VISHNU INSTITUTE OF TECHNOLOGY:: BHIMAVARAM
(Autonomous)
Approved by AICTE, Accredited by NBA, NAAC & Affiliated to JNTUK, Kakinada

MECHANICAL ENGINEERING DEPARTMENT

II-Year II-Semester

S.No	Category	Course Title	Hours			Credits
			L	**T**	**P**	**C**
1	BSC	Mathematics-IV (Numerical Methods, Probability & Statistics)	3	0	0	3
2	PCC	Fluid Mechanics and Hydraulic Machines	3	0	0	3
3	PCC	Kinematics of Machines	3	0	0	3
4	PCC	Applied Thermodynamics	3	0	0	3
5	HSS	Universal Human Values : Understanding Harmony	3	0	0	3
6	PCC (LAB)	Fluid Mechanics & Hydraulic Machines Lab	0	0	3	1.5
7	PCC (LAB)	Applied Thermodynamics Lab	0	0	3	1.5
8	PCC (LAB)	Structural Analysis Lab	0	0	3	1.5
	Skill oriented course*	Advanced Solid Modelling	1	0	2	2
	Mandatory course	Critical Reading & Creative Writing	3	0	0	0
		Total credits				**21.5**
Honors/Minors			**4**	0	**0**	**4**
Internship 2 months (Mandatory) during summer vacation						

II B.Tech. II - Semester

MATHEMATICS-IV (NUMERICAL METHODS, PROBABILITY & STATISTICS)

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

To enable the students to:

- know the standard numerical methods to find roots of functions in practical engineering problems and identify the concepts of interpolation, to estimate the unknown functional values.
- identify the methods for finding the values of derivatives and finite integrals using numerical techniques.
- understand various statistical distributions.
- decide the null or alternative hypotheses using the suitable test statistic.

UNIT I

Solution of Algebraic and Transcendental Equations & Interpolation

Introduction- algebraic function and transcendental function, Bisection method, Regula –Falsi Method, Iteration Method, Newton- Raphson method.

Introduction, Finite Differences, Forward, Backward- Newton's forward and backward formulae –Lagrange's Interpolation Formula.

UNIT II

Numerical Integration and Solution of Ordinary Differential Equations

Numerical Integration**,** Trapezoidal rule, Simpson's $1/3^{rd}$ Rule, Simpson's $3/8^{th}$ Rule.

Solution by Taylor's method, Euler's & Modified Euler's method, Runge- Kutta Method (4^{th} order).

UNIT III

Probability Distributions

Basic concepts on probability, random variables (discrete and continuous)**,** probability distribution- Binomial, Poisson and Normal distributions and their properties.

Tests of Hypothesis – Large sample Tests

Null and Alternative Hypothesis, One tail and two tailed tests, Type I and Type II errors. Large Sample tests- Test for Single mean and difference of means, Test for single proportion and difference of proportions.

UNIT V

Tests of Hypothesis -Small Sample Tests

Tests of hypothesis using Student 's t-distribution - test for single mean, two means, F-test and χ^{2-} test for goodness of fit, χ^{2-} test for independence of attributes.

COURSE OUTCOMES:

After undergoing this course, students will be able to:

1. apply standard numerical methods to solve fundamental and practical engineering problems and understand the concepts of interpolation to estimate the unknown functional values.
2. evaluate finite integrals and solving differential equations using numerical techniques.
3. understand the discrete and continuous probability distributions and apply relevant engineering problems.
4. perform inferential statistics to test hypothesis for large samples.
5. apply the concept of testing hypothesis for small samples to draw the inferences and estimate the goodness of fit.

TEXT BOOKS:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 9th Edition, 2016.
2. B. V. Ramana, Higher Engineering Mathematics, Revised Edition, Tata McGraw Hill, New Delhi, 2017.
3. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics a Modern Approach, Sultan Chand & Sons, 12th Edition 2000.

REFERENCE BOOKS:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N. Prasad, Engineering Mathematics, Volume-I, 12th Edition, S. Chand Publishers, 2014.
2. S.S. Sastry, Introductory methods of Numerical Analysis, Prentice Hall of India Pvt. Ltd., 5th Edition, 2012.

II B.Tech. II - Semester

FLUID MECHANICS AND HYDRAULIC MACHINES

L	T	P	C
3	0	0	3

COURSE OBJECTIVE:

To learn fundamentals of fluids, flow measuring devices, losses in pipes, performance of turbines and pumps.

