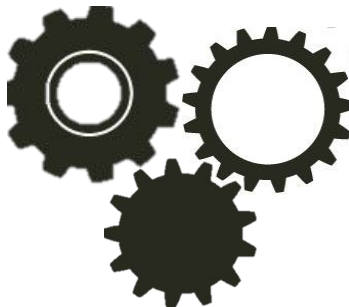# VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
Ibrahimbagh, Hyderabad-31

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-20)
WITH EFFECT FROM 2021-22
(For the students admitted in 2020-21)**

DEPARTMENT OF MECHANICAL ENGINEERING

**+91-40-23146060, 23146061
Fax: +91-40-23146090
Website:** www.vce.ac.in

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

SCHEME OF INSTRUCTION AND EXAMINATION (R-20)

B.E. – MECH : THIRD SEMESTER (2021-2022)

Course Code	Name of the Course	L	T	P/D	Duration in Hrs	SEE	CIE	Credits
B.E (MECH) III Semester								
		Scheme of Instruction			Scheme of Examination			
		Hours per Week				Maximum Marks		
		L	T	P/D		SEE	CIE	
THEORY									
U20BS310MA	Partial Differential Equations & Transform Techniques	3	-	-	3	60	40	3
U20ES310CE	Mechanics of Materials	3	-	-	3	60	40	3
U20PC310ME	Materials Engineering	3	-	-	3	60	40	3
U20PC320ME	Thermodynamics	3	-	-	3	60	40	3
U20PC330ME	Machine Drawing	1	-	4	3	60	40	3
U20OE3XXXX	Open Elective-I	2	-	-	3	60	40	2
U20HS320EH	Skill Development Course I - Communication Skills in English I	1	-	-	2	40	30	1
U20BS330MA	Skill Development Course II – Aptitude I	1	-	-	2	40	30	1
U20HS010EH	Human Values and Professional Ethics-I	1	-	-	2	40	30	1
U20MC310ME	Introduction to Entrepreneurship	1	-	-	2	40	30	0
PRACTICALS									
U20ES311CE	Mechanics of Materials Lab	-	-	2	3	50	30	1
U20PC311ME	Materials Engineering Lab	-	-	2	3	50	30	1
TOTAL			19	0	8		620	420	22
GRAND TOTAL			27			1040		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)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State
DEPARTMENT OF MATHEMATICS

PARTIAL DIFFERENTIAL EQUATIONS & TRANSFORM TECHNIQUES
for B.E., III- Sem., (CBCS)
(Civil, EEE & Mechanical only)

L : T : P (Hrs./week):3 : 0 : 0	SEE Marks:60	Course Code: U20BS310MA
Credits: 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	*At the end 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-III (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).

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.

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.

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:	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: **90 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: U20ES310CE
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: **U20PC310ME**
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	interpret binary phase diagrams of metals and alloys to assess property changes that occur during equilibrium cooling or heating
	2	examine property changes in metals and alloys due to different heat treatment processes
	3	summarize the relationship between crystal structure, crystal defects and mechanical properties
	4	outline the failure behavior of materials 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.

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: **90 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: **U20PC320ME**
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 energy transfers by applying the first-law of thermodynamics to closed system (control mass) and open system (control volume). 3. Analyze the problems on heat engines, refrigerators and entropy by applying the second-law of thermodynamics to various systems and processes. 4. Estimate the thermodynamic properties of pure substances by using the property tables and Mollier Diagram 5. Evaluate the performance of air standard cycles and Rankine vapour power cycle that form the basis for various thermal prime movers.

UNIT– I: Basics of Thermodynamics
Concepts of system: control mass and control volume; Macroscopic and Microscopic approaches; concept of Continuum; thermodynamic properties, thermodynamic state, process and cycle, quasi-static process, thermodynamic equilibrium; definition of energy, pressure and temperature; ideal gas; the Zeroth law of thermodynamics; temperature scales; problem solving.

UNIT – II: 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 – III: 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; Definitions of Exergy and Anergy; problem solving.

UNIT – IV: Properties of Pure Substances

Definition of Pure substance and phase, Concept of phase change, vapour-liquid-solid phase equilibrium of pure substances; P-T, P-v, T-s, h-s and T-v diagrams; estimation of properties using thermodynamic tables and Mollier chart; problem solving.

UNIT– V: Power cycles

Air standard cycles: Otto, Diesel, Dual and Brayton cycles; work done, air standard efficiency of gas power cycles; simple Rankine cycle; 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: **90 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): 1:0:4	SEE Marks:60	Course Code: **U20PC330ME**
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 of steam engine parts from the detailed drawings.
	5	Prepare the assembly drawings of tail stock and tool post etc 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
Screwed Fasteners: Screw thread nomenclature, forms of threads, thread series, thread designation, multi- start threads, right and left-hand threads, representation of threads and thread parts in assembly.
Fasteners: Bolted joint, hexagonal nut, square nut, hexagonal and square headed bolts, washer.
Other Bolts: Square headed bolt with square neck, T-headed bolt with square neck, stud bolt.

Other nuts: Flanged nut, Cap nut, Dome nut, Capstan nut, Ring nut and Wing nut.

Locking arrangement for nuts: Using lock nut, split pin, castle nut, Wile's lock nut,set screw, grooved nut, Locking by screw, by plate and by spring washer.

Riveted Joints: Rivets and Riveting, Caulking and Fullering, rivet heads, Definition of terms. classification of riveted joints: Lap joints and butt joints with proportions.

Unit-III: Drawing/Sketching of various views of

Keys: Saddle keys,sunk keys, Splines, Woodruff key and round keys
Cotter joints: Cotter joint with sleeve, cotter joint with socket and spigot ends, cotter joint with a gib.
Pin Joint: Knuckle joint
Shaft couplings: Rigid Couplings: Sleeve(muff), Butt muff, Half-lap muff,Split-muff, Flanged coupling with detachable flanges and solid flanged coupling.
Flanged Couplings: Flanged Coupling, Protected type flange coupling, Solid flanged coupling
Flexible Couplings(non-aligned): Universal coupling and Oldham's coupling.
Shaft bearings: Journal bearings: Solid journal bearing, bushed journal bearing, Pedestal bearing andPivot bearing.

Unit-IV: Assembly Drawings of

Engine parts: stuffing box, steam engine cross head(horizontal), vertical cross head, connecting rod end and eccentric.

