure, variation of pressure in a fluid, measurement of pressure using manometers- simple manometers, differential manometers, Pressure head. Forces on immersed plane and curved surfaces. Pressure distribution diagram for vertical surfaces, Practical application of total pressure (spillway gates). Buoyancy and Floatation: Buoyant force, stability of floating and submerged bodies, metacentre and metacentric height, Analytical and experimental determination of metacentric height.	8	15
II	Kinematics of fluid flow: Methods of describing fluid motion, Lagrangian and Eulerian methods, Types of fluid flow: steady and unsteady flow, uniform and non-uniform flow, one, two and three dimensional flow, laminar and turbulent flow, rotational and irrotational flow. Types of flow lines: stream line, path line, streak lines, conservation of mass, equation of continuity in one, two and three dimensions, (Derivation in Cartesian co-ordinate system only) Velocity & Acceleration of fluid particle, convective and local acceleration, Deformation of fluid elements: circulation and vorticity, velocity potential, stream function, equipotential lines, flow net, uses of flow net; Vortex motion, free and forced vortex (no problems).	8	15
FIRST INTERNAL EXAMINATION			
III	Dynamic of fluid flow: Euler's equation of motion and integration of Euler's equation of motion along a streamline. Bernoulli's Equation, Energy correction factors, Applications of Bernoulli's equation : Pitot tube, Venturimeter and orifice meter. Momentum Principle- Steady flow momentum equation- Momentum correction factor, Force computation on a pipe bend	8	15
IV	Flow through orifices: Different types of orifices, Flow over a sharp edged orifice, Hydraulic coefficients – Experimental determination of these	8	15

	coefficients, flow through large rectangular orifice, Flow through submerged orifices, flow under variable heads, time of emptying. Flow over weirs: flow over rectangular, triangular and trapezoidal sharp crested weir, Cipolletti weir, Broad crested weir, Submerged weirs, Proportional weir.		
SECOND INTERNAL EXAMINATION			
V	Flow through pipes: Viscous flow - Shear stress, pressure gradient relationship - laminar flow between parallel plates - Laminar flow through circular tubes (Hagen Poiseulle's Eqn) - Hydraulic and energy gradient - flow through pipes - Darcy -Weisbach's equation - pipe roughness -friction factor- Moody's diagram- Major and minor losses of flow in pipes - Pipes in series and in parallel.	12	20
VI	Boundary layer theory-no slip condition, boundary layer thickness, boundary layer growth over long thin plate, laminar, turbulent boundary layer, laminar sub layer, Momentum integral equation of boundary layer (no derivation), Blasius boundary layer equations for laminar and turbulent boundary layer. Drag and lift on Immersed bodies-Pressure drag and friction drag, profile drag, Drag and lift co-efficient-computation of drag on a flat plate. Separation of boundary layer and control.	12	20
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN (End semester exam)

Maximum Marks: 100 Exam Duration: 3 Hrs

The question paper shall have three parts.

Part A - Module I & II : Answer 2 questions out of 3 questions (15 marks each)

Part B - Module III & IV: Answer 2 questions out of 3 questions (15 marks each)

Part C - Module V & VI: Answer 2 questions out of 3 questions (20 marks each)

Note: 1.Each part should uniformly cover the two modules in that part.

2. Each question can have a maximum of 4 subdivisions (a,b,c,d), if needed.

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Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE205	ENGINEERING GEOLOGY	3-0-1-4	2016

Prerequisite: NIL

Course Objectives

Awareness about earth resources and processes to be considered in various facets of civil engineering

1. Appreciation of surface of earth as the fundamental foundation structure and the natural phenomena that influence its stability

Syllabus :

Relevance of geology in Civil Engineering. Subdivisions of Geology. Interior of the earth. Weathering, its engineering significance and laboratory tests used in civil engineering. Soil profile.
Hydrogeology-occurrence of groundwater, Types of aquifers and their properties. Engineering significance of subsurface water in construction. Methods to control of subsurface water.
Minerals- Properties that affect the strength of minerals. Physical properties and chemical composition of common rock forming minerals
Earth quakes- in relation to internal structure of earth and plate tectonics
Types of rocks. Brief account of selected rocks. Rock features that influence the strength of rocks as construction material. Rock types of Kerala. Engineering properties of rocks.
Attitude of geological structures- strike and dip. Deformation structures and their engineering significance. Geological factors considered in the construction of engineering structures.
Introduction to natural hazards and their management. Coastal Processes and protection strategies. Soil erosion and conservation measures.