UNIT I

FLUID STATICS: Properties of fluids (density, specific volume, specific gravity, viscosity, compressibility, surface tension, vapor pressure), Newton's law of viscosity, Classification of Fluids, Pascal's law,Hydrostatic law, Pressure & Measurement: Atmospheric, Gauge and Vacuum Pressure, Measurement of Pressure (Piezometer, U-Tube and Differential Manometers).

FLUID KINEMATICS: Stream line, streak line and path line, Classification of flows (steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational, irrotational, compressible, incompressible), velocity potential function, stream function, continuity equation (3D).

UNIT II

FLUID DYNAMICS: Surface and body forces, Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend. Reynold's experiment, Darcy Weisbach equation, Moody's diagram, Minor losses in pipes, Pipes in series and pipes in parallel, total energy line, hydraulic gradient line. Measurements of flows: Pitot tube, Venturimeter and Orifice meter.

DIMENSIONAL ANALYSIS: Introduction, Principle of dimensional homogeneity, Rayleigh's method, Buckingham's Pi theorem method. Dimensionless numbers (Eulers, Mach number, Reynolds number, weber number).

UNIT III

BOUNDARY LAYER CONCEPTS: Flow over a Flat Plate, Displacement Thickness, Momentum Thickness and Energy Thickness, Laminar and Turbulent boundary layers (No derivation), boundary layer in transition, Laminar Sub-Layer, Boundary Layer Separation.

BASICS OF TURBO MACHINERY: Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip for Symmetrically and Un-symmetrically vanes, velocity diagrams at inlet and outlet, work done and efficiency.

UNIT IV

HYDRAULIC TURBINES: Classification of turbines: Pelton wheel turbine, Francis turbine and Kaplan turbine, working principle, work done, efficiencies, Draft tube theory- functions and efficiency.

PERFORMANCE OF HYDRAULIC TURBINES: Geometric similarity, Unit and specific quantities, performance characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

UNIT V

CENTRIFUGAL PUMPS: Classification ,working, work done, manometric head, losses and efficiencies, specific speed-pumps in series and parallel, performance characteristic curves, NPSH, cavitation.

RECIPROCATING PUMPS: Main component parts and working, discharge and slip-Indicator diagrams.

COURSE OUTCOMES:

At the end of course students will be able to:

1. Apply fundamentals of fluid mechanics and its applicable laws to solve problems in engineering applications.
2. Formulate and solve different Types of Fluid Flows and its Velocity Potential.
3. Analyze surface forces and losses in pipe flows.
4. Compute drag & lift forces using the boundary layer concepts.
5. Design & formulate the working parameters of Hydraulic machines.

TEXT BOOKS:

1. P.N. Modi and S.M. Seth, Hydraulics, fluid mechanics and Hydraulic Machinery, Standard Book Company, 21st Edition , 2018.
2. R. K. Bansal, Fluid Mechanics and Hydraulic Machines, Laxmi Publications, 10th Edition, 2018.

REFERENCE BOOKS:

1. Frank White, Fluid Mechanics, McGraw-Hill, 8th Edition, 2015.
2. S. Ramamrutham, Hydraulics Fluid Mechanics and Fluid Machines, DhanpatRai, 9th Edition, 2014.

II B.Tech. II - Semester

KINEMATICS OF MACHINES

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- Understand mechanisms for motion transmission.
- Understand the principles in analyzing the assembly with respect to the displacement, velocity and acceleration at any point in a link of a mechanism.
- Design engineering applications involving in selection, sizing of mechanism to accomplish motion.
- To analyze Steering gear mechanisms and to understand the working principles in power drives.
- To understand the basic concepts, terminologies and kinematics of gears and gear trains.

UNIT I

MECHANISMS: Elements or links, classification, rigid, flexible and fluid link. Types of kinematic pairs, sliding, turning, rolling, screw and spherical pairs, lower and higher pairs, closed and open pairs, constrained motions, completely, partially or successfully constrained and incompletely constrained, Degrees of freedom.

Machines: Mechanism and machines, classification of machines, kinematic chain, inversion of mechanism, inversions of quadric cycle chain, single and double slider crank chains.

UNIT II

Straight line motion mechanisms: Exact and approximate copiers and generated types, Peaucellier, Hart and Scott Russel, Grasshopper, Watt, Tchebicheff and Robert Mechanisms and straight line motion, Pantograph.