Unit-V: Assembly Drawings of

Machine tool parts: Single tool post and Lathe tail stock.
Accessories: Screw jack and 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: **90 Minutes**

B.E- III SEM OPEN ELECTIVE-I COURSES			
Dept.	Title	Code	Credits
CIVIL	Green Building	U20OE310CE	2
CSE	Principles of Python Programming	U200E310CS	2
CSE	Cyber Security	U200E320CS	2
EEE	Non Conventional Energy Sources	U20OE310EE	2
IT	Object Oriented Programming Using Java	U20OE310IT	2
IT	Introduction To Scripting Languages	U20OE320IT	2
MECH	Geometric Modelling	U20OE310ME	2
MECH	Introduction to Unmanned Aerial Vehicles	U20OE320ME	2
MECH	Heat Transfer in Electronic Systems	U20OE330ME	2
Maths	Linear Algebra and Its Applications	U190E310MA	2
Chemistry	Battery science and Technology	U21OE31OCH	2
Physics	Smart Materials & Applications	U19OE31OPH	2
H&SS	Learning to Learn	U20OE310EH	2

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

DEPARTMENT OF CIVIL ENGINEERING
GREEN BUILDINGS (Open Elective-I)

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:60	Course Code: U20OE310CE
Credits: 2	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Learn the principles of planning and orientation of buildings. 2. Environmental implications of natural and building materials along with green cover 3. Acquire knowledge on various aspects of green buildings	1. Explain the principles of building planning, its bylaws and provide facilities for rainwater harvesting 2. Relate safety to Green Technology 3. Understand the concepts of green buildings 4. Understand rating systems of GRIHA and LEED

UNIT-I: Planning of buildings: Principles of planning, Relevant building bylaws, site selection for buildings, orientation of buildings, common errors in planning, Provision of rain water harvesting

UNIT-II: Building-Energy-Implications: Environmental implications of buildings energy, carbon emissions, water use,

waste disposal; Building materials: sources, methods of production and environmental Implications. Green cover and built environment

UNIT-III: Green Building Technologies: Introduction-Necessity - Concept of Green building. Principles of green building – Site selection criteria for Green Buildings – usage of low energy materials – effective cooling and heating systems – effective electrical systems – effective water conservation systems

UNIT-IV: Certification Systems: Certification systems-Green Rating for Integrated Habitat Assessment (GRIHA), Indian Green Building Council (IGBC) and Leadership in Energy and Environmental Design (LEED), case studies

Learning Resources:
1. Kumara Swamy N.Kameswara Rao A., Building Planning And Drawing, Charotar, Publications, 2013.
2. Shahane, V. S, "Planning and Designing Building", Poona, Allies Book Stall, 2004.
3. Michael Bauer, Peter Mösle and Michael Schwarz "Green Building – Guidebook for Sustainable Architecture" Springer, 2010.
4. Tom Woolley, Sam Kimmins, Paul Harrison and Rob Harrison "Green Building Handbook" Volume I, Spon Press, 2001.
5. Mili Majumdar, "Energy-efficient buildings in India" Tata Energy Research Institute, 2002.
6. TERI "Sustainable Building Design Manual- Volume I & II" Tata Energy Research Institute, 2009.

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   :   90 Minutes

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

Department of Computer Science & Engineering
PRINCIPLES OF PYTHON PROGRAMMING(OPEN ELECTIVE-I)
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code :**U200E310CS**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Acquire problem solving skills	1 Design python programs using arithmetic expressions and decision making statements
2 Learn programming and solve problems using Python language	2 Design modular python programs using functions
	3 Develop programs using strings and list
	4 Develop programs using tuples and dictionaries

UNIT-I: **Introduction to Python**: Variables, expressions and statements, order of operations

Conditionals: Modulus operators, Boolean expressions, logical operators, conditional execution, alternative executions, chained conditional, nested conditional

Iteration: while statement

UNIT-II: Functions: function calls, type conversion and coercion, mathematical functions, User-defined functions, parameters and arguments.
Recursion

UNIT-III: Strings: string length, string traversal, string slices and string comparison with examples, strings are immutable, find function, string module

List: list values, accessing elements, list traversal, list length, list membership, list and for loop, list operations with examples

UNIT-IV: **Tuples**: Mutability, tuple assignment, tuple as return values

Dictionaries: dictionary operations, dictionary methods, aliasing and copying, counting letters using dictionaries

Learning Resources:

1. Downey A, How to think like a Computer Scientist :Learning with Python, 1st Edition(2015), John Wiley
2. Lambert K.A, Fundamentals of Python –First Programs, 1st Edition(2015), Cengage Learning India
3. Perkovic L, Introduction to Computing using Python,2/e, (2015), John Wiley
4. Stewart Venit and Elizabeth Drake, Prelude to Programming: Concepts and Design, 6th Edition(2015),Pearson India
5. Mark J Guzdial, Introduction to Computing and programming in Python, 3rdEdition(2013), Pearson India
6. Allen Downey, Think Python, 2nd Edition(2015),Shroff Publisher Orielly
7. http://nptel.ac.in/courses/117106113/34
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-01sc-introduction-to-electrical-engineering-and-computer-science-i-spring-2011/python-tutorial/
9. www.scipy-lectures.org/intro/language/python_language.html

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	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests   : 90 Minutes

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
CYBERSECURITY (OPEN ELECTIVE-I)
(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 60	Course Code :**U200E320CS**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 To safeguard from threats and infection spread through the internet	1 Explain the concepts of confidentiality, availability and integrity 2 Explain the basics of fraud techniques used by a hacker 3 Explore the common exploitation mechanisms and inspect data sniffing over the network 4 Determine the ways an organization attempts to discover threats.

UNIT-I: **CYBER SECURITY FUNDAMENTALS:** Network and Security concepts: Information assurance fundamentals, Basic Cryptography, Symmetric Encryption, Public key encryption, Digital Signature, Key Exchange Protocols, DNS, Firewalls, Virtualization.

UNIT-II: ATTACKER TECHNIQUES AND MOTIVATIONS: How hackers cover their tracks, Tunneling techniques, Fraud Techniques: Phishing, Smishing, Vishing and Mobile Malicious Code, Rogue Antivirus, Click Fraud, Threat Infrastructure: Botnets, Fast-Flux, Advanced Fast-Flux.

UNIT-III: EXPLOITATION: Techniques to gain foothold: Shellcode, Integer overflow, Stack based buffer overflow, Format String Vulnerabilities, SQL Injection, Web Exploit Tools, Misdirection, Reconnaissance, and Disruption Methods

UNIT-IV:**MALICIOUS CODE, DEFENSE & ANALYSIS TECHNIQUES:**
Self-replicating replicating code, Worms, Viruses, Evading Detection and

Elevating Privileges: Obfuscation, Spyware, Token Kidnapping, Memory Forensics, Honeypots, Malicious code naming, Intrusion detection systems

Learning Resources:

1. James Graham, Ryan Olson, Rick Howard, "Cyber Security Essentials", Auerbach Publications , CRC Press, 2011
2. Mike Shema, "Anti-Hacker Tool Kit (Indian Edition)", Mc Graw Hill, 2014
3. Cyber Security - Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and SunitBelpure, Publication Wiley , 2011
4. https://www.edx.org/micromasters/ritx-cybersecurity
5. https://www.coursera.org/specializations/cyber-security
6. http://nptel.ac.in/courses/106105031/
7. https://www.netacad.com/courses/security/introduction-cybersecurity

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   :   90 Minutes

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Non Conventional Energy Sources
Open Elective-I
SYLLABUS FOR B.E. III SEMESTER

L: T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:**U20OE310EE**
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To provide a survey of the most important renewable energy resources and the technologies for harnessing these resources within the framework of a broad range of simple to state- of - the-art energy systems.	1. Demonstrate the generation of electricity from various Non-Conventional sources of energy and solar power generation 2. Illustrate the generation of energy from wind and generation of energy from waste 3. Demonstrate the generation of energy by biomass and fuel cells 4. Illustrate the ocean and geo thermal energy generation

