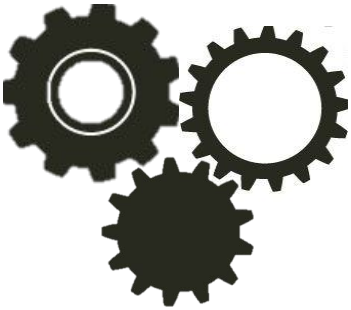
VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
Ibrahimbagh, Hyderabad-31

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-18)
WITH EFFECT FROM 2019-20
(For the students admitted in 2018-19)



DEPARTMENT OF MECHANICAL ENGINEERING

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VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-18)
B.E. – MECH : THIRD SEMESTER (2019-20)

B.E (MECH) III Semester								
Course Code	Course Title	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U18HS330EH	Skill Development-I : Communication Skills in English	2	-	-	3	60	40	2
U18HS010EH	Human Values and Professional Ethics-I	1	-	-	2	40	30	1
U18BS310MA	Partial Differential Equations & Transform Techniques	3	-	-	3	60	40	3
U18ES310CE	Mechanics of Materials	3	-	-	3	60	40	3
U18PC310ME	Materials Engineering	3	-	-	3	60	40	3
U18PC320ME	Thermodynamics	3	-	-	3	60	40	3
U18PC330ME	Machine Drawing	2	-	-	3	60	40	2
U18OE3XXXX	Open Elective-I	2	-	-	3	60	40	2
U18MC310ME	Introduction to Entrepreneurship	1	-	-	2	40	30	-
PRACTICALS								
U18ES311CE	Mechanics of Materials Lab	-	-	2	3	50	30	1
U18PC311ME	Materials Engineering Lab	-	-	2	3	50	30	1
	TOTAL	**20**	**-**	**4**		**600**	**400**	**21**
	GRAND TOTAL	**24**				**1000**		**21**

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

With effect from the Academic Year 2019-20

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities & Social Sciences

SKILL DEVELOPMENT-I: COMMUNICATION SKILLS IN ENGLISH

SYLLABUS FOR B.E.III-SEMESTER

(Common for all Branches)

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U18HS330EH**
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

UNIT-I

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-II

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-III

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-IV

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-V

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:	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 Humanities & Social Sciences

HUMAN VALUES AND PROFESSIONAL ETHICS-I

SYLLABUS FOR B.E.III-SEMESTER

(Common for all Branches)

L:T:P(Hrs/week):1:0:0	SEE Marks:40	Course Code: **U18HS010EH**
Credits :01	CIE Marks:30	Duration of SEE: 02Hours

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

UNIT-I: UNDERSTANDING THE NEED AND PROCESS FOR VALUE EDUCATION

a) Basic Human Aspirations -Philosophy, purpose & objective of Life Understanding and living 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-II: HOLISTIC UNDERSTANDING OF PROFESSIONAL ETHICS AND HUMAN 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.

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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 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: **U18BS310MA**
Credits :03	CIE Marks:40	Duration of SEE: 03Hours

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	1 expand any function which is continuous, Discontinuous, even or odd in terms of its Fourier series.
2 Formulate and understand linear and nonlinear partial differential equations.	2 formulate the Partial differential equations by eliminating arbitrary constants and functions and solve linear, non linear Partial differential equations.
3 Study the applications of Partial Differential equations	3 solve the one dimensional wave(Vibrations of a string), heat equations and two dimensional heat 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.	4 evaluate Laplace transforms and inverse Laplace transforms of functions. Apply Laplace transforms to solve ordinary differential equations arising in engineering problems.
5 Study the concept of Fourier and inverse Fourier Transform of a function and various properties.	5 determine Fourier transform, Fourier sine and cosine transform of a function.

UNIT-I: 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: 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: FOURIER TRANSFORMS

Fourier Integral Theorem (without Proof) - Fourier Transforms – Inverse Fourier Transform - Properties of Fourier Transform –Fourier Cosine & Sine Transforms.