Steering Mechanism: Conditions for correct steering, Davis Steering gear, Ackerman‘s steering gear, velocity ratio.

Hooke’s joint: Single and double Hooke‘s joint, Universal coupling, applications.

UNIT III

Kinematics: Velocity and acceleration, Motion of link in machine, Determination of Velocity and acceleration diagrams, Graphical method, Application of relative velocity method four bar chain.

Analysis of Mechanisms: Analysis of slider crank chain for displacement, velocity and acceleration of slider, Acceleration diagram for a given mechanism, Klein's construction, Coriolis acceleration, determination of Coriolis component of acceleration.

Plane motion of body: Instantaneous center of rotation, relative motion between two bodies, three centres in line theorem, graphical determination of instantaneous centre, diagrams for simple mechanisms and determination of angular velocity of points and links.

UNIT IV

Cams: Definitions of cam and followers, their uses, Types of followers and cams, Terminology, Types of follower motion, Uniform velocity, Simple harmonic motion and uniform acceleration. Maximum velocity and maximum acceleration during outward and return strokes in the above 3 cases.

Analysis of motion of followers: Roller follower, circular cam with straight and convex flanks.

UNIT V

Gears: Higher pairs, friction wheels and toothed gears, types, law of gearing, condition for constant velocity ratio for transmission of motion, forms of teeth: cycloidal and involute profiles. Velocity of sliding, phenomena of interferences, Methods of interference, condition for minimum number of teeth to avoid interference, expressions for arc of contact and path of contact, Introduction to Helical, Bevel and worm gearing.

Gear Trains: Introduction, Train value, Types, Simple and reverted wheel train, Epicyclic gear train. Methods of finding train value or velocity ratio, Epicyclic gear trains. Selection of gear box, Differential gear for an automobile.

COURSE OUTCOMES:

At the end of course the students will be able to:

1. Able to describe the principles of kinematic pairs, links, and their classification, DOF, simple mechanisms, and inversions.
2. Interpret different concepts of mechanisms like straight line motion mechanisms, Steering gear mechanisms and universal joint.
3. Analyze the planar mechanisms for position, velocity and acceleration.
4. Draw the cam profiles for appropriate motions of the follower.
5. Select appropriate gears by evaluating gear tooth geometry, applications and understand different types of gear trains for specific applications.

TEXT BOOKS:

1. Thomas Bevan, Theory of Machines, Pearson Education India, 3rd Edition, 2009.
2. Rattan .S.S, Theory of machines, TMH, 4th Edition, 2014.

REFERENCE BOOKS:

1. R.K Bansal, Theory of Machines, Lakshmi Publications, 5th Edition, 2012.
2. R.S Khurmi& J.K Gupta, Theory of Machine, S Chand, 14th Edition, 2005.

II B.Tech. II - Semester

APPLIED THERMODYNAMICS

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To study different types of IC engines, working & their performances.
- To learn about combustion stages and factors affecting the combustion in SI and CI engines.
- To study different types of boilers and their mountings and accessories.
- To learn about steam nozzles, steam turbines, and their performance.
- To analyze the performance of ideal and practical gas turbines.

UNIT I

Introduction: Introduction to IC engines, Working principles of 4-Stroke and 2-Stroke Spark Ignition and Compression Ignition Engines, Differences between 2-s and 4-s cycle engines, Differences between SI and CI engines, Valve and Port Timing Diagrams, effect of operating variables, comparison of air standard and actual cycles, effect of time loss, heat loss and exhaust loss in Petrol and Diesel engines.

Engine Testing And Performance: Introduction, Parameters of performance-measurement of cylinder pressure, Measurement of Fuel consumption, Air intake, Brake power, Determination of Frictional power and Indicated power, Performance tests, Heat Balance sheet.

UNIT II

Combustion in SI and CI Engines: Stages of combustion in SI engines, abnormal combustion and knocking in SI engines, factors affecting knocking, effects of knocking, control of knocking, Fuels for SI and CI engine, important qualities of IC engine fuels, rating of fuels, Stages of combustion in CI engines, detonation in C.I. engines, factors affecting detonation, controlling detonation, combustion chamber for SI and CI engine.

UNIT III

Basic Concepts: Rankine cycle, Schematic layout, Thermodynamic Analysis, Methods to improve cycle performance; Regeneration and Reheating.

