VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
Ibrahimbagh, Hyderabad-31

Approved by A.I.C.T.E., New Delhi and
Affiliated to Osmania University, Hyderabad-07

Sponsored by
VASAVI ACADEMY OF EDUCATION
Hyderabad

SYLLABI UNDER CBCS FOR B.E III & IV SEMESTERS OF MECHANICAL ENGINEERING (R-19) WITH EFFECT FROM 2020-21 (For the students admitted in 2019-20)

DEPARTMENT OF MECHANICAL ENGINEERING

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VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

SCHEME OF INSTRUCTION AND EXAMINATION (R-19)

B.E. – MECH : THIRD SEMESTER (2020-2021)

B.E (MECH) III Semester								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U19HS330EH	Skill Development-I : Communication Skills in English	2	0	0	3	60	40	2
U19HS010EH	Human Values and Professional Ethics-I	1	0	0	2	40	30	1
U19BS310MA	Partial Differential Equations & Transform Techniques	3	0	0	3	60	40	3
U19ES310CE	Mechanics of Materials	3	0	0	3	60	40	3
U19PC310ME	Materials Engineering	3	0	0	3	60	40	3
U19PC320ME	Thermodynamics	3	0	0	3	60	40	3
U19PC330ME	Machine Drawing	3	0	0	3	60	40	3
U19OE3XXXX	Open Elective-I	2	0	0	3	60	40	2
U19MC310ME	Introduction to Entrepreneurship	1	0	0	2	40	30	0
PRACTICALS								
U19ES311CE	Mechanics of Materials Lab	0	0	2	3	50	30	1
U19PC311ME	Materials Engineering Lab	0	0	2	3	50	30	1
	TOTAL	**21**	**0**	**4**		**600**	**400**	**22**
	GRAND TOTAL	**25**				**1000**		**22**

1) Student should acquire one online course certificate equivalent to two credits during III to VII semester
2) Left over hours allotted to Sports / Library / Mentor Interaction / CC / RC / TC / CCA / ECA

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities and Social Sciences

SKILLL DEVELOPMENT-I : COMMUNICATION SKILLS IN ENGLISH
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week): 2:0:0	SEE Marks:60	Course Code: **U19HS330EH**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

Course Overview:

Be it career or relationships, the harsh truth in today's global scene is that the future of any person is affected strongly by his//her communication skill in English. The four major skills of language learning, listening, speaking, reading and writing provide the right key to success.

Course Objective:

The main objective of this finishing school curriculum is to involve content for all the above mentioned four skills in teaching English and to get students proficient in both receptive and productive skills.

Overview of the delivery Methodology:

- Every Session will have activities on all the four skills.
- To personalize the learning a variety of case studies and structured problem solving activities will be given in small groups and the trainers will facilitate peer reviews.
- Integration of continuous grading (for assignment 1 and 2), instant feedback,(peer review sheets) clear goals, rewards (certificates and appreciation kits), have been included this time for positive reinforcement.
- The Writing and Reading exercises will be given in the workbook and will carry marks
- Vocabulary exercises will also be part of every session
- The Lateral entry students will be given a self study plan for language enhancement and will be given extra reading and writing exercises

Unit1 – Fundamentals of Communication

Unit Overview:

The module is an introductory module that covers the **fundamentals of communication**. This module is intended to enable the students to communicate using greetings and small sentences/queries.

Learning Outcome:

The students should be able to:

- Respond to questions
- Engage in informal conversations.
- Speak appropriately in formal situations
- Write formal and informal emails/letters

Competencies:

- Greeting appropriately
- Introducing themselves, a friend
- Reading and summarising the gist of a conversation
- Responding to simple statements and questions both verbally and in writing
- Writing an email with appropriate salutation, subject lines, introduction, and purpose of mail.
- Using appropriate vocabulary for both formal and informal situations
- Stating takeaways from a session or conversations

Sessions:

1. Introduction to Formal and Informal Conversations
2. Informal Conversations
3. Informal Conversations - Writing
4. Formal Conversations
5. Formal Conversations - Writing

Unit 2 - Narrations and Dialogues

Unit Overview:

The Module is intended to develop level of language competence that enables them to narrate and participate in casual dialogues.

Learning Outcome:

The students should be able to

- Narrate a message/story/incident, both verbally and in writing.
- Describe an event/a session/ a movie/ an article/image
- Understand Vocabulary in context

Competencies:

- Framing proper phrases and sentences to describe in context
- Reading Stories and articles and summarising the gist
- Speaking fluently with clarity and discrimination
- Listening for main ideas and reformulating information in his/her own words
- Drawing and write appropriate conclusions post reading a passage.
- Speaking Reading and Writing descriptive sentences and paragraphs
- Using appropriate tenses, adjectives and adverbs in conversations and written tasks

Sessions:

1. Recalling and Paraphrasing
2. Describing Present Events
3. Describing Past Events
4. Describing Future Events
5. Describing Hypothetical events

Unit 3 - Rational Recap

Unit Overview:

The module enables the participants to organize their communication, structure their speaking and writing, explain their thoughts/ideas, and summarize the given information.

Learning Outcome:

The students should be able to:

- Classify content and describe in a coherent form
- Recognize and list the key points in a topic/message/article.
- Compare and contrast using appropriate structure
- Explain cause and effect
- Understand the problem and solution framework
- Use appropriate transitions in their presentations and written assignments

Competencies:

- Organizing the communication based on the context and audience

1. Structuring the content based on the type of information.

- Explaining a technical/general topic in detail.
- Writing a detailed explanation/process
- Recapitulating

Sessions:

1. Introduction to Mind maps
2. Classification
3. Sequencing
4. Description and Enumeration

Unit 4: Technical Expositions and Discussions

Unit Overview:

The module enables the students to build strategies for effective interaction and help them in developing decisive awareness and personality maintaining emotional balance.

Learning Outcome:

The students should be able to:

- Participate in technical and forum discussions by providing factual information, possible solutions, and examples.

Competencies:

- Comprehending key points of a topic and note main points including supporting details.
- Construct a logical chain of arguments and decisive points.
- Writing a review about a product by providing reasons, causes, and effects

Sessions:

1. Compare and Contrast
2. Cause and Effect
3. Problem and Solution

Unit 5: Drawing Conclusions

Unit Overview:

This module is intended to provide necessary inputs that enable the students to draw conclusions out of a discussion and provide reports.

Learning Outcome:

Students should be able to:

- Provide logical conclusions to the topics under discussion.
- Prepare, present, and analyze reports.

Competencies:

- Reasoning skills - Coherent and logical thinking
- Reporting and Analyzing skills.
- Analyzing the points discussed.
- Connecting all points without gaps.
- Identifying clinchers.
- Communicating the decisions

Sessions:

1. Reasoning
2. Analyzing
3. Generalization and Prediction

Students are given workbooks prepared by Talent sprint.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Human Values and Professional Ethics-1

SYLLABUS FOR B.E.III-SEMESTER

L:T: P (Hrs/Week):1	SEE Marks:40	Course Code: U19HS010EH
Credits: 1	CIE Marks:30	Duration of SEE:Hours:02

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: -	On completion of this course the student will be able to :
1. Get a holistic perspective of value- based education. 2. Grasp the meaning of basic human aspirations vis-a-vis the professional aspirations. 3. Understand professionalism in harmony with self and society. 4. Develop ethical human conduct and professional competence. 5. Enrich their interactions with the world around, both professional and personal.	1. Gain a world view of the self, the society and the profession. 2. Start exploring themselves in relation to others and their work –constantly evolving into better human beings and professionals. 3. Inculcate Human values into their profession. 4. Obtain a holistic vision about value-based education and professional ethics.

UNIT-1Understanding the need and process for Value Education

a) Basic Human Aspirations -Philosophy, purpose & objective of Life Understanding andliving in harmony at various levels-with self, family, society and nature.

b) **Ethical and moral values -** Truth, honesty, empathy, integrity, consistency, cooperation, confidentiality, trustworthiness, self-respect, self-restraint, self-assertion, self-reliance.

UNIT-2Holistic Understanding of Professional Ethics andHuman Values

a) At the level of individual: as socially and ecologically responsible engineers and technologists.

b) At the level of society: as mutually enriching organizations, being work conscious.

c) Recognizing the value of time and respecting time of self and others.

MODE OF DELIVERY

• Questionnaires • Quizzes • Case-studies • Observations and practice • Home and classroom assignments	• Discussions • Skits • Short Movies/documentaries • Team tasks and individual tasks • Research based tasks • Viva

Relevant Websites, CD's and Documentaries

- Value Education website, Http://www.universalhumanvalues.info UPTU website, Http://www.uptu.ac.in
- Story of stuff, Http://www.storyofstuff.com
- AlGore, As Inconvenient Truth, Paramount Classics ,USA
- Charlie Chaplin, Modern Times, United Artists, USA
- IIT Delhi, Modern Technology-The Untold story-Anand Gandhi, Right Here Right Now, Cyclewala production.