UNIT-IV: 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: 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. 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.
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. http://tutorial.math.lamar.edu/Classes/DE/DE.aspx
6. http://mathworld.wolfram.com/topics
7. http://www.nptel.ac.in/course.php

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

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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 Civil Engineering

MECHANICS OF MATERIALS

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **U18ES310CE**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of the course are	*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 behaviour of columns subjected to axial loads and compute stresses in beams due to bending. 3. Analyze 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

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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

MATERIALS ENGINEERING

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **U18PC310ME**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
The objective of this course is to study phase diagrams, heat treatment and crystal defects, loading and failure of metals.	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 Bauchinger effect. Recovery, Recrystallisation, Grain growth and its effect on mechanical properties of metals.

UNIT-IV:

Fracture: Type 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 NONFERROUS 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", 4th 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,

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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: **U18PC320ME**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
The objectives of this course are to apply the laws of thermodynamics using fundamentals, concepts of steam, air and vapour power cycles	1 apply the basic knowledge of thermodynamics to determine the state properties
	2 estimate the thermodynamic properties of the pure substances by using the property tables
	3 estimate the energy transfers by applying the first law of thermodynamics to closed & open systems
	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, Microscopic and Macroscopic approach of thermodynamics, Properties and State of a substance, State Postulate, processes and cycles, quasi-static process, Thermodynamic Equilibrium, Concept of continuum, Energy, Pressure and Temperature, Ideal gas, Zeroth law of thermodynamics, Temperature Scales.

UNIT-II: PROPERTIES OF A PURE SUBSTANCE

Pure substance, Concept of phase change, Vapour-Liquid-Solid-Phase Equilibrium in a pure substance, graphical representation of pressure, volume and temperature; Tables of Thermodynamic Properties; Properties of steam, steam tables, Mollier diagram, Thermodynamic Surfaces.

UNIT-III: FIRST LAW OF THERMODYNAMICS

Thermodynamic work, Simple Compressible System; Heat, Comparison of Heat and Work; Joule's experiment, Statement of First Law of Thermodynamics for a control mass undergoing a cycle and change of state; Energy as property of system, Internal energy, Enthalpy, Specific heat, First Law as a rate equation, Conservation of mass, First law of thermodynamics for a control volume, steady state processes, Steady Flow Energy Equation, PMM-1, Limitations of first law.

UNIT-IV: SECOND LAW OF THERMODYNAMICS

PMM-2, Heat engine, Heat pump and Refrigerator, Physical description of Second Law of Thermodynamics, Kelvin– Planck and Clausius statements of Second Law of thermodynamics & their equivalence; Carnot cycle, Carnot Theorems, Clausius Inequality, Entropy as a property of a system, Entropy change in various thermodynamic processes, T– S diagrams, principle of Entropy increase; Gibb's equations and Maxwell relations; Concept of exergy and anergy;

UNIT-V: POWER CYCLES

Air standard cycles: Otto, Diesel, Dual cycles, comparison of Otto, Diesel and Dual cycles; Brayton cycle; work done, air standard efficiency of gas power cycles; Simple Rankine cycle: thermal analysis of Rankine cycle.

Learning Resources:

1. R.E.Sonntag, C. Borgnakke & G.J. Van Wylen, "Fundamentals of Thermodynamics", 6th Edition, John Wiley Publications, 2009.
2. P.K.Nag, "Engineering Thermodynamics", 5th Edition, McGraw Hill Education, 2008.
3. Y.Cengel & Boles, "Thermodynamics: An Engineering Approach", 7th Edition, McGraw Hill, 2011.
4. Y.V.C.Rao, "An Introduction to Thermodynamics", 2nd Edition, University Press, 2010.
5. PL Ballaney, "Thermal Engineering", Khanna Publishers, New Delhi, 2010.
6. ISI Steam Tables in SI units, Indian Standards Institution, New Delhi, SP:26-1983.