UNIT-I: Introduction and Solar Energy:
Introduction: Need for Non-conventional energy sources, Types of Non-Conventional energy sources. Renewable energy across the Global and in India. Renewable energy for rural applications, Renewable energy for urban, industrial and commercial applications
Solar Energy: Solar cell fundamentals: Semiconductors, Photovoltaic effect, Solar PV cell, module, panel, array, Solar cell operating characteristics: Voltage-current characteristic, energy losses, maximising the performance. Applications of solar energy, Solar energy program in India, Case study

UNIT-II: Wind Energy and Waste to Energy:
Wind Energy: Nature of wind, Basic components of Wind Energy Conversion System(WECS), Power extraction from the wind, Applications of wind energy. Wind energy program in India, Case Study
Waste to Energy: Key issues, Waste recovery management, Case study
UNIT-III: Biomass Energy and Fuel Cells:
BiomassEnergy: Definition, Bio fuels, Biomass resources, Biomass conversion technologies: Incineration- Thermo chemical conversion- Bio-

chemical conversion. Advantages and disadvantages of biomass energy, Case study

Fuel Cells: Definition-Classification of fuel cells, Principle of operation, Hydrogen-oxygen fuel cell, Alkaline fuel cell, Proton exchange membrane fuel cell, Molten carbonate fuel cell, Solid oxide electrolyte cells, Comparison of fuel cells- Advantages and Disadvantages of fuel cells-Applications of Fuel cells. Case study

UNIT-IV: Ocean Energy and Geothermal Energy:

Ocean Energy: Ocean thermal electric conversion (OTEC) methods: Open cycle and Closed cycle- Principles of tidal power generation-Advantages and limitations of tidal power generation, Case study

Geothermal Energy: Geothermal resources- Vapour dominated geothermal plant- Liquid dominated geothermal plant- Applications of Geothermal Energy, Case study

Learning Resources:

1. B H KHAN, Non-Conventional Energy Resources, McGraw Hill, 2nd Edition, 2009.
2. G. S. Sawhney, Non-Conventional Energy Resources, PHI Learning Pvt Ltd, 2012
3. ShobhNath Singh, Non-Conventional Energy Resources, Pearson, 2016
4. G.D. Rai, Non-Conventional Energy Sources ,Khanna Publishers, New Delhi, 2011.
5. Ashok Desai V, Non-Conventional Energy, Wiley Eastern Ltd, 1990.
6. Mittal K.M, Non-Conventional Energy Systems, Wheeler Publishing Co. Ltd, 1997.
7. Ramesh R, Kurnar K.U, Renewable Energy Technologies, Narosa Publishing House, New Delhi, 1997.

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 INFORMATION TECHNOLOGY

OBJECT ORIENTED PROGRAMMING USING JAVA
(Open Elective-I) (Common for CIVIL, ECE, EEE & MECH)
SYLLABUS FOR B.E. III SEMESTER

L:T:P (Hrs/week):2:0:0	SEE Marks: 60	Course Code: **U20OE310IT**
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
	On completion of the course, students will be able to
Explain the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, building simple GUI applications.	1. Understand fundamental concepts in Object oriented approach. 2. Develop object-oriented programs using the concepts of exception handling and multi threading. 3. Demonstrate the usage of Java I/O streams to handle user input and output. 4. Design and develop GUI programs.

UNIT- I
Java Programming Fundamentals: Introduction, Overview of Java, Data types, Variables-scope and lifetime, Operators, Control statements, Structure of a Java class, Classes, Methods, Inheritance, and Command Line Arguments.
Arrays: One-dimensional arrays, creating an array, declaration of arrays, initialization of arrays, two-dimensional arrays.
Packages: Creation, importing a package and user defined package.
Interfaces: Defining interfaces, extending interfaces, implementing interfaces.

UNIT- II
Exception Handling: Introduction, types of exceptions, syntax of exception handling code, multiple catch statements, using finally statement, user-defined exceptions.

UNIT- III
Basic I/O Streams: Java I/O classes and interfaces, Files, Stream and Byte classes, Character Streams.

Exploring java.lang: Object, Wrapper classes, String, String Buffer, System

UNIT- IV
Introducing Awt,Awt Controls:
Event Handling: The Delegation Event Model, Event Classes, Source of Events, Event Listener Interfaces.
 Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, CheckboxGroup, Choice Controls, Using Lists, Managing Scroll Bars, Using TextField, Using TextArea, Understanding Layout Managers, Menu bars and Menus, Dialog Boxes, FileDialog, Exploring the controls, Menus ,and Layout Managers.

Learning Resources:
1. Herbert Schildt, The Complete Reference Java, 7th Edition, Tata McGraw Hill, 2006.
2. James M Slack, Programming and Problem solving with JAVA, Thomson Learning, 2002.
3. C Thomas Wu, An Introduction to Object Oriented Programming with Java 5th edition, McGraw Hill Publishing, 2010.
4. Y. Daniel Liang , An Introduction to JAVA Programming, Tata McGraw Hill, 2009.
5. Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.
6. https://docs.oracle.com/javase/tutorial/
7. https://nptel.ac.in/courses/106105191/

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	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests			: 90 Minutes		

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

INTRODUCTION TO SCRIPTING LANGUAGES
(Open Elective-I) (Common for CIVIL, ECE, EEE & MECH)
SYLLABUS FOR B.E. III SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks: 60	Course Code :**U200E320IT**
Credits : 2	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
This course will enable the students to acquire basic skills for writing python scripts.	1. Demonstrate basic knowledge of Python script. 2. Demonstrate an understanding of fundamental Python syntax and semantics and be fluent in the use of Python control flow statements and functions. 3. Construct python data structure programs using list, tuples, dictionaries, sets and numpy arrays. 4. Develop programs using Object oriented paradigm, and handle file related operations.

Unit – I
Introduction to Python, running a python script, writing comments, using variables, operators, expressions, strings and text, format specifiers, printing information. passing command line arguments, prompting users, parameters, unpacking variables.

Unit – II
Decision making: if and else if, repetition: while loops and for loops.
Defining functions, passing arguments to functions, returning values from functions, recursion.

Unit – III
Data structures: lists, operations on list, tuples, operations on tuples, sets, operations on sets, dictionaries, operations on dictionaries.
Numpy arrays: creation, access, slicing, matrix operations.

Unit – IV

Modules, Classes and Objects, is – a relationship: inheritance, has-a relationship: composition, Exception handling, File handling: reading and writing files, serialization using JSON.

Intro to Python Standard Library & other useful libraries: Scipy, Scikit, Pandas, Seaborn.