Learning Resources:

1. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
2. B.L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
3. A.N Tripathy, 2003 Human values, New Age International Publishers.

4. EG Seebauer & Robert L. Berry,2000, Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	01	Max. Marks for each Internal Test:	20
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mathematics
Partial Differential Equations & TRANSFORM TECHNIQUES
SYLLABUS FOR B.E.- III-SEMESTER

(Civil, EEE & Mechanical Branches)

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : **U19BS310MA**
Credits :3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1. **Study** the Fourier series, conditions for expansion of function and half range series **2. Formulate** and understand linear and nonlinear partial differential equations. **3. Study** the applications of Partial Differential equations 4. **Understand** the Definition of Laplace and inverse Laplace Transforms-Shifting Properties and various theorems and how to apply them in solving Differential Equations. 5. **Study** the concept of Fourier and inverse Fourier Transform of a function and various properties.	1. **Expand** any function which is continuous, Discontinuous, even or odd in terms of its Fourier series. 2. **Formulate t**he Partial differential equations by eliminating arbitrary constants and functions and solve linear, non linear Partial differential equations. 3. **Solve the** one dimensional wave(Vibrations of a string), heat equations and two dimensional heat equations. 4. **Evaluate** Laplace transforms and inverse Laplace transforms of functions. Apply Laplace transforms to solve ordinary differential equations arising in engineering problems. 5. **Determine** Fourier transform, Fourier sine and cosine transform of a function.

UNIT-I: (14 Hours)
Laplace Transforms: Introduction to Laplace transforms - Inverse Laplace transform - Sufficient Condition for Existence of Laplace Transform –Properties of Laplace Transform- Laplace Transform of Derivatives - Laplace Transform of Integrals - Multiplication by t^n - Division by t – Evaluation of Integrals by Laplace Transforms- Convolution Theorem - Application of Laplace transforms to Initial value Problems with Constant Coefficients.

UNIT-II: (10 Hours)
Fourier series: Introduction to Fourier series – Conditions for a Fourier expansion – Functions having points of discontinuity – Change of Interval - Fourier series expansions of even and odd functions - Fourier Expansion of Half- range Sine and Cosine series.

UNIT-III: (10 Hours)
Fourier Transforms: Fourier Integral Theorem (without Proof) - Fourier Transforms – Inverse Fourier Transform - Properties of Fourier Transform –Fourier Cosine & Sine Transforms.

UNIT-IV: (10 Hours)
Partial Differential Equations : Formation of first and second order Partial Differential Equations - Solution of First Order Equations – Linear Equation - Lagrange's Equation - Non-linear first order equations – Standard Forms.

UNIT-V: (8 Hours)
Applications of Partial Differential Equations: Method of Separation of Variables - One Dimensional Wave Equation- One Dimensional Heat Equation – Two Dimensional Heat equation Laplace's Equation- (Temperature distribution in long plates).

Learning Resources:

1. **Text Books:**
   1. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
   2. Higher Engineering Mathematics, Dr.B.S Grewal 40th Edition, Khanna Publishers.
2. **Reference Books:**
   1. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
   2. A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.
3. **Online Resources :**
   1. **http://tutorial.math.lamar.edu/Classes/DE/DE.aspx**

2. **http://mathworld.wolfram.com/topics**
3. **http://www.nptel.ac.in/course.php**

The break-up of CIE : Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF CIVIL ENGINEERING

MECHANICS OF MATERIALS
SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U19ES310CE
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
In this subject the students will	Upon the completion of this course students will be able to
1. Learn the analysis of members subjected to axial and transverse loads. 2. Assess the behavior of columns subjected to axial loads and compute stresses in beams due to bending. 3. Analyse the stresses developed in shafts, springs due to torsion and internal pressure in cylinders.	1. Analyse members subjected to axial loads including thermal effects using basic concepts of Mechanics of materials. 2. Draw shear force and bending moment diagrams in statically determinate beams. 3. Compute stresses and strains in bending, shear and principal stresses. 4. Determine the deflection of statically determinate beams subjected to UDL and point loads using double integration method and apply Euler's theory for long columns. 5. Compute stresses in circular shafts for torsion, springs subjected to axial load and stresses induced in cylinders.

UNIT-I: **Stresses and Strains:** Definitions, types of stresses and strains. Elasticity and plasticity. Hooke's law. stress-strain diagrams for engineering materials. Modulus of elasticity. Poisson's ratio. Relationship between elastic constants. Linear and volumetric strains. Bars of uniform strength. Temperature stresses. Compound bars.

UNIT-II: Shear Force and Bending Moment: Bending moment and shear force diagrams for cantilever, simply supported beams and beams with overhangs carrying point and uniformly distributed loads. Relationship between intensity of loading, shear force and bending moment.

UNIT-III:Stresses in Beams: Simple theory of bending. Moment of resistance. Modulus of section. Distribution of shear stresses in rectangular, I- and T-, standard steel and hollow sections. Compound stresses, principal stresses and strains. Mohr's circle of stress.

UNIT-IV:Deflections: Slope and deflections by the method of double integration in cantilever, simply supported beams and beams with over hangs subjected to point loads and uniformly distributed loads.
Columns: Euler's theory of long columns with axial load.

UNIT-V: Torsion: Derivation of torsion formula for circular sections. Torsional stresses, angle of twist, power transmission, effect of combined bending and torsion. Close coiled helical springs with axial load.

Cylinders: Stresses in thin and thick cylinders with internal and external pressures. Hoop and longitudinal stresses. Stresses in compound cylinders.

Learning Resources:

1. Ferdinand P. Beer, E. Russell Johnston , John T. Dewolf, Mechanics of Materials, 2017.
2. Ramamrutham S., Narayanan R., Strength of Materials, Dhanpat Rai Publishing Company, 2011.
3. Bansal R.K., A text book of Strength of Materials, Laxmi Publications, 2010.
4. Rajput R.K., Strength of Materials, S.Chand Publications, 2006.
5. Junnarkar S.B., Mechanics of Structures (Vol-I & II), Charotar Publishing House, Anand, 2002.
6. Pytel and Singer F.L., Strength of Materials, Harper & Row, New York, 1999.
7. Subramanian R., Strength of Materials, Oxford University Press, 2010.
8. Hibbeler.R., Mechanics of Materials, Pearson Publishers, 2017
9. Bhavikatti.S.S, Strength of Materials, Vikas Publishers, 2013

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

MATERIALS ENGINEERING

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **U19PC310ME**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE *The objective of the course is to*	**COURSE OUTCOMES** *On completion of the course, students will be able to*	
study phase diagrams, heat treatment, crystal defects, loading and failure of metals and alloys.	1	explain property changes in metals and alloys using phase diagrams
	2	assess property changes in metals due to different heat treatment processes
	3	describe the relationship between crystal defects and mechanical properties
	4	estimate the behavior of metals under different loading conditions.
	5	explain properties and applications of alloy steels and non ferrous alloys.

UNIT-I: STRUCTURE OF ALLOYS

Construction and interpretation of Thermal equilibrium diagram of binary nonferrous alloys, Gibb's phase rule, Study of Eutectic, Eutectoid, Peritectic, Peritectoid and monotectic reactions. Lever rule. Iron– Iron Carbide Equilibrium diagram, Study and interpretation.

Plain Carbon Steels: types, properties and applications

Cast Irons: types, properties and applications.

UNIT-II: HEAT TREATMENT

Purpose of heat treatment, Annealing, Normalising, Hardening, Tempering, Construction and interpretation of T.T.T curve. Austempering and Martempering. Case Hardening: Carburising, Nitriding, Carbo–nitriding, Flame Hardening, Induction Hardening, brief introduction of Age Hardening.

UNIT-III: CRYSTAL STRUCTURE & ATOMIC PACKING

Common crystal structure of metals, Calculation of atomic packing factor for simple cubic, BCC, FCC and HCP crystal structures.

Defects in crystals, point, line, surface and volume defects. Mechanisms of plastic deformation: slip and twinning, Effect of dislocations on plastic deformation, Critical resolved shear stress, Hall– Petch equation, cold working and hot working, strain Hardening and Bauschinger effect. Recovery, Recrystallisation, Grain growth and its effect on mechanical properties of metals.

UNIT-IV:

Fracture: Types of fracture in metals, Ductile and brittle fracture, Griffith theory of brittle fracture, modes of fracture, ductile-brittle transition.