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

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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):2:0:0	SEE Marks:60	Course Code: **U18PC330ME**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*	
The objectives of this course are to learn drawing fundamentals, orthographic projections of machine components, and their dimensional proportions and prepare assembly drawings.	1	interpret the conventions used in machine drawing and conversion of pictorial views into orthographic views.
	2	sketch the fasteners and joints with suitable proportions.
	3	sketch the machine elements with suitable proportions
	4	prepare the assembly drawings from the detailed drawings.

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

Fasteners: Screw threads, metric and BSW threads, square threads and multi start threads. Nuts, bolts, washers, set screws, lock nuts.

Rivited Joints: Forms and proportions of rivet-heads, different views of riveted lap and butt joints.

Unit-III: DRAWING / SKETCHING OF VARIOUS VIEWS OF

Shaft joints: Cotter joint and knuckle joint.

Keys and shaft couplings: Muff, flanged, flexible, universal and Oldham's coupling.

Shaft bearings: Solid and bush bearing, plummer block, foot step bearing.

Unit-IV: ASSEMBLY DRAWINGS OF

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

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: **U18MC310ME**
Credits : --	CIE Marks:30	Duration of SEE:02Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*	
The objective of this course is to inspire students to develop entrepreneurial mind-set, provide the information about the facilities, schemes available to start enterprise 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 report

UNIT-I:

ENTREPRENEURSHIP

Entrepreneurial characteristics, Classification of Enterprises, Incorporation of Business, Forms of Business organizations, Role of Entrepreneurship in economic development, Start-ups.

Idea Generation and Opportunity Assessment: Ideas generation, 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, Other financial assistance.

Entrepreneurial skills, design thinking, selling and communication. Project Formulation and Appraisal, Preparation of Project Report, Content; Guidelines for Report preparation, Project report and pitching

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 Startup", 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 (along with II int.):	01	Max. Marks for the 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 30 Minutes**

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: **U18ES311CE**
Credits :01	CIE Marks:30	Duration of SEE: 03Hours

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 assessment for day to day evaluation			18
Duration of Internal Test: **3 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: **U18PC311ME**
Credits :01	CIE Marks:30	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 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 characteristic by Image Analyzer.

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 assessment for day to day evaluation			18
Duration of Internal Test: **2 Hours**			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-18)
B.E. – MECH : FOURTH MESTER (2019-20)

B.E (MECH) IV Semester								
Course Code	Course Title	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U18HS430EH	Skill Development-II : Communication Skills in English	2	-	-	3	60	40	2
U18BS410MA	Numerical Methods, Probability & Statistics	3	-	-	3	60	40	3
U18ES420EC	Basic Electronics Engineering	2	-	-	3	60	40	2
U18PC410ME	Applied Thermodynamics	3	-	-	3	60	40	3
U18PC420ME	Mechanics of Fluids and Hydraulic Machines	3	-	-	3	60	40	3
U18PC430ME	Kinematics of Machines	3	-	-	3	60	40	3
U18OE4XXXX	Open Elective II	3	-	-	3	60	40	3
PRACTICALS								
U18ES421EC	Basic Electronics Engineering Lab	-	-	2	3	50	30	1
U18PC411ME	Applied Thermodynamics Lab	-	-	2	3	50	30	1
U18PC421ME	Fluid Mechanics and Hydraulic Machines Lab	-	-	2	3	50	30	1
	TOTAL	**19**	**-**	**6**		**570**	**370**	**22**
	GRAND TOTAL	**25**				**940**		**22**

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

With effect from AY 2019-20

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities and Social Sciences

SKILL DEVELOPMENT-II : COMMUNICATION SKILLS IN ENGLISH

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U18HS430EH**
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:

- 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-I:
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-II:
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

UNITIII:

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-IV:

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-V:

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:	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 Mathematics

NUMERICAL METHODS, PROBABILITY & STATISTICS

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **U18BS410MA**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