Learning Resources

1. Allen B. Downey, Think Python, 2nd Edition, Green Tea Press
2. "Learning Python", 5th Edition, O'reilly
3. https://www.python.org
4. https://nptel.ac.in/courses/106106182/
5. The Python Standard Library — Python 3.9.6 documentation
6. Python Tutorial (w3schools.com)
7. Best Python Libraries for Every Python Developer | by Claire D. Costa | Towards Data Science
8. Search results · PyPI

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	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	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

GEOMETRIC MODELLING (Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U20OE310ME**
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 identify various Wire frame modelling entities and their representations.
	2 interpret synthetic curve representations and various 2D transformations for geometric model by matrix approach.
	3 development of various surfaces using surface modelling.
	4 analyze various 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

INTRODUCTION TO UNMANNED AERIAL VEHICLES (Open Elective-I)
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U20OE320ME**
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 the features of UAV, elements, navigation and guidance of UAV and to design and silmulate UAV	1. Explain the types and characteristics of UAVs and their applications.
	 2. Illustrate the concepts of aerodynamics of flight vehicle.
	 3. Identify and explain the components, sensors and payload of UAVs,
	    their navigation and guidance.
	 4. Design and perform structural, aerodynamic analysis of UAV
	    components

Unit-I: Introduction to UAV
UAV: Definition, History; Difference between aircraft and UAV; DGCA Classification of UAVs; Types and Characteristics of Drones: Fixed, Multi-rotor, and Flapping Wing; Applications: Defense, Civil, Environmental monitoring.

Unit-II: Basics of Flight
Different types of flight vehicles; Components and functions of an airplane; Forces acting on Airplane; Physical properties and structure of the atmosphere; Aerodynamics – aerofoil nomenclature, aerofoil characteristics, Angle of attack, Mach number, Lift and Drag, Propulsion and airplane structures.

Unit-III: UAV Elements, Navigation and Guidance
Components: Arms, motors, propellers, electronic speed controller (ESC), flight controller; Propulsion; Data Link; Sensors and Payloads: GPS, IMU,

Light Detection and Ranging (LiDAR), Imaging cameras, Classification of payload based on applications; Hyper-spectral sensors; Laser Detection and Range (LADAR); Synthetic Aperture Radar (SAR); Thermal cameras; ultra-sonic detectors; Case study on payloads. Introduction to navigation systems and types of guidance; Mission Planning and Control.

Unit-IV: Design & Simulation of UAV

Introduction to CAD; Design of UAV components; Structural Analysis using CAE; Aerodynamic Analysis using CFD; Manufacturing of the components of UAVs: 3D printing; Case studies;

Learning Resources:

1. Andey Lennon, "Basics of R/C Model Aircraft Design" Model Airplane News Publication
2. John Baichtal, Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs.
3. K Valavanis, George J Vachtsevanos, Handbook of Unmanned Aerial Vehicles, New York,
    Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.
4. DGCA RPAS Guidance Manual, Revision 3 - 2020

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

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

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U20OE330ME**
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 and Second laws of thermodynamics to various engineering problems.
	2 formulate heat conduction problems in rectangular, cylindrical and spherical coordinate system by transforming the physical system into a mathematical model.
	3 to determine heat transfer coefficient in forced and free convection heat transfer.
	4 analyse heat transfer processes involved in cooling of electronic components

UNIT-I: BASIC 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, First and Second laws of Thermodynamics. Numerical problems.

UNIT-II: heat transfer: Conduction
Heat Transfer – Different Modes, governing laws and application to heat transfer: Fourier, Newton, Stefan–Boltzmann laws; general heat conduction equation - Steady state one-dimensional heat conduction through slabs, hollow cylinders and spheres. Concept of thermal resistance in series and parallel (composite systems), contact resistance, overall heat transfer coefficient. Critical radius of insulation. Heat transfer with and without internal heat generation. Numerical problems.

UNIT-III: heat transfer: Convection

Extended surfaces: Fins - Applications of fins, Fin Equation, Fin Effectiveness and Efficiency. Convection Heat Transfer: Heat transfer coefficient - Forced and Natural Convection in Electronic Devices, non dimensional numbers - Nusselt number, Reynolds number, Grashoff number and Prandlt number, forced and free convection correlations - flat plates and cylinders. Numerical problems.

UNIT-IV: 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)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF PHYSICS

LINEAR ALGEBRA AND ITS APPLICATIONS
(Open Elective-I)
SYLLABUS FOR BE III Semester

L:T:P(Hrs/week): 2:0:0	SEE Marks:60	Course Code: **U200E310MA**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

UNIT – I (8 classes)
Vector Spaces-Definition of a Vector Space, Subspaces, Basis and Dimension, Coordinates and Change of Basis.

UNIT – II (6 classes)
Linear Transformation -I
Definition of Linear Transformation- Properties of Linear Transformations – Product of Linear Transformations – Algebra of Linear Operators.

UNIT – III (6 classes)
Linear Transformation -II
Range and kernel of a linear map – Dimension of Range and Kernel - Rank and nullity – Inverse of linear transformation - Rank nullity theorem (without Proof)- Matrix of Linear Transformation.

UNIT – IV (8 classes)
Inner Product Spaces-The Dot Product on R and Inner Product Spaces, Orthonormal Bases, Orthogonal Complements, Application: Least Squares Approximation

Learning Resources:
1. Introduction to Linear Algebra with Application, Author : Jim Defranza, Daniel Gagliardi, Publisher : Tata McGraw-Hill

2. An Introduction to Linear Algebra, V.Krishna Murthy, V.P Mainra, J.L Arora, Affiliated to East-West Press Pvt Ltd

Reference Books:

(i) Elementary Linear Algebra, Author: Anton and Rorres, Publisher: Wiley India Edition.

(ii) Advanced Engineering Mathematics, Author : Erwin Kreysig, Publisher : Wiley Publication

(iii) Elementary Linear Algebra, Author : Ron Larson, Publisher : 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:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

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

BATTERY SCIENCE AND TECHNOLOGY
(Open Elective-I)
SYLLABUS FOR BE III Semester

L:T:P(Hrs/week): 2:0:0	SEE Marks:60	Course Code: **U20OE310CH**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

LEARNING OUTCOMES:
At the end of the course students should be able to:
1.Discuss the construction, electrochemistry, technology and applications of selected primary batteries
2.Discuss the construction, electrochemistry, technology and applications of few secondary batteries
3.Explain the working principle, electrochemistry, technology and applications of prominent fuel cells
4. Evaluate different batteries or fuel cells in order to select a suitable battery or fuel cell for a given application

UNIT-I: BATTERIES- FUNDAMENTALS
Introduction and types of batteries: Primary and secondary.
Battery characteristics: Free energy change, electromotive force of battery, ampere-hour, capacity, power, power density, energy density, efficiency, cycle life, tolerance to service conditions, performance characteristics.

UNIT-II: PRIMARY BATTERIES
Construction, chemistry and technology of Zinc-Air Battery, Zinc –HgO battery and their applications.
Primary lithium batteries: Soluble cathode cells, solid cathode cells-Lithium manganese dioxide, solid electrolyte cells- Lithium polymer electrolyte battery- Applications. Reserve battery- Electrochemistry of perchloric acid cell- applications.

UNIT-III: SECONDARY BATTERIES
Construction, chemistry and technology of maintenance free lead acid battery (MFLA), valve regulated lead acid battery (VRLA), absorbed glass mat lead acid battery (AGMLA) - comparision between lead acid battery

and VRLA along with advantages - Construction, electro chemistry and applications of Nickel-Cadmium battery, Nickel metalhydride battery.
Lithium ion batteries: Construction, chemistry and applications of liquid organic electrolyte cells, polymer electrolyte cells, lithium ion cells.