Expected Outcomes:

1. The course would help the student to understand of the factors that determine the stability of earth's surface
2. The student would comprehend better the earth resources used as building materials

Text Books / References:

1. Duggal, SK,Rawal,N and Pandey, HK (2014) Engineering Geology, McGraw Hill Education, New Delhi
2. Garg, SK (2012) Introduction to Physical and Engineering Geology, Khanna Publishers, New Delhi
3. Gokhale, KVGK (2010) Principles of Engineering Geology, BS Pubications, Hyderabad
4. Kanithi V (2012) Engineering Geology, Universities Press (India) Ltd., Hyderabad
5. Singh, P (2004) Engineering and General Geology, S. K. Kataria and Sons, New Delhi
6. Bennison, GM, Olver, PA and Moseley, KA (2013) An introduction to geological structures and maps, Routledge, London
7. Gokhale, NW (1987) Manual of geological maps, CBS Publishers, New Delhi

COURSE PLAN			
Module	**Contents**	**Hours**	**End Sem.Exam Marks %**
I	Relevance of geology in Civil Engineering. Subdivisions of Geology. Weathering, types and its engineering significance. Laboratory tests used in civil engineering for assessing intensity of weathering. Engineering classification of weathered rock masses. Soil profile. Geological classification of soils.	8	15
II	Hydrogeology-occurrence of groundwater, Types of aquifers, permeability / hydraulic conductivity. Engineering significance of subsurface water-problems created in construction, as an erosional agent. Methods to control of subsurface water-barriers and liners, drains and wells.(Resistivity survey of groundwater may be demonstrated)	11	15
FIRST INTERNAL EXAMINATION			
III	Minerals- Properties that affect the strength of minerals. Physical properties and chemical composition of following minerals -quartz, feldspars (orthoclase and plagioclase), micas (biotite and muscovite), amphibole (hornblende), pyroxene (augite and hypersthene), gypsum, calcite, clay minerals (kaolinite), their chemical formulae. Earth quakes- in relation to internal structure of earth and plate tectonics	8	15
IV	Rocks as aggregates of minerals. Basic concepts-igneous, sedimentary and metamorphic rocks, Brief account of following rocks- granite, basalt, sandstone, limestone, shale, marble and quartzite. Rock features that influence the strength of rocks as construction material-concepts of lineation and foliation-schistosity and gneissosity. Rock types of Kerala. Brief account of engineering properties of rocks used as construction material (building and foundation) and road aggregates. Assessment of these properties.(Students should be taught to identify common rock forming minerals and common rocks based on their physical properties).	10	15
SECOND INTERNAL EXAMINATION			
V	Attitude of geological structures- strike and dip. Brunton compass. Deformation structures and	11	20

	their engineering significance- folds, faults and joints. Geological factors considered in the construction of dams and reservoirs, tunnels. (Simple exercises based on geological/topographic maps for determination of dip, apparent dip and thickness of lithological beds and preparation of geological cross sections should be performed. The students should be instructed in handling clinometer/Brunton compass to determine strike and dip)		
VI	Introduction to natural hazards-Mass movements (Landslides), floods, their common management strategies. Coastal Processes- waves, currents and landforms. Types of coastal protection strategies. Soil erosion- causes and types and soil conservation measures.	8	20
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN (End semester exam)

Maximum Marks :100 Exam Duration: 3 Hrs

The question paper shall have three parts.