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

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

UNIT-IV: 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: 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. R.K. Jain & S.R.K. lyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2. Higher Engineering Mathematics, Dr.B.S Grewal 40^{th} Edition, Khanna Publishers.
3. Probability, Statistics and Random Processes, T. Veerarajan , Tata MCGraw Hill Education Private Ltd.
4. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
5. A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.
6. Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand & sons, New Delhi.
7. http://tutorial.math.lamar.edu/Classes/DE/DE.aspx
8. http://mathworld.wolfram.com/topics
9. http://www.nptel.ac.in/course.php

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 Electronics and Communication Engineering

BASIC ELECTRONICS ENGINEERING

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U18ES420EC**
Credits :02	CIE Marks:40	Duration of SEE: 03Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 to understand the characteristics and operation of different electronic devices.	1 employ different electronic devices to build electronic circuits such as rectifiers, filters, voltage regulators.
2 to study the working of rectifiers, transistor amplifiers and oscillators.	2 describe the functioning of electronic circuits such as feedback amplifiers and oscillators.
3 to study the working principle of different types of transducers.	3 have the knowledge of certain electronic devices such as SCR, UJT.
	4 convert real time electrical signals into corresponding signals using different types of transducers.
	5 measure waveform details from CRO.

UNIT-I : SEMICONDUCTOR DIODES

P-N Junction diode, Biasing, Diode resistance, Transition capacitance and Diffusion capacitance, Applications, Rectifiers: Half wave and Full wave Rectifiers (Bridge, center tapped), ripple factor and efficiency, comparison of rectifiers, Filters: Types of filters, Rectifiers with and without filters, Zener Diode: Characteristics, Zener diode as a voltage regulator, IC voltage regulators, Block diagram of Regulated Power Supply

UNIT-II : TRANSISTORS

Bipolar Junction Transistor (BJT), Construction, Types, Working principle, Configurations, Transistor parameters, Transistor as an amplifier, Problems, Field Effect Transistor(FET): Construction, working and characteristics of FET, Metal Oxide Semiconductor FET (MOSFET):Types (depletion and enhancement), MOSFET characteristics, Comparison of

BJTs with MOSFET

UNIT-III: FEEDBACK CONCEPTS

Basic concept of feedback, Types of feedback, Feedback topologies, General characteristics of Negative feedback amplifiers; Oscillators: Classification, LC Type and RC Type Oscillators and Crystal Oscillators (Qualitative treatment only)

UNIT-IV : DATA ACQUISITION SYSTEMS

Introduction, Classification of transducers, Capacitive transducer, Inductive transducer, LVDT, Electrical strain gauges, Temperature transducers (Thermocouple), Piezoelectric transducer, Photoelectric transducer; Industrial Devices: SCR, UJT - Construction, Working principle and Characteristics only; Display Systems: Constructional details of C.R.O and Applications.

Learning Resources:

1. S.Shalivahan, N. Suresh Kumar, A Vallavea Raj Electronic Devices and Circuits Tata McGraw Hill, 2003.
2. Jacob Milman & C., Halkias, Electronic devices Eighth Edition, Reprinted, Mc Graw Hill, 1985.
3. Ramakanth A. Gayakwad, Op-AMPS and Linear Integrated Circuits, 3rd edition, Prentice Hall of India,1985.
4. Mooris Mano, Digital design, 3rd edition, Prentice Hall of India, 2002.
5. Cooper, Electronic Measurement and Instrumentations.
6. https://nptel.ac.in/courses/117103063/

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

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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

APPLIED THERMODYNAMICS

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **U18PC410ME**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*	
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.	1	analyze the performance of air compressors and solve numericals related to the performance of single stage and multi stage air compressors.
	2	describe the various cooling, lubrication, ignition & fuel supply systems and evaluate the performance parameters of internal combustion engines.
	3	discuss various stages of combustion phenomena in I.C. 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

Uses of compressed air, Classification of compressors-single stage and multistage compressors, Derivation of work done with and without clearance volume, Work done of multistage compressors-effect of clearance volume on work done -Inter-cooling and After-cooling.