Boilers: Classifications, Working principle of critical boilers with sketches, Mountings and Accessories, Boiler horse power, Draught, classification, Height of chimney for given draught and discharge, condition for maximum discharge, efficiency of chimney.

UNIT IV

Steam Nozzles: Steam Nozzles, Introduction, Area, velocity relationship, Mass flow rate, Choking of Nozzles, Performance characteristics of Nozzles.

Steam Turbines: Steam Turbines, Impulse and reaction Turbines, Compounding of steam turbines, multistage reaction Turbines, Reheat factor and Efficiency.

UNIT V

Ideal Gas Turbine Cycles: Analysis of Ideal Gas Turbine Cycles, Simple Cycle, Regeneration Cycle, Reheat Cycle, Inter cooling Cycle.

Practical Gas Turbine Cycles: Analysis of Practical Gas Turbine Cycles, Methods of accounting for component losses, Efficiencies, changes in the composition of the working fluid.

COURSE OUTCOMES:

After completing this course, the students will able to:

1. Understand the types of IC engines, working and their performance.
2. Understand the combustion stages, factors affecting the combustion in SI and CI engines.
3. Describe the working of a vapour power cycles and Identify the need of various boilers, draught systems for a thermal power plant.
4. Apply thermodynamic analysis to study the characteristics of steam nozzles and evaluate the performance characteristics of an impulse and reaction turbines.
5. Analyze the performance of Ideal and practical gas turbines.

TEXT BOOK:

1. V Ganesan, Internal Combustion Engines, McGraw-Hill, 4th Edition, 2017.
2. R.K. Rajput, Applied Thermodynamics, Lakshmi Publications, 2nd Edition, 2016.

REFERENCE BOOKS:

1. Mahesh M. Rathore, Thermal Engineering, McGraw-Hill, 1st Edition, 2010.
2. R. Yadav, Thermodynamics and Heat Engines, Central Book Depot, 1st Edition, 2003.

II B.Tech. II - Semester

UNIVERSAL HUMAN VALUES

L	T	P	C
3	0	0	3

Pre-requisites: None. Universal Human Values 1 (desirable)

COURSE OBJECTIVES:

The objective of the course is four fold:

- Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
- Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence.
- Strengthening of self-reflection.
- Development of commitment and courage to act.

COURSE TOPICS:

The course has 28 lectures and 14 practice sessions in 5 modules:

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Purpose and motivation for the course, recapitulation from Universal HumanValues-I
2. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process forself-exploration
3. Continuous Happiness and Prosperity- A look at basic HumanAspirations
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correctpriority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the currentscenario
6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

7. Understanding human being as a co-existence of the sentient 'I' and the material'Body'
8. Understanding the needs of Self ('I') and 'Body' - happiness and physicalfacility
9. Understanding the Body as an instrument of 'I' (I being the doer, seer andenjoyer)
10. Understanding the characteristics and activities of 'I' and harmony in'I'
11. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisalof Physical needs, meaning of Prosperity indetail
12. Programs to ensure Sanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

13. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values ofrelationship
14. Understanding the meaning of Trust; Difference between intention andcompetence
15. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values inrelationship
16. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive HumanGoals
17. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to worldfamily.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

18. Understanding the harmony in theNature
19. Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self- regulation innature
20. Understanding Existence as Co-existence of mutually interacting units in all-pervasivespace
21. Holistic perception of harmony at all levels ofexistence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Module 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics

22. Natural acceptance of humanvalues
23. Definitiveness of Ethical HumanConduct
24. Basis for Humanistic Education, Humanistic Constitution and Humanistic UniversalOrder
25. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people- friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above productionsystems.
26. Case studies of typical holistic technologies, management models and production systems
27. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions andorganizations
28. Sumup.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. to discuss the conduct as an engineer or scientist etc.

TEXTBOOK

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi,2010

REFERENCEBOOKS

1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak,1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi,2004.
3. The Story of Stuff(Book).
4. The Story of My Experiments with Truth - by Mohandas KaramchandGandhi
5. Small is Beautiful - E. FSchumacher.
6. Slow is Beautiful - CecileAndrews
7. Economy of Permanence - J CKumarappa
8. Bharat Mein Angreji Raj -PanditSunderlal
9. Rediscovering India - byDharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul KalamAzad
12. Vivekananda - Romain Rolland(English)
13. Gandhi - Romain Rolland(English)

II B.Tech. II - Semester

FLUID MECHANICS AND HYDRAULIC MACHINES LAB

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

- Measure the losses in pipes and coefficient of discharge using Venturimeter and orifice meter.
- To verify Bernoulli's theorem.
- Apply the impulse momentum equation and determine the force exerted by jet on vanes.
- Study the performance of hydraulic machines viz. turbines and pumps.