Part A -Module I & II : Answer 2 questions out of 3 questions (15 marks each)

Part B - Module III & IV: Answer 2 questions out of 3 questions (15 marks each)

Part C - Module V & VI : Answer 2 questions out of 3 questions (20 marks each)

Note : 1.Each part should uniformly cover the two modules in that part.

2. Each question can have a maximum of 4 subdivisions (a,b,c,d), if needed.

Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE207	SURVEYING	3-0-0-3	2016

Prerequisite : Nil

Course objectives:

- To introduce the principle of surveying
- To impart awareness on the various fields of surveying and types of instruments
- To understand the various methods of surveying and computations

Syllabus: Basics of Surveying, Levelling and Contouring, Area and Volume Computation, Theodolite Survey, Mass Diagram, Triangulation, Theory of Errors, Electronic Distance Measurement, Total Station Survey

Course Outcomes: After successful completion of the course, the students will possess knowledge on the basics of surveying and different methods of surveying

Text Books :

1. Prof. T.P.Kenetkar & Prof.S.V.Kulkarni - Surveying and Levelling , Pune Vidyarthi Griha Prakashan,2004
2. N N Basak, Surveying and Levelling, Mc GrawHill Education

References :

1. R.Agor - A Text book of Surveying and Levelling, Khanna Publishers, 2005
2. C. Venkatramaiah, Textbook of Surveying, Universities Press (India) Private Limited 2011
3. James M Andersen, Edward M Mikhail, Surveying Theory and Practice, McGraw Hill Education
4. Dr. B.C.Punmia , Ashok Kumar Jain &Arun Kumar Jain - Surveying , Laxmi publications (P)Ltd , 2005
5. S.K.Duggal - Surveying Vol. I, Tata Mc Graw Hill Ltd ,Reprint 2015.

COURSE PLAN			
Module	**Contents**	**Hours**	**Sem.Exam Marks %**
I	**Introduction to Surveying-** Principles, Linear, angular and graphical methods, Survey stations, Survey lines- ranging, Bearing of survey lines, Local attraction, Declination, Dip, Latitude and Departure, Methods of orientation, Principle of resection	7	15
II	**Levelling:** Principles of levelling- Dumpy level- booking and reducing levels, Methods- simple, differential, reciprocal leveling, profile levelling and cross sectioning. Digital and Auto Level, Errors in levelling **Contouring**: Characteristics, methods, uses.	7	15
FIRST INTERNAL EXAMINATION			
III	**Area and Volume**: Various methods of computation. **Theodolite survey**: Instruments, Measurement of horizontal and vertical angle. **Mass diagram**: Construction, Characteristics and Uses.	6	15
IV	**Triangulation:** Triangulation figures, Strength of figure, Triangulation stations, Inter visibility of stations, Towers and signals – Satellite Stations and reduction to centre.	8	15
SECOND INTERNAL EXAMINATION			
V	**Theory of Errors** – Types, theory of least squares, Weighting of observations, Most probable value, Application of weighting, Computation of indirectly observed quantities - method of normal equations.	8	20
VI	**Electromagnetic distance measurement (EDM) –** Principle of EDM, Modulation, Types of EDM instruments, Distomat **Total Station –** Parts of a Total Station – Accessories – Advantages and Applications, Introduction to Astronomical terms, Field Procedure for total station survey, Errors in Total Station Survey.	6	20
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN (End semester exam) :

Maximum Marks :100 Exam Duration: 3 Hrs

The question paper shall have three parts.

Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI : 2 questions out of 3 questions carrying 20 marks each

Note : 1.Each part should uniformly cover the two modules in that part.