UNIT- IV: FUEL CELLS
Introduction, classification based on temperature and nature of electrolyte. Working principle, components, applications and environmental aspects of alkaline fuel cell (AFC)- Hydrogen-Oxygen alkaline fuel cell, Molten carbonate fuel cell (MCFC), Polymer electrolyte membrane fuel cell (PEMFC), Solid oxide fuel cell (SOFC).

Learning Resources:

Text Books:
1. P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai and Pub, Co., New Delhi (2002)
2. S.S. Dara "A text book of engineering chemistry" S.Chand and Co.Ltd., New Delhi (2006).

Reference Books:
1. Dell R. M. and Rand D. A. J., "Understanding Batteries", Royal Society of Chemistry, UK, 2001.
2. Chemistry of Engineering Meterials by R.P Mani and K.N.Mishra, CENGAGE learning
3. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi,2008.
4. Derek Pletcher and Frank C. Walsh, "Industrial Electrochemistry", Chapman and Hall, New York, 1993.

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: **90 Minutes**

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

SMART MATERIALS & ITS APPLICATIONS
(Open Elective-I)
SYLLABUS FOR BE III Semester

L:T:P(Hrs/week): 2:0:0	SEE Marks:60	Course Code: **U20OE310PH**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

Course Objectives	Course Outcomes	BTL
The student will be able to	**the student should at least be able:**	2
1. grasp the concepts of peizo and ferro electric materials	1. summarize various properties and applications of peizo and ferro electric materials	3
2. Learn fundamentals of pyro and thermo electric materials	2. apply fundamental principles of pyro and thermo electricity in relevant fields of engineering	3
3. gain knowledge on shape memory alloys	3. Explain types of shape memory alloys and their properties and applications	2
4. acquire fundamental knowledge on chromic materials	4. Outline the importance of chromic materials in engineering fields.	

UNIT I: PIEZO AND FERRO MATERIALS (8 hours)

Piezo electric effect and inverse piezoelectric effect, Piezo electric materials, Structure of Quartz crystal, Piezoelectric oscillator, Magnetostriction, Magnetostriction oscillator, piezo-electric sensors, applications of Piezo-electric materials.

Characteristics and properties of ferro-electric materials, Structure of Barium Titanate, Curie-Weiss law, applications of Ferro electric materials

UNIT II: PYRO AND THERMO-ELECTRIC MATERIALS (6 hours)

Pyroelectricity: pyro electric effect, pyro electric materials, pyro-electric sensors.

Thermoelectricity: thermoelectric effect, Seebeck effect, Peltier effect, thermocouple and laws of thermocouples, Principle and working of thermoelectric generator and Thermoelectric cooler, applications of thermoelectric materials

UNIT III: SHAPE MEMORY MATERIALS (8 hours)

Introduction to shape memory alloys (SMA)- Shape Memory Effect (SME) different phases of Shape memory alloys, Austenite, Martensite, Properties and characteristics of engineering SMAs**,** Super elasticity, one and two way shape memory effects, Properties of Ni-Ti shape memory alloy, Cu-based shape memory alloys, biomedical Materials and their applications, Advantages, disadvantages of SMAs, Applications of SMAs.

UNIT-IV: (6 hours)

Electro-chromaticity, Electro-chromic materials, Electro-chromic sensors and devices.

Photo-chromaticity, Photo-chromic materials, Photo-chromic sensors and devices.

Thermo-chromaticity, thermo-chromic materials, thermo-chromic sensors and devices.

Smart fluids: Magneto-rheological and Electro-rheological fluids.

Learning Resources:

1. K. Otsuka and C M Wayman, Shape memory materials, Cambridge university press, 1998.

2. T W Duerig, K N Melton, D Stockel, C M Wayman, Engineering aspects of shape memory alloys, Butterworth-Heinemann, 1990

3. A.K. Sawhney, A Course in Electronic Measurements and Instrumentation, Dhanpat Rai & Sons, 2015

4. D. Patranabis, Sensors and Transducers, PHI Learning Pvt. Ltd., 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: **90 Minutes**

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

LEARNING TO LEARN
(Open Elective-I)
SYLLABUS FOR BE III Semester

L:T:P(Hrs/week): 3:0:0	SEE Marks:60	Course Code: **U20OE310EH**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to :-	At the end of this course, the student will be able to:
Develop effective study skills, and enable students to cut down on the number of hours spent studying	Get learners maximize their learning in a stipulated amount of time
Explore illusions of competence in learning, the challenges of overlearning, and the advantages of interleaving	Become competent learners and learn creatively
Handle procrastination and learn for long term	Meet deadlines, submit progress reports and recall what has been learnt for effective usage
Plan, prioritise and carry out tasks based on goals and priority	Set Performance Standards and take initiative based on set goals

OVERVIEW:
No matter what your skill levels in topics you would like to master, you can change your thinking and change your life. If you are struggling to cope, you'll see a structured treasure trove of practical techniques that walk you through what you need to do to get on track. If you've ever wanted to become better at anything, this course will help serve as your guide.

UNIT 1: STUDY SKILLS
Good study skills can increase a student's confidence, competence, and self-esteem. They can also reduce anxiety about tests and deadlines. This module is designed to develop effective study skills, and enable students

to cut down on the number of hours spent studying, leaving more time for other important things in their life

- Study Skills Checklist
- Learning Styles
- Habits of Effective Students
- Using the Focused and Diffuse Modes
- Introduction to memory and Memory Technique

UNIT 2: Chunking

In this module, we're going to be talking about chunks. Chunks are compact packages of information that your mind can easily access. We'll talk about how you can form chunks, how you can use them to improve your understanding and creativity with the material, and how chunks can help you to do better on tests. We'll also explore illusions of competence in learning, the challenges of overlearning, and the advantages of interleaving.

- Knowledge Chunking
- Skill and Will
- Sleep and Learning

UNIT 3: Procrastination and Memory

In this module, we talk about two intimately connected ideas—procrastination and memory. Building solid chunks in long term memory--chunks that are easily accessible by your short term memory—takes time. This is why learning to handle procrastination is so important. Finally, we talk about some of the best ways to access your brain's most powerful long term memory systems so that learning is long term and the learner has the ability to recall and use it as per need.

- Controlling Procrastination
- Ranking the importance of tasks with a to- do list
- Finding their most productive time
- Keeping track of time spent on different tasks
- Introduction to Deep learning

UNIT 4: Renaissance Learning and Unlocking Your Potential

In this module we're going to talk more about important ideas and techniques that will enhance student's ability to learn. Students will also discover how to more profitably interact with fellow learners, how to recognize your own strengths, and how to avoid the "imposter syndrome." Fighter pilots and surgeons use checklists to help them with their critical duties—you can use a similar checklist to help you prepare for tests.