Fatigue: Types of fatigue loading, Experimental determination of fatigue strength (RR– Moore Test),S–N Curve, Structure of fatigue fractured specimen, Effect of metallurgical variables on fatigue of metal, Low cycle fatigue, Cumulative fatigue damage, Factors to be considered for the improvement for the fatigue life.

Creep: Creep Test, Creep curve, Creep strength, Creep deformation mechanisms, difference between creep curve and stress-rupture curve.

Diffusion: Fick's laws of diffusion, Application of diffusion theory in Mechanical Engineering.

UNIT-V: ALLOY STEELS AND NON-FERROUS ALLOYS

Effects of alloying elements like Nickel, Chromium, Manganese, Silicon and Tungsten and Titanium. Study about Stainless steels, HSS, Maraging steels, Hadfield steel, Brass, Bronze, Invar, Duralumin and Ti Alloy (Ti– 6Al– 4V) – their composition, properties and applications.

Super alloys:Hastelloy, Inconel- composition, properties and applications.

Learning Resources:

1. V. Raghavan, "Material Science and Engineering", 5th Edition, Prentice Hall of India Ltd., 1994.
2. S.H. Avner, "Introduction to Physical Metallurgy", 2nd Edition, Tata McGraw Hill, 1997.
3. William D. Callister and David G. Rethwisch, "Materials Science and Engineering: An Introduction", 9th Edition, John Wiley and Sons Ltd., 2014
4. OP Khanna, "Metallurgy and Material Science" . S. Chand, New Delhi 2005.
5. E. Dieter, "Mechanical Metallurgy", 3rd Edition, Tata McGraw Hill, 1997.
6. William F Smith, Javad Hashemi, Ravi Prakash, "Material Science and Engineering", 5th Edition, McGraw Hill Education, 2014.
7. Physical Metallurgy Principles - Robert E Reed-Hill and Reza Abbaschian, 4th Edition, Cengage Learning,

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

THERMODYNAMICS

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **U19PC320ME**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

Course Objectives	Course Outcomes
Thermodynamics deals with energy, matter and the laws governing their interactions. It is useful in the design of processes, devices and systems involving effective utilization of energy and matter. The course emphasizes on the fundamentals and concepts of the laws of thermodynamics as applied to control mass and control volume systems, to various thermal systems working on air and vapour power cycles.	On completion of the course the student will be able to: 1. Apply the basic knowledge of thermodynamics to determine the state properties 2. Estimate the thermodynamic properties of pure substances by using the tables of properties 3. Estimate the energy transfers by applying the first-law of thermodynamics to closed system (control mass) and open system (control volume) 4. Analyze the problems on heat engines, refrigerators and entropy by applying second-law of thermodynamics to various systems and processes 5. Evaluate the performance of air standard cycles and vapour power cycle

UNIT– I: Basics of Thermodynamics

Concept of system: control mass and control volume; Macroscopic and Microscopic approaches; concept of Continuum; thermodynamic properties, state of substances, process and cyclic process, quasi-steady process, thermodynamic equilibrium; definition of energy, pressure and temperature; ideal gas; zeroth-law of thermodynamics; temperature scales.

UNIT – II: Properties of Pure Substances

Definition of phase and phase change, vapour-liquid-solid phase equilibrium (saturation curves/Mollier diagram) of pure substances; P-T, P-v and T-v diagrams; estimation of properties using thermodynamic tables.

UNIT – III: First-law of Thermodynamics

Definition of Work and Heat; Joule's experiment; first-law to a control mass undergoing a process; Energy as property of system; internal energy, enthalpy and specific heat; P-v and T-v diagrams; conservation of mass and energy to a control volume; steady-state process, steady flow energy equation (SFEE): applications; PMM-1; first-law rate equation to a control mass and control volume; problem solving;

UNIT – IV: Second-law of Thermodynamics

Reversible and irreversible processes; heat engine, heat pump and refrigerator; Carnot cycle; performance parameters (efficiency and COP); Kelvin–Planck and Clausius statements; PMM-2, Clausius inequalities; entropy as a property; entropy change in a process, T–s diagram; principle of entropy increase; Exergy/Availability and Anergy; Gibb's equations and Maxwell relations; problem solving.

UNIT– V: Power cycles

Air standard cycles: Otto, Diesel and Dual Cycles; Brayton cycle; work done, air standard efficiency of gas power cycles; simple Rankine cycle and its analysis; problem solving.

Learning Resources:

1. R.E. Sonntag, C. Borgnakke & G.J. Van Wylen, "Fundamentals of Thermodynamics", 6th edition, John Wiley Publications, 2015
2. P.K. Nag, "Engineering Thermodynamics", 5th edition, McGraw Hill Education, 2014.
3. Y. Cengel & M. Boles, "Thermodynamics an Engineering approach", 7th Edition, McGraw Hill, , 2011.
4. E Rathakrishnan, "Fundamentals of Engineering Thermodynamics", 2nd edition, PHI, 2013.
5. ISI Steam Tables in SI units, Indian Standards Institution, New Delhi, SP:26-1983.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

MACHINE DRAWING

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week): 3:0:0	SEE Marks:60	Course Code: **U19PC330ME**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE *The objective of the course is to*	**COURSE OUTCOMES** *On completion of the course, students will be able to*
learn drawing fundamentals, orthographic projections of machine components, and their dimensional proportions and prepare assembly drawings.	1 conversion of pictorial views into orthographic views by interpreting the conventions used in machine drawing using first angle projection method. 2 sketch the fasteners and riveted joints with suitable proportions to learn their details. 3 sketch the rod joints, keys, shaft couplings and bearings with suitable proportions. 4 prepare the assembly drawings from the detailed drawings to be used in assembly.

Unit-I: Introduction

Format of drawing sheet, title block and part list, conventions of drawing lines and dimensions, First and third angle projection methods, scales as per ISO standards, convention for sectional views. Orthographic projections including sectional views of simple machine elements.

Unit-II: Drawing/Sketching of Various views of

Screw Threads: Terminology, Thread forms of V threads and Square threads

Fasteners:

Nuts: Hexagonal nut, Square nut and Special purpose nuts.

Bolts: Hexagonal headed bolt, Methods to prevent rotation of a bolt while screwing a nut.

Locking arrangement for nuts.

Rivited Joints: Riveting, Caulking and Fullering, ,Forms and proportions of rivet-heads, Failure of riveted joints, Dimensions of a riveted joint, Views of riveted lap and butt joints with dimensions.

Unit-III: Drawing/Sketching of various views of

Rod joints: Cotter joint and knuckle joint.

Keys joints: Taper keys and Parallel keys

Shaft couplings:

Rigid Couplings: Muff, Half -lap, Split-muff couplings.

Flanged Couplings: Flanged Coupling, Protected type flange coupling, Solid flanged coupling

Flexible Coupling: Universal and Oldham's coupling.

Shaft bearings: Types of bearings

Journal bearings: Solid bearing and bushed bearing, Plummer block

Pivot bearings: Foot-step bearing

Unit-IV: Assembly Drawings of

Engine parts: stuffing box, cross head for vertical and horizontal engine, connecting rod, eccentric.

Unit-V: Assembly Drawings of

Machine elements: Lathe tail stock, Single tool post.

Miscellaneous: Screw jack, Pipe vice.

Learning Resources:

1. N.D. Bhatt, "Machine Drawing, 28th Edition, Charotar Publishing house, Anand, New Delhi, 1994.
2. N. Siddeshwar, "" Machine Drawing", 5th Edition, Tata Mc Graw Hill Publishing Co. Ltd., 1994
3. K.L. Narayana, P.Kannaiah, K.Venkat Reddy, "Machine Drawing", 2nd Edition, New Age International (P) Ltd., 1999.
4. K.C. John, "Text book of Machine Drawing", PHI Learning, 2010.
5. Ajeet Singh, "Machine Drawing includes Autocad", 2nd Edition, Mc Graw Hill Education, 2014.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

INTRODUCTION TO ENTREPRENEURSHIP
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):1:0:0	SEE Marks:40	Course Code: **U19MC310ME**
Credits : --	CIE Marks:30	Duration of SEE: 02Hours

COURSE OBJECTIVE *The objective of the course is to*	**COURSE OUTCOMES** *On completion of the course, students will be able to*
inspire students develop an entrepreneurial mind-set, educate about the resources and schemes available to start enterprises in India.	1 Demonstrate awareness about entrepreneurship and potentially be an entrepreneur. 2 Generate and analyse the business ideas. 3 Know about the supporting organizations available to establish the business in the country. 4 Prepare a business plan.

Unit-I:Introduction to Entrepreneurship: Entrepreneurial characteristics, classification of enterprises, forms of business organizations, role of entrepreneurship in economic development, start-ups.