2. Each question can have a maximum of 4 subdivisions (a,b,c,d), if needed

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Course code	Course Name	L-T-P-Credits	Year of Introduction
HS210	LIFE SKILLS	2-0-2	2016

Prerequisite : Nil

Course Objectives

- To develop communication competence in prospective engineers.
- To enable them to convey thoughts and ideas with clarity and focus.
- To develop report writing skills.
- To equip them to face interview & Group Discussion.
- To inculcate critical thinking process.
- To prepare them on problem solving skills.
- To provide symbolic, verbal, and graphical interpretations of statements in a problem description.
- To understand team dynamics & effectiveness.
- To create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values, Loyalty and also to learn to appreciate the rights of others.
- To learn leadership qualities and practice them.

Syllabus

Communication Skill: Introduction to Communication, The Process of Communication, Barriers to Communication, Listening Skills, Writing Skills, Technical Writing, Letter Writing, Job Application, Report Writing, Non-verbal Communication and Body Language, Interview Skills, Group Discussion, Presentation Skills, Technology-based Communication.

Critical Thinking & Problem Solving: Creativity, Lateral thinking, Critical thinking, Multiple Intelligence, Problem Solving, Six thinking hats, Mind Mapping & Analytical Thinking.

Teamwork: Groups, Teams, Group Vs Teams, Team formation process, Stages of Group, Group Dynamics, Managing Team Performance & Team Conflicts.

Ethics, Moral & Professional Values: Human Values, Civic Rights, Engineering Ethics, Engineering as Social Experimentation, Environmental Ethics, Global Issues, Code of Ethics like ASME, ASCE, IEEE.

Leadership Skills: Leadership, Levels of Leadership, Making of a leader, Types of leadership, Transactions Vs Transformational Leadership, VUCA Leaders, DART Leadership, Leadership Grid & leadership Formulation.

Expected outcome

The students will be able to

- Communicate effectively.
- Make effective presentations.
- Write different types of reports.
- Face interview & group discussion.
- Critically think on a particular problem.
- Solve problems.
- Work in Group & Teams
- Handle Engineering Ethics and Human Values.
- Become an effective leader.

Resource Book:

Life Skills for Engineers, Complied by ICT Academy of Kerala, McGraw Hill Education (India) Private Ltd., 2016

References:

- Barun K. Mitra; (2011), *"Personality Development & Soft Skills*", First Edition; Oxford Publishers.
- Kalyana; (2015) "*Soft Skill for Managers*"; First Edition; Wiley Publishing Ltd.
- Larry James (2016); "*The First Book of Life Skills*"; First Edition; Embassy Books.
- Shalini Verma (2014); *"Development of Life Skills and Professional Practice"*; First Edition; Sultan Chand (G/L) & Company
- John C. Maxwell (2014); "The 5 Levels of Leadership", Centre Street, A division of Hachette Book Group Inc.

Course Plan

Module	Contents	Hours L-T-P L	P	Sem. Exam Marks
I	Need for Effective Communication, Levels of communication; Flow of communication; Use of language in communication; Communication networks; Significance of technical communication, Types of barriers; Miscommunication; Noise; Overcoming measures, Listening as an active skill; Types of Listeners; Listening for general content; Listening to fill up information; Intensive Listening; Listening for specific information; Developing effective listening skills; Barriers to effective listening skills. **Technical Writing:** Differences between technical and literary style, Elements of style; Common Errors, **Letter Writing:** Formal, informal and demi-official letters; business letters, **Job Application**: Cover letter, Differences between bio-data, CV and Resume, **Report Writing:** Basics of Report Writing; Structure of a report; Types of reports. **Non-verbal Communication and Body Language:** Forms of non-verbal communication; Interpreting body-language cues; Kinesics; Proxemics; Chronemics; Effective use of body language **Interview Skills**: Types of Interviews; Ensuring success in job interviews; Appropriate use of non-verbal communication, **Group Discussion**: Differences between group discussion and debate; Ensuring success in group discussions, **Presentation Skills**: Oral presentation and public speaking skills; business presentations, **Technology-based Communication:** Netiquettes: effective e-mail messages; power-point presentation; enhancing editing skills using computer software.	2 3	2 4 4	See evaluation scheme