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.

Engine Systems: Battery and Magneto ignition systems; working principle of simple carburettor and its limitations, Multipoint fuel injection system, Lubrication systems, cooling systems.

Performance of I.C Engines: Determination of indicated power, brake power, frictional power, brake thermal efficiency, mechanical efficiency, indicated thermal efficiency, relative efficiency, volumetric efficiency, specific fuel consumption based on brake power and indicated power, Heat balance sheet.

UNIT-III: COMBUSTION IN I.C. ENGINES

Normal and abnormal Combustion phenomena in spark ignition engines and compression ignition 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 spark ignition and compression ignition engines; Air pollution from IC engines-Effects and control of exhaust from engines.

UNIT-IV: STEAM BOILERS

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

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, Velocity of steam flowing through the nozzle; mass of steam discharged from the nozzle, Condition for maximum discharge, Critical pressure ratio; diameters of nozzle at throat and exit for maximum discharge.

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. Ballaney. P.L, "Thermal Engineering", 25th Edition, Khanna Publishers, New Delhi, 2010.

4. Rajput R.K, "Thermal Engineering", 10th Edition, Laxmi Publishers, New Delhi, 2016.
5. Mathur & R.P. Sharma, Internal combustion engines, Dhanapat Rai & sons,2013.

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

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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: **U18PC420ME**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*	
The objective of the course is to understand properties of fluids, fluid flows, conservation equations, flow through pipes and concept of boundary layer and flow separation, application of hydrodynamic forces on vanes, calculate the parameters for design of hydraulic machines and estimate their performance.	1	calculate the properties of fluid and pressure.
	2	apply mathematical knowledge to predict the characteristics of a fluid flow
	3	compute pressure gradient in pipe flows.
	4	design and estimate the efficiency of turbines with study of characteristic curves under various operating heads
	5	design and estimate the efficiency of pumps with study of characteristic curves under various operating heads

UNIT-I

Properties of Fluids: Introduction to Fluid mechanics, definition of fluid and concept of continuum. Fluid properties and numerical problems. Introduction to Non Newtonian fluids, Ideal fluids and real fluids; Vapour pressure, compressibility, surface tension numerical problems.

Fluid Statics: Fluid pressure at a point, Pascal law, numerical problems. Atmospheric pressure, absolute, gauge and vacuum pressure, measurement of pressure: Manometers-simple manometers and differential manometers, numerical problems.

UNIT-II

Fluid Kinematics: Lagrangian and Eulerian approach for description of fluid flow; Classification of fluid flow: steady and unsteady, uniform and non-uniform flow. Velocity of fluid particles, Acceleration in a fluid flow: Description of the flow pattern: Stream line, path line, streak line, Rotational and irrotational motions. velocity potential, Laplace equation, stream function, Poissions equation, numerical problems.

Fluid Dynamics: principles of conservation of mass, momentum and energy; derivation of continuity equation in Cartesian co ordinates in three 3-D flow, numerical problems. Introduction to forces acting in fluid motion. Derivation of Euler's equation of motion and Bernoullies equation. Applications of Bernoullies equation: Venturi meter, Orificemeter. Principle of Impulse momentum equation, forces on a pipe bend.

UNIT-III

Boundary Layer Concepts: Thicknesses, characteristics along thin plate, laminar and turbulent boundary layers (No derivation), separation of boundary layer, submerged objects – drag and lift.

Laminar Flow in Pipes: Definition of laminar and turbulent flow. Reynolds experiment, Steady laminar flow in circular pipes, Derivation of Hagen-poiseullie law, numerical problems.

Introduction to Turbulent Flow, Loss head due to Friction in Pipe Flow – Darcy WeisbachEquation; Minor losses in pipes..