Idea Generation and Opportunity Assessment: Ideas in entrepreneurship, sources of new ideas, techniques for generating ideas, opportunity recognition, steps in tapping opportunities.

Unit-II:Institutions Supporting Small Business Enterprises: Central level Institutions: NABARD, SIDBI,NIC,KVIC, NIESBUD,SIDO, DST,EDI,FICCI,CII,ASSOCHAM etc., State level institutions: DICs, SFC, SIDC, etc., Other financial assistance.

Entrepreneurial skills, design thinking, selling and communication,projectformulation and appraisal, preparation of project report, guidelines for report preparation, pitching of a potential venture.

Learning Resources:

1. Bruce R. Barringer and R. Duane Ireland, “Entrepreneurship: successfully launching new ventures”, 3rd edition, Pearson Prentice Hall, 2009.
2. P. Denning and R. Dunham, “The Innovator’s Way”, MIT Press: Cambridge, Massachusetts, 2010.
3. Arya Kumar, “Entrepreneurship”, Pearson Education, Delhi, 2012.
4. Michael H. Morris, D.F.Kuratko, J G Covin, “Corporate Entrepreneurship and Innovation”, Cengage learning, New Delhi,2010
5. Peter F. Drucker, “Innovation and Entrepreneurship”, Routledge Classics, 2015.
6. Eric Ries, “The Lean Start-up”, Currency, 1st edition, 2011.

Web Resources:

7. http://www.learnwise.org

The break-up of CIE: Internal Tests+Assignments + Quizzes

1	No. of Internal Tests:	01	Max.Marks for each Internal Test:	20
2	No. of Assignments:	01	Max. Marks for each Assignment:	05
3	No. of Quizzes:	01	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF CIVIL ENGINEERING

MECHANICS OF MATERIALS LAB
SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week)0 : 0 : 2	SEE Marks:50	Course Code: U19ES311CE
Credits : 1	CIE Marks:30	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
In this subject the students will	*Upon the completion of this course students will be able to*
1. Determine the properties of materials under the action of various loads. 2. Learn the ability to work in a team and make effective presentations.	1. Determine Young's Modulus of materials of beams by conducting deflection test. 2. Assess the quality of materials by conducing hardness test and impact test and also learn the operation of universal testing machine (UTM). 3. Determining modulus of rigidity of materials by conducting torsion test and spring test. 4. Practise working as a team member and lead a team. 5. Demonstrate professional behaviour in conducting the experiments and presenting the results effectively.

List of Experiments

1. Determination of Young's modulus by conducting Deflection test on Cantilever beam
2. Determination of Young's modulus by conducting Deflection test on Simply supported beam
3. Izod Impact test
4. Direct tension test on metal rods
5. Brinnell and Rockwell Hardness test
6. Compression test on brittle and ductile materials
7. Determination of modulus of rigidity by conducting tension test on a helical spring
8. Determination of modulus of rigidity by conducting compression test on a helical spring
9. Determination of modulus of rigidity by conducting torsion test
10. Determination of modulus of elasticity by conducting deflection test on fixed beam
11. Determination of modulus of elasticity by conducting deflection test on continuous beam
12. Bend test on metal rod.

No. of Internal Tests: 01 Max. Marks for Internal Test: 12

Marks for day-to-day laboratory class work 18

Duration of Internal Test: 2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

MATERIALS ENGINEERING LAB

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):0:0:2	SEE Marks:50	Course Code: **U19PC311ME**
Credits :01	CIE Marks:30	Duration of SEE: 03Hours

COURSE OBJECTIVE *The objective of the course is to*	**COURSE OUTCOMES** *On completion of the course, students will be able to*
prepare metallographic samples, observe micro structure for various metals, heat treatment of steel samples and examine micro structures using metal analyzer.	1 describe the relationship between microstructure and properties of ferrous alloys. 2 describe the relationship between microstructure and properties of non- ferrous alloys. 3 assess property changes in steels due to Annealing and Normalising processes. 4 assess property changes in steels due to Hardening and Tempering processes. 5 interpret the microstructure using image analyzer.

List of Experiments:

1. Study of General Procedure for Specimen preparation and Metallurgical Microscope.
2. Preparation of Mounted samples with the help of mounting press.
3. Metallographic study and analysis of Low Carbon Steel.
4. Metallographic study and analysis of Medium Carbon Steel.
5. Metallographic study and analysis of High Carbon Steel.
6. Metallographic study and analysis of Gray Cast Iron.
7. Metallographic study and analysis of Spheroidal cast iron.
8. Metallographic study and analysis of Stainless steel.
9. Metallographic study and analysis of α– Brass.
10. Metallographic study and analysis of α– β Brass.
11. Metallographic study and analysis of Bronze.
12. Study of effect on Hardness of plain carbon steel before and after the following Processes: Annealing and Normalizing.
13. Study of effect on Hardness of plain carbon steel before and after the following Processes: Hardening and Tempering.
14. Measurement of hardenability using Jominy End Quench Test.
15. Study of crystal structure of BCC, FCC and HCP crystals.
16. Demo of Microstructure characteristics by Image Analyzer.

From the above experiments, each student should perform at least 12 (Twelve) experiments.

The break-up of CIE:

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: **2 Hours**			

OPEN ELECTIVE-I offered by Mechanical engineering Department in B.E. III Semester (2020-21)

S.No.	Elective	Code	Title	credits
1	OE - I	U19OE310ME	Geometric Modelling	2
2		U19OE320ME	Mechanical Technology	2
3		U19OE330ME	Basic Heat Transfer for Electronic Systems	2

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Mechanical Engineering

GEOMETRIC MODELLING (Open Elective-I)
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U19OE310ME**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	COURSE OUTCOMES *On completion of the course, students will be able to*
The objective of this course is to understand wire-frame modelling & transformations, surface, solid modelling and assembly modelling techniques.	1 define various geometric modelling techniques and development of wire frame modelling for synthetic entities by using mathematical equations. 2 formulate 2D transformations for geometric model by matrix approach. 3 development of various surfaces using surface modelling. 4 development of solid models using various solid modelling schemes and Study various Assembly constraints, Assembly tree and develop few assembled models.

UNIT-I: INTRODUCTION TO CAD
product life cycle, conventional design and computer aided design.
Wire Frame Modelling: wire frame entities and their definitions. Interpolation and approximation of curves. Concept of parametric and non–parametric representation of circle and helix curves, demonstration of 2D geometry through CAD software.

UNIT-II: SYNTHETIC CURVES
Parametric representation of cubic spline, Bezier and B– spline curves, continuity, properties and characteristics of splines. Concepts of NURBS, synthetic curves demonstration.
2D transformation and their mathematics: Translation, scaling, rotation, Homogeneous co-ordinates, Concatenated transformations.

UNIT-III: SURFACE MODELING
Analytical surfaces: Definitions of planar, surface of revolution, Tabulated cylinder. Synthetic surfaces: Cubic and Bezier surfaces, visualization of different surfaces.

UNIT-IV: **SOLID MODELLING**
C– rep and B– rep and feature instancing, Octree encoding, spatial enumeration, cell decomposition, sweeping approaches. Euler's representation of solid models, creation of solid model in CAD software.
ASSEMBLY MODELING: Assembly constraints, assembly tree, top down assembly, bottom up assembly, development of a history tree for a simple assembly, demonstration of simple assembly.

Learning Resources:

1. Ibrahim Zeid, "CAD/CAM- Theory and Practice", McGraw-Hill Inc. New York, 2011.
2. Steven Harrington, "Computer graphics: a programming approach", McGraw-Hill, 1987.
3. David Rogers, J. Alan Adams, "Mathematical elements for computer graphics", McGraw Hill, 1990.
4. McConnell, J. J. "Computer graphics theory into practice", Jones and Bartlett Publishers, 2006.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

MECHANICAL TECHNOLOGY (Open Elective-I)
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U19OE320ME**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
The objective of this course is to learn the basic principles of excavating equipment, conveying equipment hoisting equipment, concrete producing equipment and pneumatic equipment.	1 identify the operations of various earth moving equipments for maintenance and selection with respect to their applications. 2 justify various conveying equipment for transporting material based on working principles. 3 Explain the working principles of various types of hoisting equipment in civil engineering applications. 4 examine various aggregate and concrete producing equipments used in concrete production and working of pneumatic equipment.

UNIT-I: EXCAVATING EQUIPMENT
General description, operation, maintenance and selection of Earth moving and Excavating Equipment: Shovels, Dragline, Clamshell, Cable excavator, Bucket wheel excavator, Tractor, Bulldozer, Scraper, Trenchers, Grader, Earth Compactors.