II	Need for Creativity in the 21st century, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity Critical thinking Vs Creative thinking, Functions of Left Brain & Right brain, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence. Steps in problem solving, Problem Solving Techniques, Problem Solving through Six Thinking Hats, Mind Mapping, Forced Connections. Problem Solving strategies, Analytical Thinking and quantitative reasoning expressed in written form, Numeric, symbolic, and graphic reasoning, Solving application problems.	2 2	2 2	
III	Introduction to Groups and Teams, Team Composition, Managing Team Performance, Importance of Group, Stages of Group, Group Cycle, Group thinking, getting acquainted, Clarifying expectations. Group Problem Solving, Achieving Group Consensus. Group Dynamics techniques, Group vs Team, Team Dynamics, Teams for enhancing productivity, Building & Managing Successful Virtual Teams. Managing Team Performance & Managing Conflict in Teams. Working Together in Teams, Team Decision-Making, Team Culture & Power, Team Leader Development.	3 3	2 2	
IV	Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic Virtue, Respect for Others, Living Peacefully. Caring, Sharing, Honesty, Courage, Valuing Time, Cooperation, Commitment, Empathy, Self-Confidence, Character Spirituality, Senses of 'Engineering Ethics', variety of moral issued, Types of inquiry, moral dilemmas, moral autonomy, Kohlberg's theory, Gilligan's theory, Consensus and controversy, Models of Professional Roles, Theories about right action, Self-interest, customs and religion, application of ethical theories. Engineering as experimentation, engineers as responsible experimenters, Codes of ethics, Balanced outlook on. The challenger case study, Multinational corporations, Environmental ethics, computer ethics,	3 3 3	2 2	

	Weapons development, engineers as managers, consulting engineers, engineers as expert witnesses and advisors, moral leadership, sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers(India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers(IETE), India, etc.	3		
V	Introduction, a framework for considering leadership, entrepreneurial and moral leadership, vision, people selection and development, cultural dimensions of leadership, style, followers, crises. Growing as a leader, turnaround leadership, gaining control, trust, managing diverse stakeholders, crisis management Implications of national culture and multicultural leadership Types of Leadership, Leadership Traits. Leadership Styles, VUCA Leadership, DART Leadership, Transactional vs Transformational Leaders, Leadership Grid, Effective Leaders, making of a Leader, Formulate Leadership	4 2 2	 2 2	
END SEMESTER EXAM				

EVALUATION SCHEME

Internal Evaluation

(Conducted by the College)

Total Marks: 100

Part – A

(To be started after completion of Module 1 and to be completed by 30th working day of the semester)

1. Group Discussion – Create groups of about 10 students each and engage them on a GD on a suitable topic for about 20 minutes. Parameters to be used for evaluation is as follows;

(i) Communication Skills – 10 marks
(ii) Subject Clarity – 10 marks
(iii) Group Dynamics - 10 marks
(iv) Behaviors & Mannerisms - 10 marks

(Marks: 40)

Part – B

(To be started from 31st working day and to be completed before 60th working day of the semester)

2. Presentation Skills – Identify a suitable topic and ask the students to prepare a presentation (preferably a power point presentation) for about 10 minutes. Parameters to be used for evaluation is as follows;

(i)	Communication Skills*	-	10 marks
(ii)	Platform Skills**	-	10 marks
(iii)	Subject Clarity/Knowledge	-	10 marks

(Marks: 30)

* Language fluency, auditability, voice modulation, rate of speech, listening, summarizes key learnings etc.

** Postures/Gestures, Smiles/Expressions, Movements, usage of floor area etc.

Part – C

(To be conducted before the termination of semester)

3. Sample Letter writing or report writing following the guidelines and procedures. Parameters to be used for evaluation is as follows;

(i)	Usage of English & Grammar	-	10 marks
(ii)	Following the format	-	10 marks
(iii)	Content clarity	-	10 marks

(Marks: 30)

External Evaluation

(Conducted by the University)

Total Marks: 50 Time: 2 hrs.