UNIT-IV

Impact of Jets: Hydrodynamic force of jets on stationary and moving flat and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

Hydraulic Turbines: Layout of hydraulic power plant ,Working principle and construction of Pelton wheels, Francis turbine and Kaplan Turbines - Velocity triangles ,Work done (power developed), efficiencies. Specific speed, Unit quantities, Model testing of turbines, Draft tubes, functions and types of draft tubes. cavitation

UNIT-V

Centrifugal Pumps: Classification, Working principle, Velocity triangles, Manometric head, Work done per second, efficiencies, Minimum starting speed – Specific speed, unit quantities

Reciprocating Pumps: Classification, working principle, single and double acting pumps, discharge, work done and power, slip, variation of pressure

head in the Suction and delivery pipes due to acceleration of piston. Indicator diagrams- Ideal and actual diagrams.

Learning Resources:

1. Modi P.N. and Seth S.M., "*Hydraulics and Fluid Mechanics including Hydraulics Machines"*, Standard Book House, Delhi, 2015.
2. Dr. D.S. Kumar, *"Fluid Mechanics and Fluid Power Engineering"* S.K. Kataria& Sons, Re-print 2014
3. Frank M White, "*Fluid Mechanics*", Tata McGraw-Hill, 7th Edition, 2012
4. Robert W. Fax, Philip J. Pritchard, Alan T. McDonald "*Introduction to Fluid Mechanics*", Wiley India Edition. (Wiley Student Edition Seventh 2011).
5. Bansal R.K., "*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: **U18PC430ME**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*	
The objective of the course is 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 Electronics and Communication Engineering

BASIC ELECTRONICS ENGINEERING LAB

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):0:0:2	SEE Marks:50	Course Code: **U18ES421EC**
Credits :01	CIE Marks:30	Duration of SEE:03Hours

	COURSE OBJECTIVE		**COURSE OUTCOMES** *On completion of the course, students will be able to*
1	Verify the characteristics of various electronic devices.	1	Verify input/output characteristics of active devices and to compute their parameters.
2	Understand the functioning of voltage regulator and rectifiers.	2	Analyse the functioning of voltage regulators, rectifiers and oscillators.
3	Perform different arithmetic operations using operational amplier.	3	Perform operations such as addition, subtraction, comparison of voltage levels using operational amplifier.
4	Understand the working of logic gates to implement adder and subtractor.	4	Implement digital adders and subtractors using logic gates.

List of Experiments:

1. Characteristics of Semiconductor diodes (Si and Zener)
2. CRO Applications
3. Full wave rectifier with and without filter
4. Zener Voltage Regulator
5. Characteristics of BJT (CB and CE)
6. Characteristics of FET
7. RC Phase shift oscillator
8. Hartley oscillator and Calpitt's Oscillator

9. Applications of Operational Amplifier: Adder, Subtractor, Comparator.
10. Verifications of Logic gates
11. Realization of Half and Full adder

Learning Resources:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, Basic Electronics, A Text-Lab Manual, 7th Edition, TMH, 1994.
2. Paul B. Zbar, Industrial Electronics, A Text – Lab Manual, 3rd Edition, TMH, 1983.
3. https://nptel.ac.in/courses/122106025/

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment for day to day evaluation			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: **U18PC411ME**
Credits :01	CIE Marks:30	Duration of SEE:03Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*	
The objective of the course is 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 assessment for day to day evaluation			18
Duration of Internal Test: 2 **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: **U18PC421ME**
Credits :01	CIE Marks:30	Duration of SEE:03Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*	
The objective of the course is 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 characteristics curves of a Pelton wheel at constant head.
8. Performance characteristics curves of a Francis Turbine at constant head.

9. Performance characteristics curves of a Kaplan Turbine at constant head.
10. Performance characteristics curves of a centrifugal pump at constant speed.
11. Performance characteristics curves of a self priming pump at constant speed.
12. Performance characteristics curves of a reciprocating pump at constant speed.
13. Performance characteristics curves of a gear pump at constant speed.
14. Performance characteristics 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 assessment for day to day evaluation			18
Duration of Internal Test: **2 Hours**			