Ultimately, you will learn more about the joys of living a life filled with learning!
• Psychology of Goal Setting
• Criteria for Goal Setting
• Steps in Goal Setting
• Visioning
• Strategy & Action Plan
• Goal Progress Review

METHODOLOGY	ASSESSMENTS
- Case Studies	- Online assignments
- Demonstration	- Individual and Group
- Presentations	- Tracking Journal
- Expert lectures	- Checklist
- Writing and Audio-visual lessons	
- Games & Activities	
- Learning Tool	

LEARNING RESOURCES
learn.talentsprint.com

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: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Skill Development Course I -Communication Skills in English I
SYLLABUS FOR BE III Semester

L:T:P(Hrs/week): 1:0:0	SEE Marks:40	Course Code: **U20HS320EH**
Credits : 1	CIE Marks:30	Duration of SEE:02Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Communication Skills in English	**Communication Skills in English**
Get students proficient in both receptive and productive skills especially virtually	Introduce themselves effectively and converse in a formal environment especially in the online space
Enable students to understand the importance and method of exchanging information in a formal space- both written and spoken	Write emails with appropriate structure and content
Introduce students to an ideal structure for a presentation and discussion- individually and in groups	Use appropriate structure based on the content employing appropriate transitions in written and spoken communication
Develop and improve reading skills needed for college work and reproduce the content based on the situational need	Paraphrase content and write an effective summary

Unit 1: Delightful Descriptions   6 hrs
- Introductions on an Online Forum
- Making Observations and Giving Opinion
- Recalling and Describing

Unit 2: Formal Conversation Skills 6 hrs
- Ask for Information
- Give Information
- Give Feedback
- Seek Permission

Unit 3: Technical Expositions and Discussions 8 hrs
- Classification
- Sequence
- Compare and Contrast
- Cause and Effect
- Problem and solution

Unit 4: Rational Recap 4 hrs
- Paraphrasing
- Summarizing

METHODOLOGY	ASSESSMENTS
- Case Studies	- Online assignments
- Demonstration	- Individual and Group
- Presentations	
- Expert lectures	
- Writing and Audio-visual lessons	

Learning Resources:
learn.talentsprint.com

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

1	No. of Internal Tests:	02	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: **60 Minutes**			

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

Department of Mathematics

Skill Development Course II -Aptitude I
SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):1:0:0	SEE Marks:40	Course Code: **U20BS330MA**
Credits : 1	CIE Marks:30	Duration of SEE: 02Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Aptitude	Aptitude
This is a foundation course and aims at enhancing employability skills.	Solve questions in the mentioned areas using shortcuts and smart methods.
Students will be introduced to higher order thinking and problem solving skills in the following areas - Arithmetic Ability, Numerical Ability and General Reasoning.	Understand the fundamentals concept of Aptitude skills.
Students will be trained to work systematically with speed and accuracy while problem solving.	Perform calculations with speed and accuracy.

UNIT 1: QUANTITATIVE APTITUDE - NUMERICAL ABILITY 6 hrs

- Introduction to higher order thinking skills
- Speed Math
- Number systems
- LCM & HCF

UNIT 2: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY FOUNDATION 6 hrs

- Ratio proportions
- Partnership
- Ages
- Allegations and mixtures
- Averages

UNIT 3: QUANTITATIVE APTITUDE 4 hrs
- Percentages
- Profit and loss

UNIT 4: REASONING ABILITY- GENERAL REASONING PART 1   4 hrs
- Blood Relations
- Number Series
- Coding and decoding

UNIT 5: QUANTITATIVE APTITUDE 4 hrs
- Time and Work
- Chain Rule
- Pipes and Cisterns

METHODOLOGY	**ASSESSMENTS**
- Demonstration	- Online assignments
- Presentations	- Individual and Group
- Expert lectures	
- Audio-visual lessons	

Learning Resources:
learn.talentsprint.com

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

1	No. of Internal Tests:	02	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: 60 Minutes

ASAVI 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

L:T:P(Hrs/week):1:0:0	SEE Marks:40	Course Code: **U20HS010EH**
Credits : 1	CIE Marks:30	Duration of SEE: 02Hours

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.	1. Understand the significance of value inputs in a classroom and start applying them in their life and profession
2. Grasp the meaning of basic human aspirations vis-a-vis the professional aspirations.	2. Distinguish between Personal and Professional life goals– constantly evolving into better human beings and professionals.
3. Understand professionalism in harmony with self and society.	3. Work out the strategy to actualize a harmonious environment wherever they work.
4. Develop ethical human conduct and professional competence.	4. Distinguish between ethical and unethical practices, and start implementing ethical practices
5. Enrich their interactions with the world around, both professional and personal.	5. Apply ethics and values in their personal and professional interactions.

UNIT-1 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-2 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.

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: 60 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: **U20MC310ME**
Credits : --	CIE Marks:30	Duration of SEE: 02Hours

COURSE OBJECTIVE	COURSE OUTCOMES	
The objective of the course is to	*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	get awareness about entrepreneurship and potentially become an entrepreneur.
	2	discern the characteristics required to be a successful entrepreneur
	3	know the importance of effective communication.
	4	demonstrate effective sales skills

Unit-I: Sources of new ideas, techniques for generating ideas.

Team formation, how entrepreneurship has changed the country and world, entrepreneurial myths, E-cells and their significance, success story of entrepreneurs, eg: Practo, global entrepreneurs, entrepreneurial journeys, challenges, and successes, characteristics of a Successful Entrepreneur, entrepreneurial styles, introduction to business model.

Unit-II: Importance of effective communication for entrepreneurs, communication barriers, miscommunication, incorrect assumptions about people, importance of listening, design thinking-a problem solving process, sales skills, understanding the customer-centric approach, personal selling techniques, show and tell, elevator pitch, managing risks and learning from failures, women entrepreneurs.

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: **60 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: U20ES311CE
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. Practice 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: **U20PC311ME**
Credits :01	CIE Marks:30	Duration of SEE: 03Hours

COURSE OBJECTIVE	COURSE OUTCOMES	
The objective of the course is to	*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	illustrate the relationship between microstructure and properties of ferrous alloys.
	2	illustrate the relationship between microstructure and properties of non-ferrous alloys.
	3	examine property changes in steels due to Annealing and Normalising processes.
	4	examine 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 α– Brass.
9. Metallographic study and analysis of α– β Brass.
10. Metallographic study and analysis of Bronze.
11. Study of effect on Hardness of plain carbon steel before and after the following Processes: Annealing and Normalizing.
12. Study of effect on Hardness of plain carbon steel before and after the following Processes: Hardening and Tempering.

13. Measurement of hardenability using Jominy End Quench Test.
14. Study of crystal structure and calculation of packing factor of Simple Cubic, BCC, FCC and HCP crystals.
15. To evaluate the grain characteristics of a given ferrous specimen.
16. To evaluate the grain characteristics of a given non-ferrous specimen.