EXPERIMENTS:

Minimum of 10 experiments needs to be performed

1. Calibration of Venturimeter.
2. Calibration of Orificemeter.
3. Determination of friction factor for a given pipeline.
4. Determination of loss of head due to sudden contraction in a pipeline.
5. Verification of Bernoulli's theorem.
6. Impact of jet on Vanes.
7. Performance Test on Pelton Wheel Turbines.
8. Performance Test on Francis Turbine.
9. Performance Test on Kaplan Turbine.
10. Performance Test on Single Stage Centrifugal Pump.
11. Performance Test on Multi Stage Centrifugal Pump.
12. Performance Test on Reciprocating Pump.

COURSE OUTCOMES:

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

1. Estimate minor and major losses in the pipelines.
2. Measure the coefficient of discharge of a flow measuring devices.

3. Evaluate the performance of centrifugal pumps, reciprocating pumps and hydraulic turbines.
4. Evaluate the force exerted by a jet on different vanes.

II B.Tech. II - Semester

APPLIED THERMODYNAMICS LAB

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

- Interpret the basic concepts in the area of IC engines and other power input devices of thermal engineering field.
- Evaluate the performance of various types of petrol, diesel engines and reciprocating air compressor.
- To study the boilers used in steam turbines and locomotives.

EXPERIMENTS:

Minimum of 10 Experiments need to be performed

1. Valve Timing Diagram of a four stroke Engine & Port timing diagram of a two stroke Engine.
2. Testing of Fuels – Viscosity, flash point/fire point, carbon residue & calorific value.
3. Performance test on 4 stroke diesel engine.
4. Performance Test on 4 -Stroke SI engines.
5. Heat Balance Sheet on 4 stroke CI engine.
6. Exhaust gas emission measurements of 4-stroke petrol engine.
7. Evaluation of engine friction by conducting Morse test on 4-stroke multi cylinder petrol engine.
8. Determination of FP by retardation test on IC engine.
9. Determination of FP by motoring test on IC engine.
10. Performance test on variable compression ratio engines.
11. Performance test on reciprocating air compressor unit.
12. Study of Boilers.
13. Dis-assembly / Assembly of Engines.

14. Study the P-Ɵ and P-V diagram for 4 stroke diesel engine at different loads.
15. Economical speed test of an IC engine.

COURSE OUTCOMES:

At the end of course students will be able to:

1. Evaluate the performance of petrol engine and diesel engines at different operating conditions.
2. Determine the performance of compressors.
3. Study the properties of the fuel.
4. Discuss the different types of boilers.
5. Draw Valve Timing and Port timing diagrams of an IC engine.

II B.Tech. II - Semester

STRUCTURAL ANALYSIS LAB

L	T	P	C
0	0	3	1.5

Prerequisites:

Knowledge of any Modelling Software, Knowledge of Coordinate Systems and Geometric Transformations etc.

COURSE OBJECTIVES:

The course is intended to provide basic understanding of basic modelling and Analysis techniques students with following aspects:

- To acquire basic understanding of Analysis software.
- To understand the different kinds of analysis and apply the basic principles to find out the stress and other related parameters of bars, beams loaded with the loading conditions.
- To learn to apply the basic principles to carry out dynamic analysis to know the natural frequency of different kind of beams.

LABORATORY WORK

Study of ANSYS Lab contains:

1. Stress analysis of bars of constant crosssectionarea.
2. Stressanalysisof barsoftaperedcrosssectionarea.
3. Stressanalysisof asteppedbar.
4. Analysisoftrusses.
5. Stressanalysisof beams.
6. Stressanalysisofrectangularplatewithacircularhole.
7. Thermalanalysis.
8. Dynamicanalysis.