Part – A

Short Answer questions

There will be one question from each area (five questions in total). Each question should be written in about maximum of 400 words. Parameters to be used for evaluation are as follows;

(i) Content Clarity/Subject Knowledge
(ii) Presentation style
(iii) Organization of content

(Marks: 5 x 6 = 30)

Part – B

Case Study

The students will be given a case study with questions at the end the students have to analyze the case and answer the question at the end. Parameters to be used for evaluation are as follows;

(i) Analyze the case situation
(ii) Key players/characters of the case
(iii) Identification of the problem (both major & minor if exists)
(iv) Bring out alternatives
(v) Analyze each alternative against the problem
(vi) Choose the best alternative
(vii) Implement as solution
(viii) Conclusion
(ix) Answer the question at the end of the case

(Marks: 1 x 20 = 20)

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
KTU
Estd.
2014

Course No.	Course Name	L-T-P - Credits	Year of Introduction
CE231	CIVIL ENGINEERING DRAFTING LAB	0-0-3-1	2016

Prerequisite : BE 110 - Engineering Graphics

Course Objectives :

1. To introduce the fundamentals of Civil Engineering drawing.
2. To understand the principles of planning
3. To learn drafting of buildings.
4. To impart knowledge on drafting software such as AutoCAD.

List of Exercises : (at least 10 exercises / plates are mandatory **)**

1. Paneled Doors
2. Glazed Windows and Ventilators in wood
3. Steel windows
4. Roof truss in steel sections
5. Reinforced concrete staircase
6. Residential buildings with flat roof
7. Residential buildings with tiled roof
8. Preparation of site plan and service plans as per building rules
9. Building Services (for single and two storied buildings only). Septic tanks and soak pit detailed drawing
10. Two storied and multi storied buildings
11. Public buildings like office, dispensary, post office, bank etc.
12. Industrial buildings with trusses

Expected outcome.

To accomplish the abilities/skills for the following.

1. To understand the drawings of various components of buildings
2. Preparation of building drawings.
3. Interpretation of building drawings.
4. Use of a drafting software.

Text Books:

1. National Building Code of India.
2. Kerala Municipal Building Rules.
3. Dr. Balagopal T.S. Prabhu, Building Drawing and Detailing, Spades Publishers, Calicut
4. AutoCAD Essentials, Autodesk official Press, John Wiley & Sons, USA

References:

1. Shah, M.G., Kale, C. M. and Patki, S.Y. Building Drawing With An Intergrated Approach to Built Environment, Tata McGraw Hill Publishing Company Limited, New Delhi

Points to note:

1. Equal weightage to be given for manual drafting and drafting using computer aided drafting software.
2. Evaluation of drawing, along with a viva-voce, to be done at the end of every day class.

Internal Continuous Evaluation - 100 marks

Best 10 plates - 60 marks

Viva-voce - 10 marks

Final Examination - 30 marks

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Course No.	Course Name	L-T-P - Credits	Year of Introduction
CE233	SURVEYING LAB	0-0-3-1	2016

Prerequisite : Nil

Course Objectives:

1. To equip the students to undertake survey using tacheometer
2. To equip the students to undertake survey using total station
3. To impart awareness on distomat and handheld GPS

List of Exercises/Experiments : (10 to12 exercises are mandatory)

1. Introduction to conventional surveying -1 class
2. Levelling (dumpy level) -2 class
3. Theodolite surveying (Theodolite) -3class
4. Total Station survey (Total Station) -5 class
   a. Heights and Distance
   b. Area computation
   c. Downloading
5. Study of instruments –Automatic level, digital level, Handheld GPS -2 class
6. Test -2 class

Expected outcome .

Ability to undertake survey using level and theodolite and total station

Internal Continuous Evaluation - 100 marks

Record/output (Average) - 60 marks

Viva-voce (Average) - 10 marks

Final practical examination – 30 marks