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**			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-20)
B.E. – MECH : FOURTH SEMESTER (2021-2022)

		B.E (MECH) IV Semester						
		Scheme of Instruction			Scheme of Examination			
		Hours per Week				Maximum Marks		
Course Code	Name of the Course	L	T	P/D	Duration in Hrs	SEE	CIE	Credits
THEORY								
U20BS410MA	Numerical Methods, Probability & Statistics	3	1	-	3	60	40	3
U20ES410EE	Basic Electrical and Electronics Engineering	3	-	-	3	60	40	3
U20PC410ME	Applied Thermodynamics	3	-	-	3	60	40	3
U20PC420ME	Mechanics of Fluids and Hydraulic Machines	3	-	-	3	60	40	3
U20PC430ME	Kinematics of Machines	3	-	-	3	60	40	3
U20OE4XXXX	Open Elective II	3	-	-	3	60	40	3
U20BS430MA	Skill Development Course III – Aptitude II	1	-	-	2	40	30	1
U20PE430ME	Skill Development Course IV - Technical Skills I	1	-	-	2	40	30	1
PRACTICALS								
U20ES411EE	Basic Electrical and Electronics Engineering Lab	-	-	2	3	50	30	1
U20PC411ME	Applied Thermodynamics lab	-	-	2	3	50	30	1
U20PC421ME	Fluid Mechanics and Hydraulic Machines Lab	-	-	2	3	50	30	1
TOTAL		20	1	6		590	390	23
GRAND TOTAL		27				980		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)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State
DEPARTMENT OF MATHEMATICS
NUMERICAL METHODS, PROBABILITY & STATISTICS
for B.E., IV- Sem., (CBCS)
(Civil, EEE & Mechanical only)

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: U20BS410MA
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	At the end 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 (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 4th 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.

Text Books:
3. R.K. Jain & S.R.K. lyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
4. Higher Engineering Mathematics, Dr.B.S Grewal   40th Edition, Khanna Publishers.
5. Probability, Statistics and Random Processes, T. Veerarajan , Tata MCGraw Hill Education Private Ltd.

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.

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:	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: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
Basic Electrical and Electronics Engineering
SYLLABUS FOR B.E. IV SEMESTER

| L: T: P (Hrs/Week):2:0:0 | SEE Marks: 60 | Course Code: U20ES410EE |
| Credits: 3 | 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 $-\phi$ 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. Murugesh Kumar.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 : 90 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: **U20PC410ME**
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 two 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 principles of 2-stroke, 4-stroke, SI and CI engines; valve- and port-timing diagrams; deviation of actual cycles from air standard cycles; Performance of IC engines: indicated power, brake power, frictional power, mechanical efficiency, brake thermal efficiency, indicated thermal efficiency, relative efficiency, volumetric efficiency, specific fuel consumption (SFC), Morse test, 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: types of combustion chambers in SI and CI engines; air pollution from IC engines and its ill effects.

Unit-IV: Steam Power Plant and Steam Boilers

Working of Carnot and Rankine cycles; modified Rankine cycle, cycle efficiency improvement methods: reheating and regeneration; cogeneration; problem solving.

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.

Unit-V: Steam Nozzles and Condensers

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.

Types of condensers: jet and surface condensers; atmospheric cooling tower.

Learning Resources:

1. Eastop, T.D, Mc Conkey, A, "Applied Thermodynamics for Engineering Technologists", 5th Edition, Pearson Education, New Delhi, 2017.
2. Ganesan.. 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: **90 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: **U20PC420ME**
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	identify importance of various fluid properties at rest and in transit and Solve problems involving fluid properties and shear forces resulting from Newtonian fluids
	2	derive and analyze fluid systems using the continuity, momentum, impulse momentum, and energy equation for various fluid flows.
	3	Distinguish laminar and turbulent flows through pipes and understand the concept of boundary layer theory and flow separation
	4	Estimate force on vanes and efficiencies of turbine under different operating conditions Describe working of pumps and evaluate performance characteristics
	5	identify importance of various fluid properties at rest and in transit and Solve problems involving fluid properties and shear forces resulting from Newtonian fluids

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, 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;
Fluid Dynamics: mass, momentum and energy conservation laws; continuity equation in Cartesian coordinate system, forces acting in fluid flows, Euler equation and Bernoullie equation, venturi meter, orificemeter.

UNIT-III
Laminar Flow in Pipes: Reynolds experiment, steady flow in circular pipes, Hagen–Poiseuille equation.
Turbulent Flow in pipes: introduction, head loss – major (Darcy–Weisbach equation) and minor losses; problem solving.

Boundary Layer flows: formation and its thickness, displacement, momentum and energy thickness, separation of boundary layer;

UNIT-IV
Impact of Jets: Principle of impulse momentum 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.
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, Air vessels.

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: **U20PC430ME**
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	identify the various elements of a mechanism and calculate the degrees of freedom of a mechanism. Understand the various inversions of different kinematic chains.
	2	perform kinematic analysis of various planar mechanisms using graphical and analytical methods.
	3	understand the steering gear mechanisms and analyze the motion transmission characteristics by using belt drive.
	4	design the cam profile for various types of followers under the given required motion of the followers.
	5	analyze the motion transmission characteristics by using gear drive.

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 planar 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: **90 Minutes**

B.E- IV SEM OPEN ELECTIVE-II COURSES			
Dept.	**Title**	**Code**	**Credits**
CIVIL	Disaster Management	U20OE410CE	3
CSE	Principles of Data Structures	U20OE410CS	
MECH	Optimization Methods	U20OE410ME	3

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF CIVIL ENGINEERING
DISASTER MANAGEMENT
(Open Elective-II)
SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week): 3 : 0 : 0	SEE Marks:60	Course Code: U20OE410CE
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
1. Know about the state of art of disaster management in world and explore the history of the disasters and comprehend how past events have helped shape the future. 2. Study the various natural and manmade disasters and apply the mitigation measures 3. Expose students to various technologies used for disaster mitigation and management.	1. Attain knowledge on various types, stages, phases in disaster with international & national policies and programmes with reference to the disaster reduction. 2. Understand various types of natural disaster, their occurrence, Effects, Mitigation and Management Systems in India 3. Understand different types of manmade disasters, their occurrence, Effects, Mitigation and Management Systems in India. 4. Explain the utility of geography information systems (GIS), Remote sensing technology in all phases of disaster mitigation and management. 5. Understand the Role of Remote Sensing and Geographical Information Systems (GIS) in Disaster Management

UNIT-I

Introduction: Hazard, vulnerability and risk, Types of disasters, Disaster management cycle, Progress of disaster management in world, vulnerability profile of India, Disaster management act, Disaster management in India

UNIT-II

Natural Disasters – **Hydro- meteorological based disasters**: Tropical cyclones, floods, drought and desertification zones - Causes, Types, effects and Mitigation measures.

UNIT-III

Natural Disasters – **Geographical based disasters**: Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures.

UNIT-IV

Human induced hazards: Chemical industrial hazards, major power breakdowns, traffic accidents, etc.

UNIT-V

Role of Remote Sensing and Geographical Information Systems (GIS) in Disaster Management: Introduction to remote sensing and GIS, its applications in disaster management.

Suggested Books:

1. Rajib, S and Krishna Murthy, R.R.(2012) "Disaster Management Global Challenges and Local Solutions", Universities Press, Hyderabad, 2012.
2. Navele, P & Raja, C.K. (2009), Earth and Atmospheric Disasters Management, Natural and Manmade, B.S. Publications, Hyderabad, 2009.
3. Battacharya, T. Disaster Science and Management, Tata McGraw Hill Company, New Delhi, 2012.