UNIT-II: CONVEYING EQUIPMENT
Belt conveyor, Screw Conveyor, Bucket Conveyor, Apron Conveyor and Aerial Ropeway.

UNIT-III: HOISTING EQUIPMENT
Hoist winch, Differential and Worm geared chain hoists, Fork lift trucks, Guyed and stiffly derricks, swing and non– swing mobile crane, whirler crane, Construction elevator, passenger lift and Bucket elevators.

UNIT-IV:
AGGREGATE AND CONCRETE PRODUCING EQUIPMENT
Crushers – Jaw, Gyratory, Hammer and Roll Crushers, Screens – Stationary, Shaking and Vibrating screens. Concrete mixers and Concrete pumps.
Pneumatic Equipment: Reciprocating air– compressor, construction pneumatic tools; jack hammer, paving breaker, Rock drill, concrete vibrator.

Learning Resources:

1. R.L. Peurifoy, “Construction Planning Equipment and Methods”, 7th Edition, McGraw-Hill Publishers, 1956.
2. Mahesh Varma, “Construction Equipment and its planning and application”, Metropolitan books Co, Delhi, 2004
3. Goodes Spence, ”Building and Civil Engineering Plant”, Crosby Lock Wood, 1995.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

BASIC HEAT TRANSFER FOR ELECTRONIC SYSTEMS (Open Elective-I)
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U19OE330ME**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	COURSE OUTCOMES *On completion of the course, students will be able to*
The objective of this course is to study the basic laws of thermodynamics and the cooling of electronic equipment along with basic modes of heat transfer	1 understand and apply the first law of thermodynamics to various engineering problems 2 understand and apply the second law of thermodynamics to various engineering problems 3 formulate heat conduction problems in rectangular, cylindrical and spherical coordinate system by transforming the physical system into a mathematical model. 4 analyse heat transfer processes involved in cooling of electronic components

UNIT-I: INTRODUCTION TO THERMODYNAMICS
Basic Concepts-System, Types of Systems, Control Volume, Surrounding, Boundaries, Universe, Macroscopic and Microscopic viewpoints, Thermodynamic Equilibrium, State, Property, Process, Cycle – Reversibility – Quasi–static process; Zeroth Law of Thermodynamics. Energy in state and in transition-Work and Heat. PMM I – Joule's Experiment – First law of Thermodynamics, First law applied to – process.

UNIT-II: SECOND LAW OF THERMODYNAMICS
Limitations of the First Law; Second Law of Thermodynamics- Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM II, Carnot cycle and its specialties, Clausius inequality, introduction to entropy.

UNIT-III: HEAT TRANSFER
Heat Transfer – Different Modes, governing laws and application to heat transfer: Fourier, Newton, Stefan–Boltzmann laws; general heat conduction equation: Cartesian co-ordinates (derivation), Steady state one-dimensional heat conduction through slabs, hollow cylinders and spheres (numericals); Concept of thermal resistance in series and parallel (composite systems), overall heat transfer coefficient; Critical radius of insulation: concept, derivation and numerical: with and without internal heat generation.

UNIT-IV: INTRODUCTION TO COOLING OF ELECTRONIC EQUIPMENT
Needs & Goals; Temperature effects on different failure modes; Electronic equipment for airplanes, missiles, satellites and spacecraft; electronic equipment for ships & submarines; electronic equipment for communication systems and ground support system; chassis and circuit boards cooling.

Learning Resources:

1. P.K. Nag, "Engineering Thermodynamics", Tata Mc Graw Hill, 4th Edition, 2008.
2. Yunus Cengel & Boles, "Thermodynamics – An Engineering Approach", TMH New Delhi, 2008.
3. Sachadeva R.C., "Fundamentals of Engineering Heat and Mass Transfer", New Age International (P) Ltd Publishers, New Delhi, 2010.
4. Dave S. Steinberg, "Cooling Techniques for Electronic Equipment", Second Edition, John Wiley & Sons, 1991.
5. Yunus Cengel & Afshin J Ghajar, "Heat and Mass Transfer: Fundamentals & its Applications", Mc Graw Hill, 5th Edition, 2013.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

SCHEME OF INSTRUCTION AND EXAMINATION (R-19)

B.E. – MECH : FOURTH SEMESTER (2020-2021)

B.E (MECH) IV Semester								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U19HS430EH	Skill Development-II : Communication Skills in English	2	0	0	3	60	40	2
U19BS410MA	Numerical Methods, Probability & Statistics	3	0	0	3	60	40	3
U19ES410EE	Basic Electrical and Electronics Engineering	3	0	0	3	60	40	3
U19PC410ME	Applied Thermodynamics	3	0	0	3	60	40	3
U19PC420ME	Mechanics of Fluids and Hydraulic Machines	3	0	0	3	60	40	3
U19PC430ME	Kinematics of Machines	3	0	0	3	60	40	3
U19OE4XXXX	Open Elective II	3	0	0	3	60	40	3
PRACTICALS								
U19ES411EE	Basic Electrical and Electronics Engineering Lab	0	0	2	3	50	30	1
U19PC421ME	Fluid Mechanics and Hydraulic Machines Lab	0	0	2	3	50	30	1
U19PC411ME	Applied Thermodynamics lab	0	0	2	3	50	30	1
	TOTAL	**20**	**0**	**6**		**570**	**370**	**23**
	GRAND TOTAL	**26**				**940**		**23**

1) Student should acquire one online course certificate equivalent to two credits during III to VII semester
2) Left over hours allotted to Sports / Library / Mentor Interaction / CC / RC / TC / CCA

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities and Social Sciences

SKILL DEVELOPMENT-II : COMMUNICATION SKILLS IN ENGLISH

(COMMON FOR ALL BRANCHES)

SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs/Week) :2 hours	SEE Marks :60	Course Code:**U19HS430EH**
Credits:2	CIE Marks :40	Duration of SEE: Hours :03

Course Overview:

Be it career or relationships, the harsh truth in today's global scene is that the future of any person is affected strongly by his//her communication skill in English. The four major skills of language learning, listening, speaking, reading and writing provide the right key to success.

Course Objective:

The main objective of this finishing school curriculum is to involve content for all the above mentioned four skills in teaching English and to get students proficient in both receptive and productive skills.

Overview of the delivery Methodology:

- Students will be given Reading/Listening exercises that they have would have to do as a prerequisite for the class room intervention
- Every Session will have activities on all the four skills. Listening, Speaking, Reading and Writing
- The Writing and Reading exercises will be given in the workbook and will carry marks
- Vocabulary exercises will also be part of every session
- Students will be asked to summarise their takeaways in every class in three sentences.
- The Lateral entry students will be given a self study plan for language enhancement and will be given extra reading and writing exercises. This will be done through Talent Sprint's online portal
- To personalize the learning a variety of case studies and structured problem solving activities will be given in small groups and the trainers will facilitate peer reviews.
- Integration of continuous grading (for assignment 1 and 2), instant feedback, (peer review sheets) clear goals, rewards (certificates and appreciation kits), have been included this time for positive reinforcement.

Unit 1: Discussions and Debates

Module Overview:

The module enables the students to build strategies for effective group interaction and help them in developing decisive awareness and personality maintaining emotional balance.

Learning Outcome:

The students should be able to:

- Participate in group and forum discussions by providing factual information, possible solutions, and examples.
- Debate on a topic by picking up the key points from the arguments placed.

Competencies:

- Analytical and Probing Skills
- Interpersonal Skills
- Comprehending key points of the debate and note decisive points including supporting details.
- Construct a logical chain of arguments and decisive points.

Sessions:

1. Six Thinking Hats
2. Biker B
3. Initiation Techniques
4. Generating points (VAP,SPELT,KWA)
5. Summarization Techniques

Unit 2: Powerful Presentations

Unit Overview:

Presentations need to be very straightforward and logical. This Module is designed to introduce students to an ideal structure for a presentation

Learning Outcome:
Students should be able to:

- Provide logical conclusions to the topics under discussion.
- Prepare, present, and analyze reports.
- Analyzing the points discussed.
- Connecting all points without gaps.
- Identifying clinchers.
- Communicating the decisions

Sessions:

1. Persuasion skills
2. Debating Structure and Content
3. Toulmin Model
4. Case Study Based Group Discussions

Unit 3 - Effective Technical Writing

Unit Overview:
Organizing writing in a logical order, using headings and easy-to-see bookmarks, and formatting table information are important for technical writing. This module is designed to give the trainees inputs on how to organize using Information Mapping.Editing plays an important role in Technical Writing. In this unit the trainees are also given inputs to correct spelling, language and Punctuation errors.