COURSE OUTCOMES:

At the end of the course the students are able to:

1. Demonstrate the basic features of an analysis package.

2. Use the modern tools to formulate the problem and to create geometry, discretize, apply boundary condition to solve problems of bars and truss to find stress with different loading conditions.
3. Demonstrate the stress analysis of beams and plates.
4. Carry out dynamic analysis and finding natural frequencies for various boundary conditions.

REFERENCE BOOKS:

1. Daryl L Logan, A first course in the Finite element method, CL Engineering, 5th Edition, 2010.
2. David V Hutton, Fundaments of Finite Element Analysis, McGraw Hill, Rev Edition, 2017.

II B.Tech. II - Semester

ADVANCED SOLID MODELLING

L	T	P	C
1	0	2	2

COURSE OBJECTIVES:

To provide students with advanced training in solid modelling and improve their machine designing skills using assembly, kinematics and surface design.

COURSE CONTENT

Solid modelling using CATIA: Solid part from 2D sketches, Boolean operations, Solid remastering.

Assembly Design: Creating assembled components by joining individual parts using assembly tools, assembly for kinematics with DOF, Different types of joints (Spherical joint, Screw Joint, cylindrical joint, etc.), Assembly of components with sub-assemblies.

Kinematics: Creating and applying motion to different mechanisms, finding DOF of given mechanism, Kinematics for machine parts and engine parts.

Surface Design: Introduction to surface design, tools in surface design, sweep operations, surface to solid and surface remastering.

LIST OF EXPERIMENTS:

1. Creating 3D solids using boolean operations.
2. Creating a given solid body using solid remastering.
3. Assembly of Engine components.
4. Assembly of Machine components.
5. Assembly involving sub-assemblies.
6. Assembly with DOF.
7. Applying motion to given mechanism and machine parts.
8. Creating a complex surface using surface tools.

9. Creating a solid body from the surface.
10. Creating a given solid body using surface remastering.

COURSE OUTCOMES:

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

1. Model a Solid using different 3D tools in CAD software.
2. Create complex engineering assemblies using appropriate assembly constraints.
3. Develop a mechanism and be able to apply motion using kinematics.
4. Create, modify complex surfaces and be able to perform remastering techniques for creating duplicate bodies.

II B.Tech. II - Semester

CRITICAL READING AND CREATIVE WRITING

L	T	P	C
3	0	0	0

COURSE OBJECTIVES:

The students will have the ability to:

- Understand how to identify, analyze, interpret and describe critical ideas, themes,
  and values in literary texts.
- List the elements of a Short Story.
- Apply critical and theoretical approaches to the reading and analysis of literary texts in multiple genres.

UNIT I

Essentials of Good Writing

1. Focus, Development, Unity, Coherence and Correctness.
2. Imagery
   A. Figurative Language- Simile, Metaphor, Personification, Hyperbole,Oxymoron, Paradox, Alliteration, Assonance.
   B. Sensory details.
3. Point of View

UNIT II

Elements of a Short story

1. Plot, Setting, Character, Theme
2. Analysis of given short stories: 2 stories
   A. Good Sees the Truth but Waits by Leo Tolstoy.
   B. The Cop and the Anthem by O. Henry.

UNIT III

Prose Writing:

Reflective Writing – Personal Essay

Descriptive Writing: Person/Place/Thing

UNIT IV

Reading Comprehension

Reading for facts, contextual vocabulary, tone and inference.

UNIT V

Speech Analysis

A. Tryst with Destiny-
https://www.youtube.com/watch?v=lrEkYscgbqE
B. Stay Hungry, Stay Foolish –
https://www.youtube.com/watch?v=UF8uR6Z6KLc

COURSE OUTCOMES:

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

1. Understand and explain the characteristics of a literary text.
2. Critically analyze the quality of a Shorty Story.
3 Produce essays like personal essay or descriptive essay applying the principles of good writing.
4. Identify facts, themes and critical ideas in a passage.
5. Articulate an awareness of the basic elements of a speech.

REFERENCES:

1. The Cambridge Companion to Creative Writing (South Asian Edition).
2. Creative Writing: A Beginner's Manual (Paper Back Edition).
3. Teaching and Developing Reading Skills: Cambridge Handbooks for Language Teachers.

WEB REFERENCES:

https://www.skillsyouneed.com/learn/critical-reading.html
https://englishforeveryone.org
http://sixminutes.dlugan.com/speech-evaluation-1-how-to-study-critique-speech/
http://www.homeofbob.com/literature/genre/fiction/ficElmnts.html