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: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING
PRINCIPLES OF DATA STRUCTURES
(Open Elective-II)
SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week): 3 : 0 : 0	SEE Marks:60	Course Code: U20OE410CS
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSEOBJEC	COURSEOUTCOMES
Objectives of this course are to:	At the end of the course ,students will be
1. Understand Basic linear and non-linear data structures and learn techniques of recursion 2. Understand concepts of Linked lists 3. Understand Concepts of Stacks and queues 4. Understand Concepts of Trees	1. Understand the basic concepts of data structures. 2. Understand the notations used to analyze. The performance of algorithms. 3. Choose and apply an appropriate data structure for a specified application. 4. Understand the concepts of recursion and its applications in problem solving.

UNIT-I
Introduction: Data Types, Data structures, Types of Data Structures, Operations, ADTs,
Algorithms, Comparison of Algorithms, Complexity, Time- space tradeoff.
Recursion: Introduction, format of recursive functions, recursion Vs. Iteration, examples.

UNIT-II
LinkedLists: Introduction,Linkedlistsandtypes,Representationoflinkedlist,operationson
Linked list, Comparison of Linked Lists with Arrays and Dynamic Arrays.

UNIT-III
Stacks and Queues: Introduction to stacks, applications of stacks, implementation, and comparison of stack implementations.
Introduction to queues, applications of queues and

implementations, Priority Queues and applications.

UNIT-IV

Trees: Definitions and Concepts, Operations in Binary Trees, Representation of binary tree, Conversion of General Trees to Binary Trees, Representations of Trees, Tree Traversals, Binary search Tree.

UNIT-V

SearchingandSorting: Linearsearching,binarySearching,sortingalgorithms:bubblesort, selection sort, quick sort, merge sort.

Textbooks:

1. Narasimha Karumanchi, "Data Structures and Algorithms Made Easy", CareerMonkPublications,2017
2. HorowitzE,SahniS.,andSusanAnderson-Freed,"FundamentalsofDatastructuresinC",SiliconPr;2 edition(1August2007)
3. ReemaThareja,"DataStructuresusingC",Oxford,2014.

Reference Books:

1. Kushwaha D.S. and Misra A.K, "Datastructures AProgramming Approach with C", PHI.
2. SeymourLipschutz,"DataStructureswithC",McGrawHillEducation,2017.

Learning Resources:

1.https://www.tutorialspoint.com/data_structures_algorithms/index.htm
2.https://www.edx.org/course/foundations-of-data-structures
3.https://sites.google.com/site/merasemester/data-structures

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: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. IV-SEMESTER
OPTIMIZATION METHODS (Open Elective-II)

Instruction : 3Hours /week	SEE Marks : 60	Course Code : U20OE410ME
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. Understand revised simplex methods per customer requirements to suit for 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 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
Special cases in simplex method, Duality in LPP, Differences between primal and dual, shadow prices, Dual simplex method, Revised simplex method.

UNIT-III
Transportation Model
Introduction to 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.

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, Univariate search, pattern Directions, Hook Jeeves, Powel method, steepest decent method.

Learning Resources:
1. SingiresuS.Rao, "Engineering optimization- Theory and Practice", 4thEdition, 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: 90 Minutes

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

SKILL DEVELOPMENT COURSE III - APTITUDE II
SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:40	Course Code: **U20BS430MA**
Credits :01	CIE Marks:30	Duration of SEE:03Hours

COURSE OBJECTIVES	COURSE OUTCOMES
APTITUDE	**APTITUDE**
Build further on aptitude skills and enhance employability skills	Solve questions in the mentioned areas using shortcuts and smart methods
Enhance higher order thinking skills and problem solving in the following areas - Arithmetic ability, Numerical ability and General reasoning	Understand the fundamentals concept of Aptitude skills
Train to work systematically with speed and accuracy while problem solving	Perform calculations with speed and accuracy

UNIT 1: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED 8 hrs
- Time speed and distance
- Boats and Streams
- Problems on trains

UNIT 2: REASONING ABILITY- LOGICAL REASONING 6hrs
- Seating Arrangements- Linear; Circular; Complex
- Venn diagrams
- Syllogism
- Cubes & Cuboids
- Dices

UNIT 3: REASONING ABILITY- NON VERBAL REASONING 4hrs
- Figure Series
- Directions
- Clocks

- Calendars

UNIT 4: QUANTITATIVE APTITUDE - 2hrs
- Mensuration Part -1
- Mensuration Part -2
- Logarithms

UNIT 5: QUANTITATIVE APTITUDE 4hrs
- Permutations and combinations
- Probability

METHODOLOGY	ASSESSMENTS
- Demonstration	- Online assignments
- Presentations	- Individual and Group
- Expert lectures	
- Audio-visual lessons	

Learning Resources:
learn.talentsprint.com

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

1	No. of Internal Tests:	02	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: **90 Minutes**

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
Basic Electrical and Electronics Engineering Lab
SYLLABUS FOR B.E. IV SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks:50	Course Code: U20ES411EE
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

APPLIED THERMODYNAMICS LAB
SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):0:0:2	SEE Marks:50	Course Code: **U20PC411ME**
Credits :01	CIE Marks:30	Duration of SEE:03Hours

COURSE OBJECTIVES	COURSE OUTCOMES	
The objective of the course is to	*On completion of the course, students will be able to*	
perform experiments on various types of I.C Engines, Two-stage reciprocating air compressor and also to conduct experiments on Viscometer and flash and fire point apparatus.	1	determine the volumetric efficiency and isothermal efficiency of a two-stage reciprocating air compressor.
	2	draw the port timing diagram of two stroke petrol engine and the valve timing diagram of four stroke diesel engine.
	3	evaluate the performance of internal combustion engines and to prepare a heat balance sheet.
	4	determine absolute and kinematic viscosities of a given lubricating oil using Redwood Viscometer no 1.
	5	determine the flash and fire points of a given fuel using Cleveland's Apparatus.

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 single cylinder 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**			

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: **U20PC421ME**
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	identify whether flow is laminar or turbulent.
	3	evaluate the discharge coefficients of various flow measuring devices.
	4	evaluate the performance of impulse and reaction turbines at constant head.
	5	calculate the efficiency of dynamic and positive displacement pumps for various flow rates.

List of Experiments:

1. To determine the type of flow using Reynold's apparatus.
2. To Verify Bernoulli's Equation for an incompressible flow.
3. To determine the discharge coefficient of venture meter.
4. To determine the discharge coefficient of orificemeter.
5. To determine the friction factor in pipe flow.
6. To determine the impact coefficient of jet on given vane.
7. To study the performance characteristics of a Pelton wheel at constant head.
8. To study the performance characteristics of a Francis Turbine at constant head.
9. To study the performance characteristics of a Kaplan Turbine at constant head.
10. To study the performance characteristics of a centrifugal pump at constant speed.

11. To study the performance characteristics of a self priming pump at constant speed.
12. To study the performance characteristics of a reciprocating pump at constant speed.
13. To study the performance characteristics of a gear pump at constant speed.
14. To study the performance characteristics 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**			