Learning Outcome:
The Students should be able to choose appropriate words and tone to present accurate, specific, and factual written documents

Competencies:

- Reporting an incident
- Writing/Presenting an essay
- Language and Vocabulary

Sessions:

1. Information Mapping
2. Report writing
3. Memos
4. SoP (statement of purpose)
5. MoM (Minutes of the Meeting)

Unit 4 - Reading for Content and Context

Unit Overview:
This course is designed to develop and improve reading and study skills needed for college work. Topics include identifying main idea and supporting details, determining author's purpose and tone, distinguishing between fact and opinion, identifying patterns of organization in a paragraph or passage and the transition words associated with each pattern, recognizing the relationships between sentences, identifying and using context clues to determine the meanings of words, identifying logical inferences and conclusions, and recognizing the point and support of an argument.

Learning Outcomes
Upon completion of the course, students should be able to:

1. Compose a summary of beginning high level reading text that identifies the thesis and key supporting details.
2. Summarize with 70% comprehension.
3. Apply reading skills, including how to approach different types of literature.

Competencies

- Distinguish facts from opinions.
- Make inferences
- Identify author's purpose, point of view, tone, and method of development.
- Comprehend the use of figurative language.
- Synthesize information gathered from reading in order to give informed opinion.

Sessions:

1. Skimming and Scanning Techniques
2. Recognition of author's purpose
3. Awareness of stylistic differences
4. Evaluation of fact and opinion
5. Discernment of fact and opinion

Unit 5 – Critical Reading Skills

Unit Overview:

Research shows that good reading skills can lead to well written assignments. In this unit, students will learn reading strategies to understand and retain information, to understand the organization of reading passages, and strategies for learning and retaining vocabulary. Building on these basic strategies, students will develop skills to critically analyze texts. In addition, students will practice and develop paraphrasing and summarizing skills. Students will receive ongoing feedback on their assignments throughout the course.

Learning Outcomes

- Recognition of propaganda techniques
- Present vocabulary building methods
- Use comprehension and vocabulary strategies to raise reading rate.

Competencies:

The student will enhance the ability to apply the following critical thinking skills when reading:

a. Understand the meaning of new vocabulary through:

1) Context clues, e.g., synonyms, antonyms, examples, definitions, and restatements, etc.

2) Roots and affixes

b. Analyze text, e.g., simple outlining and note taking, summarize, draw conclusions, and apply information to personal experiences.

Sessions

1. Contextual Vocabulary
2. Theme Detection
3. Note making and Inference
4. Main idea identification
5. Précis Writing
6. Critical Response

Students are given workbooks prepared by Talent Sprint.

The break-up of CIE : Internal Tests + Assignments + Quizzes

1.	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mathematics

NUMERICAL METHODS, PROBABILITY & STATISTICS

SYLLABUS FOR B.E. IV-SEMESTER

(Civil, EEE & Mechanical only)

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : **U19BS410MA**
Credits :3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. **Study t**he methods to solve algebraic and transcendental equations, apply numerical methods to interpolate 2. **Understand** numerical differentiation and integrate functions and to solve differential equations using numerical methods. 3. **Understand** Random variables Probability Distributions. 4. **Understand** tests of hypothesis for large and small samples**.** 5. **Study** the method to fit different curves to a given data, how Correlation between variables can be measured.	1. **Solve** algebraic and transcendental equations using Bisection method Regula-Falsi, Newton-Rap son and apply numerical methods to interpolate. 2. **Solve** problems using numerical differentiation using interpolation approach and differential equations using numerical methods. 3. **Apply** various probability distributions to solve practical problems. 4. **Estimate** unknown parameters of populations and apply the tests of hypotheses for large and small samples. 5. **Solve** problems to fit various curves to the given data using curve fitting, and also to find co-efficient of correlation and to determine regression lines and their applications.

UNIT-I: (10 Hours)

Interpolation:

Finite Differences- Interpolation- Newton's Forward and Backward Interpolation Formulae – Interpolation with unequal intervals – Lagrange's Interpolation Formula – Divided differences – Newton's Divided difference formula.

UNIT-II: (10 Hours)

Numerical Solutions of ODE:

Numerical Differentiation -Interpolation approach- Numerical Solutions of Ordinary Differential Equations of first order - Taylor's Series Method - Euler's Method - Runge-Kutta Method of 4^{th} order(without proofs)

UNIT-III (10 Hours)

Probability:

Random Variables - Discrete and Continuous Random variables-Properties- Distribution functions and densities - Expectation – Variance – Normal Distribution.

UNIT-IV: (12 Hours)

Test of Hypothesis:

Introduction -Testing of Hypothesis- Null and Alternative Hypothesis -Errors- -Level of Significance – Confidence Intervals-Tests of Significance for small samples - t-test for single mean - F- test for comparison of variances - Chi-square test for goodness of fit – Introduction to Design of experiments.

UNIT-V: (10 Hours)

Curve Fitting:

Curve fitting by the Method of Least Squares - Fitting of Straight line- Regression - Lines of Regression Correlation – Karl Pearson's Co-efficient of Correlation.

Learning Resources:

1. **Text Books:**

3. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
4. Higher Engineering Mathematics, Dr.B.S Grewal 40^{th} Edition, Khanna Publishers.

5. Probability, Statistics and Random Processes, T. Veerarajan , Tata MCGraw Hill Education Private Ltd.

2. **Reference Books:**

3. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
4. A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.
5. Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand & sons, New Delhi.

3. **Online Resources :**

4. **http://tutorial.math.lamar.edu/Classes/DE/DE.aspx**
5. **http://mathworld.wolfram.com/topics**
6. **http://www.nptel.ac.in/course.php**

The break-up of CIE : Internal Tests + Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Electrical and Electronics Engineering

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(For Mechanical Engineering students)
SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week): 2:0:0	SEE Marks: 60	Course Code:U19ES410EE
Credits: 2	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
The objective of this course is to provide an understanding of Electronic Devices, Linear and Digital circuits, enhancing the ability to solve the problems using fundamental concepts of AC circuits, three phase connections, principle of operation of Transformers, DC machines and AC machines.	1. Apply the fundamental concepts to solve the problems in single phase and 3 phase AC circuits. 2. Analyze the behaviour of transformer and demonstrate the principle of operation and performance characteristics of DC Machines. 3. Select suitable three phase induction motor and also interpret speed control method for different applications. 4. To understand the Electronic devices, Operational Amplifier Fundamentals & OP-AMP Linear Applications. 5. Understand the number system, different codes, and code conversion and Design different combinational circuits.

Unit-I

Electrical Circuits:

Ohm's law, KCL, KVL, single phase AC circuit fundamentals, power, power factor, 3 phase AC circuits–star and delta Connection.

Unit-II

DC Machines: Construction and principle of operation, classification, back emf, torque equation, speed torque characteristics, losses and efficiency, speed control of DC motor, applications.

AC Machines:

1- ϕ Induction Motor: operating principle of split phase, capacitor start & capacitor run induction motor.

3 –ϕ Induction Motor: construction, principle of operation, torque equation, speed torque characteristics.

Single phase Transformers: Types of transformer, construction and working principle.

Unit-III

Electronic Devices and Circuits: Operation and V–I characteristics of PN junction diode, BJT, MOSFET and SCR, applications. Half wave and full wave uncontrolled rectifier, basic filters.

Unit – IV

Linear Integrated Circuits: Operational amplifiers, ideal op – amp characteristics, inverting and non-inverting amplifier. Op – amp applications: adder, subtractor, integrator, differentiator, comparator, zero crossing detector.

Unit – V

Digital Electronics: Number systems, logic gates, half adder, full adder, parallel adder/ subtractor, flipflops – RS, JK, T and D.

Learning Resources:

1. Mehta.V.K and Rohit Mehta, “Principles of Electrical Engineering and Electronics”, S.Chand&Co. Limited, New Delhi, 2006.
2. Muthusubramanian.R,Salivahanan.SandMuraleedharan.K.A,“BasicElectrical,ElectronicsandComputerEngineering”,Tata McGraw-Hill Publishers, 2006.
3. MurugeshKumar. K, “Basic Electrical Science and Technology”, Vikas Publishing Limited, 2011.
4. Roy Choudhury and ShailJain, “Linear Integrated Circuits”, New Age International Limited, 2003.
5. Leach. D. P, Malvino. A.P and Goutam Saha, “Digital Principles and Applications”, Tata McGraw –Hill, 2008.

The break-up of CIE : Internal Tests + Assignments + Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

APPLIED THERMODYNAMICS

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **U19PC410ME**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

Course Objectives	Course Outcomes
The objective of the course is to describe the reciprocating air compressors, internal combustion engines and the combustion phenomenon, steam boilers and condensers, analyze vapour power cycles and steam nozzles.	On completion of the course the student will be able to 1. analyze the performance and solve numerical problems of single stage and double stage reciprocating air compressors 2. describe the various cooling, lubrication, ignition & fuel supply systems and evaluate the performance parameters of internal combustion (IC) engines 3. discuss various stages of combustion phenomena in IC engines 4. explain the working principles of different boilers and condensers 5. analyze the performance of vapour power cycles and steam nozzles

Unit-I: Reciprocating Air Compressors

Applications of compressed air; classification of compressors–single and multi-stage compressors, work done with and without clearance volume, work done in single- and multi-stage compressors; effect of clearance volume on work done; inter-cooling and after-cooling; problem solving.

Unit-II: Internal Combustion Engines

Classification of IC engines, working principle of 2-stroke, 4-stroke: SI and CI engines; valve- and port-timing diagrams; deviation of actual cycles from air standard cycles; battery and magneto ignition systems; working principle of simple carburettor and its limitations, multipoint fuel injection system, lubrication systems, cooling systems; Performance of IC engines: indicated power, brake power, frictional power; brake thermal efficiency, mechanical efficiency, indicated thermal efficiency, relative efficiency, volumetric efficiency, specific fuel consumption (SFC) based on brake power and indicated power; heat balance sheet; problem solving.

Unit-III: Combustion in IC Engines

Normal and abnormal combustion phenomena in SI engines and CI engines; effect of engine variables on stages of combustion and knocking; Fuel requirements and fuel rating; anti-knock additives: merits and demerits; types of combustion chambers in SI and CI engines; air pollution from IC engines and control of exhaust.

Unit-IV: Steam Boilers and Condensers

Classification of boilers-fire tube boilers- Cochran boiler; water tube boilers-Babcock and Wilcox boiler; super critical boilers-Benson boiler; fluidized bed combustion boilers; boiler mountings and accessories; boiler performance; boiler draught; types of condensers: jet and surface condensers; introduction to cooling towers.

Unit-V: Steam Power Plant and Nozzles

Working of Carnot and Rankine cycles; thermal analysis of cycles; modified Rankine cycle, cycle efficiency improvement methods: reheating and regeneration; cogeneration; steam nozzles: Types of nozzles; nozzle efficiency; steam velocity; mass of steam discharged; condition for maximum discharge; critical pressure ratio; throat and exit diameters for maximum discharge; problem solving.

Learning Resources:

1. Eastop, T.D, Mc Conkey, A, "Applied Thermodynamics for Engineering Technologists", 5th Edition, Pearson Education, New Delhi, 2017.
2. Ganeshan. V, "Internal Combustion Engines", 4th edition, Tata McGraw-Hill Education Pvt. Ltd., New Delhi, 2010.
3. Rajput R.K, "Thermal Engineering", 10th edition, Laxmi Publishers, New Delhi, 2016.
4. Mathur & R.P. Sharma, Internal combustion engines, Dhanapat Rai & Sons,2013.
5. Ballaney. P.L, "Thermal Engineering", 25th edition, Khanna Publishers, New Delhi, 2010.

Data book: S.C. Jain, "Steam tables", 15th edition, Birla publications Pvt. Ltd., New Delhi 2006.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

MECHANICS OF FLUIDS AND HYDRAULIC MACHINES

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **U19PC420ME**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES *The objectives of the course are to*	**COURSE OUTCOMES** *On completion of the course, students will be able to*
understand properties of fluids, fluid flows, conservation equations, flow through pipes, boundary layer flows, flow separation, hydrodynamic forces on vanes / blades, performance of fluid machines.	1 calculate the fluid and flow properties, 2 apply conservation equations to predict the flow characteristics, 3 determine the pressure drop and pumping power in pipe flows, 4 design and estimate the efficiency of pumps and turbines under different operating conditions (heads).

UNIT-I

Properties of Fluids: Introduction to fluid mechanics, definition of fluid and flow, continuum fluid, fluid and flow properties; Newtonian and non–Newtonian fluids, ideal and real fluids; vapour pressure, compressibility, surface tension, problem solving. Fluid Statics: pressure at a point, Pascal's law, atmospheric pressure, absolute, gauge and vacuum pressures, simple and differential manometers; problem solving.

UNIT-II

Fluid Kinematics: Lagrangian and Eulerian approach for fluid flow; Classification of fluid flows: steady and unsteady flows, uniform and non-uniform flows; velocity and acceleration in a flow; stream line, path line, streak line, rotational and irrotational flows, velocity potential and stream function, Laplace equation, Poission equation; problem solving; Fluid Dynamics: mass, momentum and energy conservation laws; continuity equation in Cartesian coordinate system, problem solving; forces acting in fluid flows, Euler equation and Bernoullie equation, venturi meter, orifice meter, problem solving; principle of impulse momentum, forces on a pipe bend, problem solving.

UNIT-III

Boundary Layer (BL) flows: formation of BL and its thickness, displacement, momentum and energy thickness, BL flow characteristics, separation of boundary layer; submerged objects – drag and lift; Laminar Flow in Pipes: Reynolds experiment, steady flow in circular pipes, Hagen–poiseullie equation, problem solving. Turbulent Flow in pipes: introduction, head loss – major (Darcy–Weisbach equation) and minor losses.

UNIT-IV

Impact of Jets: Hydrodynamic force on stationary and moving blades (flat and curved), velocity triangles, work done and efficiency; Hydraulic Turbines: layout of hydraulic power plant, working principle of Pelton, Francis and Kaplan turbines, velocity triangles, work done, efficiencies, specific speed, unit quantities, model parameters for turbines, draft tube, functions and types; cavitation.

UNIT-V

Centrifugal Pumps: Classification, working principle, velocity triangles, types of head, work done, efficiencies, minimum starting speed, specific speed, unit quantities, problem solving; Reciprocating pumps: Classification, working principle, single and double acting pumps, discharge, work done and power, slip, pressure head in the suction and delivery pipes, indicator diagrams, problem solving.

Learning Resources:

1. Frank M White, "Fluid Mechanics", Tata McGraw-Hill, 7th Edition, 2012
2. Modi P.N. and Seth S.M., "Hydraulics and Fluid Mechanics including Hydraulics Machines", Standard Book House, Delhi, 2015.
3. D.S. Kumar, "Fluid Mechanics and Fluid Power Engineering" S.K. Kataria & Sons, Re-print 2014
4. Robert W. Fax, Philip J. Pritchard, Alan T. McDonald "Introduction to Fluid Mechanics", Wiley India Edition. (Wiley Student Edition Seventh 2011).
5. R.K. Bansal, "Fluid Mechanics and Hydraulic Machines", Lakshmi Publications, 2010.

Web Resources:

1. http://nptel.ac.in/courses/112105171/
2. http://nptel.ac.in/courses/112106190/
3. http://nptel.ac.in/video.php?subjectId=105101082
4. http://web.mit.edu/hml/ncfmf.html
5. http://ocw.uci.edu/courses/engineering_mae_130a_intro_to_fluid_mechanics.html.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

KINEMATICS OF MACHINES
SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **U19PC430ME**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES *The objective of the course is to*	**COURSE OUTCOMES** *On completion of the course, students will be able to*
perform kinematic analysis of planar mechanisms and to analyze the transmission of motion using lower and higher kinematic pairs.	1 recognize the mobility of mechanisms and inversions of four-link kinematic chains. 2 perform kinematic analysis of planar mechanisms. 3 understand the steering gear mechanisms and analyze the motion transmission by using belt drive. 4 design the cam profile for the given required motion of the follower. 5 analyze the motion transmission by using gear drives.

UNIT-I:
Definitions: Kinematic link, pair, chain, mechanism and machine. Classification of links, pairs. Degrees of freedom of mechanisms using Kutzbach and Grubler's criterion.
Inversions: Quadric cycle chain, single and double slider crank chains.
UNIT-II
Analysis of Mechanisms
Velocity analysis: Graphical Relative velocity and Instantaneous centre methods.
Acceleration Analysis: Graphical method for different mechanisms including Coriolis component of acceleration.
Kinematic analysis of slider crank mechanisms using analytical method.
UNIT-III
Special Mechanisms: Steering gear mechanisms Davis and Ackerman. Hooke's joint.
Belt and Chain Drives: Open and cross belt drives, Length of belt, Ratio of tensions, Effect of Centrifugal tension and initial tension over power transmission, Conditions for maximum power. Chain drives.
UNIT-IV: CAMS
Types of Cams and followers, Nomenclature of cam. Displacement diagrams for followers: uniform velocity, parabolic , simple Harmonic and cycloidal motions. Layout of cam profiles for translating motion - knife edge, flat and roller followers and for oscillating motion - roller follower.
UNIT-V
Gears: Classification of gears, Nomenclature, Law of gear tooth action, Cycloidal and involute tooth profiles. Expressions for velocity of sliding between teeth, path of contact, arc of contact and contact ratio. Interference of involute gears, minimum number of teeth to avoid interference.
Gear Trains: Simple, Compound, Reverted and Epi-cyclic Gear Trains.

Learning Resources:

1. S.S. Ratan, "Theory of Machines", 4th Edition, McGraw-Hill, 2014.
2. Thomas Bevan, "Theory of Machines", 3rd Edition, CBS Publishers, 2005.
3. R.L. Norton, "Kinematics and Dynamics of machinery", 1st Edition, McGraw -Hill, 2009
4. J.E. Shigley, "Theory of Machines", 4th Edition, Oxford University press, 2015.
5. Amitabha Ghosh and Asok Kumar Mallik, "Theory of Machines", 3rd Edition, East West Press, 2006

Web resources:
1. www.journals.elsevier.com/mechanism-and-machine-theory
2. www.nptel.ac.in

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

Department of Electrical and Electronics Engineering

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB
(For Mechanical Engineering students)
SYLLABUS FOR B.E. IV SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks:50	Course Code:U19ES411EE
Credits :1	CIE Marks:30	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1. To introduce to students the basics of Electrical and Electronic circuits, electrical machines.	1. To familiarize with the basic experiments on electrical and electronic fundamentals and machines. 2. Design the circuits related to opamps and digital IC's. 3. Able to apply the concepts of electrical and electronics circuits to engineering applications.

List of Experiments:

1. Verification of Ohm's law and Kirchoff's laws.
2. Measurement of power and power factor in single phase R – L – C series circuit.
3. Mechanical characteristics of DC shunt and compound motor
4. Load test on 3 – phase induction motor.
5. Speed control of DC shunt motor.
6. Load test on single phase transformer.
7. V – I characteristics of BJT and MOSFET.
8. Study of half wave and full wave rectifiers with and without filters.
9. Applications of operational amplifier: Adder, subractor, integrator and differentiator.
10. Study of logic gates
11. Implementation of binary half adder and full adder/subtractor.
12. Generation of triangular, sine and square wave using IC's

From the above experiments, each student should perform at least 10 (Ten) experiments.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: **3 Hours**			

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

FLUID MECHANICS AND HYDRAULIC MACHINES LAB

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):0:0:2	SEE Marks:50	Course Code: **U19PC421ME**
Credits :01	CIE Marks:30	Duration of SEE:03Hours

COURSE OBJECTIVE *The objective of the course is to*	**COURSE OUTCOMES** *On completion of the course, students will be able to*
provide practical knowledge in verification of principles of fluid flow while imparting knowledge in measuring pressure, discharge and velocity of fluid flow. Also gain knowledge in performance testing of hydraulic machines.	1 determine the coefficient of impact on semi circular vane under constant jet velocity. 2 evaluate the discharge coefficients of various flow measuring devices. 3 evaluate the performance of impulse and reaction turbines at constant head. 4 calculate the efficiency of dynamic and positive displacement pumps for various flow rates.

List of Experiments:

1. Determination of type of flow by Reynolds apparatus.
2. Verification of Bernoulli's Equation for an incompressible flow.
3. Determination of discharge coefficient of venture meter
4. Determination of discharge coefficient of orificemeter.
5. Determination of friction factor in pipe flow.
6. Determination of impact coefficient of jet on given vane.
7. Performance characteristic curves of a Pelton wheel at constant head.
8. Performance characteristic curves of a Francis Turbine at constant head.
9. Performance characteristic curves of a Kaplan Turbine at constant head.
10. Performance characteristic curves of a centrifugal pump at constant speed.
11. Performance characteristic curves of a self priming pump at constant speed.
12. Performance characteristic curves of a reciprocating pump at constant speed.
13. Performance characteristic curves of a gear pump at constant speed.
14. Performance characteristic curves of a centrifugal pump at variable speed.

From the above experiments, each student should perform at least 12 (Twelve) experiments.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: **2 Hours**			

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

APPLIED THERMODYNAMICS LAB

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):0:0:2	SEE Marks:50	Course Code: **U19PC411ME**
Credits :01	CIE Marks:30	Duration of SEE:03Hours

COURSE OBJECTIVES *The objective of the course is to*	**COURSE OUTCOMES** *On completion of the course, students will be able to*
perform experiments on various types of I.C. Engines and two stage reciprocating air compressor and also to conduct experiments on Viscometer and flash and fire point apparatus.	1 determine volumetric efficiency and isothermal efficiency of a two stage reciprocating air compressor. 2 draw port timing diagram of two stroke petrol engine and valve timing diagram of four stroke diesel engine. 3 evaluate the performance of internal combustion engines. 4 prepare heat balance sheet of internal combustion engines. 5 determine absolute and kinematic viscosity of a given lubricating oil using Redwood viscometer.

List of Experiments:

1. To determine volumetric efficiency, isothermal efficiency and mass flow rate of a two stage reciprocating air compressor.
2. To study the constructional details of four stroke petrol and diesel engines.
3. To draw port timing diagram of a two stroke Petrol engine.
4. To draw valve timing diagram of a four stroke Diesel engine.
5. To conduct performance test on single cylinder Diesel engine.
6. To conduct heat balance test on a Diesel engine.
7. To conduct performance test on multi-cylinder Petrol engine.
8. To conduct performance test on a two-stroke Petrol engine.
9. To conduct performance test on twin-cylinder Diesel engine.
10. To study the performance of a Petrol engine under different compression ratios.
11. To conduct Morse test on multi cylinder Petrol engine.
12. To study Exhaust gas analysis of Diesel engine for carbon deposits using smoke meter.
13. To determine the viscosity of a given lubricating oil.
14. To determine the flash and fire points of a diesel.

From the above experiments, each student should perform at least 12 (Twelve) experiments.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 **Hours**			

OPEN ELECTIVE-II OFFERED BY VARIOUS DEPARTMENTS IN
B.E. IV SEMESTER (2020-21)

Course Name	Course code	credits
OPTIMIZATION METHODS	U19OE410ME	3

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. IV-SEMESTER
OPTIMIZATION METHODS (Open Elective-II)

Instruction : 3Hours /week	SEE Marks : 60	Course Code : U19OE410ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The objectives of this course are to: understand Linear & non-linear programming, transportation modeling , CPM & PERT for project scheduling and control, and application of various optimization techniques for respective field engineering (Inter disciplinary)	On completion of the course, the student will be able to: 1. Optimization of resources in multi disciplinary areas through linear programming under different conditions. 2. Sensitivity analysis of a linear programming problem as per customer requirements to suit various Organizations. 3. Minimization of total cost to apply for transportation techniques for the transhipment of Goods and products and Implement techniques like project management to analyze about material management. 4. Optimization of resources in multi disciplinary areas through non-linear programming under different conditions.

UNIT-I

Optimization-An overview

Meaning of Optimization-Origin of Optimization-Introduction to Linear programming problems (LPP) - Formulation of LPP- Graphical method, simplex method.

UNIT-II

Advanced topics in Linear programming

Duality in LPP, Differences between primal and dual, shadow prices, Dual simplex method, sensitivity analysis. special cases in LPP.

UNIT-III

Transportation Model

Definition of the transportation model-matrix of Transportation model-Formulation and solution of transportation models- Methods for calculating Initial basic feasible solution-Optimization of transportation model using MODI method.

Project Scheduling

Introduction to network analysis, Rules to draw network diagram, Fulkerson rule for numbering events, Critical path method, PERT.

UNIT-IV

Non linear programming problems

Optimization methods for single variable, multivariable functions, Maxima-Minima

One Dimensional Minimization: Uni-modal Function, Unrestricted search, Exhaustive search,Dichtomous search, Interval Halving method, Fibonacci and golden bisection Method , Newton and Quasi Newton method.

UNIT-V

Non Linear - Unconstrained optimization: classification, scaling of design variables, Random search methods, Univeriate search, pattern Directions, Hook Jeeves, Powel method, Rosenbrock method.

Learning Resources:

1. SingiresuS.Rao, “Engineering optimization- Theory and Practice”, 4th Edition, John Wiley and Sons, 2009.
2. NVS Raju, “Optimization methods for Engineers ", PHI Learning Pvt. Ltd., 2014.
3. Prem Kumar Gupta and Dr. DS Hira, “Operations Research ", S.Chand& Company Pvt. Ltd., 2014.
4. R. Paneerselvam, “Operations Research”, PHI Learning Pvt Ltd., 2009.
5. Kalyanmoy Deb, Optimization for Engineering Design- algorithms and examples, PHI pvt ltd, 1st edition 2003, Delhi.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 1 Hour 30 Minutes