

S.E. Semester –III

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)

TCET Autonomy Scheme (w.e.f. A.Y. 2021-22)

B.E. (Mechanical Engineering)							S.E. SEM: III				
Course Name: Applied Mathematics-III							Course Code: BSC- ME301				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)						
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation						
Hours Per Week					Theory (100)		Practical/ Oral (25)		Term Work (25)		Total
Theory	Tutorial	Practical	Contact Hours	Credits	IA		ESE	PR/OR		TW	125
					ISE	IE					
3	1	-	4	4	20	20	60	-	-	25	
IA – In-Semester Assessment, ESE – End Semester Examination and under IA, 20 marks of ISE (In-Semester Examination) will be conducted for 1 hour and 20 marks of IE (Innovative Examination) whereas 60 marks of ESE will be conducted for 2 hours											
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%)											
Prerequisite: Mathematics I, Mathematics II											

Course Objectives:

Course intend to deliver the basics of Laplace transforms, Fourier series and differential equations so that student should be able to apply them to solve different engineering problems.

Course Outcomes:

SN	Course Outcomes	Cognitive levels as per bloom's Taxonomy
1	Able to apply the Laplace Transform and its properties to evaluate the integrals.	L1, L2,L3
2	Able to apply Laplace & Inverse Laplace Transform to the solution of differential equations	L1, L2, L3
3	Able to compute the Fourier Series, its complex form.	L1, L2, L3
4	Able to apply the concept of Fourier Transform and Inverse Fourier transform.	L1, L2, L3
5	Able to apply initial and boundary value problems involving partial differential equations	L1, L2, L3
6	Able to use the numerical methods to solve ordinary and partial differential equation.	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive levels as per bloom's Taxonomy
1	Laplace Transform -I	6	L1, L2,L3
	Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions, Evaluation of integrals by Laplace transform, Heaviside unit step functions		
2	Laplace Transform -II	7	L1, L2, L3
	Finding inverse Laplace transform by direct method, partial and based on their properties methods, convolution theorem, solving ODEs by Laplace Transform method.		
3	Fourier Series	7	L1, L2, L3
	Introduction: Orthogonal and Orthonormal set of functions, Introduction of Dirichlet's conditions, Euler's formulae. Fourier Series of Functions: Exponential, trigonometric functions of any period $=2L$, even and odd functions, half range sine and cosine series, Complex form of Fourier series,		
4	Fourier Transform	6	L1, L2, L3
	Fourier integral representation, Fourier sine and cosine integral, Fourier Transform and Inverse Fourier transform of constant and exponential function.		
5	Partial Differential Equations	8	L1, L2, L3
	Classification of partial differential equations of second order, Variables and separable method, Heat equation, Wave equation 'Solution of one dimensional wave equation, transverse vibrations of an elastic string , one dimensional heat conduction equation, & steady state configuration for heat flow		
6	Numerical Methods	8	L1, L2, L3
	Taylor's series, Euler and modified Euler's methods. Runge-Kutta method of fourth order for solving first and second order equations, Numerical Solution of Partial differential equations using Bender-Schmidt Explicit Method and simplified Crank- Nicolson implicit method.		

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Advanced Engineering Mathematics	Erwin kreyszig	John Wiley & Sons	9th Edition	2006
2	An Introduction to Ordinary Differential Equations	E. A. Coddington	Prentice Hall India	3rd Edition	1995
3	Higher Engineering Mathematics	B.S. Grewal	Khanna Publishers	36th Edition	2010
4	Engineering Mathematics	Veerarajan T	Tata McGraw-Hill, New Delhi	3rd Edition	2008
5	Higher Engineering Mathematics	Ramana B.V	Tata McGraw Hill, New Delhi	11th Edition	2010
6	Numerical Methods	Kandasamy	S. Chand & CO.	-	-

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TCET Autonomy Scheme (w.e.f. A.Y. 2021-22)

B.E. (Mechanical Engineering)					S.E. SEM: III				
Course Name: Thermodynamics					Course Code:ESC- ME301				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	IA		ESE	PR/OR	TW
					ISE	IE			
3	1	-	4	4	20	20	60	-	25
IA – In-Semester Assessment, ESE – End Semester Examination and under IA, 20 marks of ISE (In-Semester Examination) will be conducted for 1 hour and 20 marks of IE (Innovative Examination) whereas, 60 marks of ESE will be conducted for 2 hours The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%) Prerequisite: Physics, Chemistry, Mathematics I, Mathematics II									

Course Objectives:

This course intends to deal with the fundamentals of Thermodynamics including thermodynamic systems and properties, relationships among the thermodynamic properties, the laws of thermodynamics and applications of these basic laws in thermodynamic systems. This course will provide the essential tools required to study thermodynamic systems in Applied Thermodynamics.

Course Outcomes:

SN	Course Outcomes	Cognitive levels as per bloom's Taxonomy
1	Apply fundamental concepts of thermodynamics to thermodynamic systems.	L1, L2
2	Understand the process and the first law of thermodynamics and compute the work involved & heat transfer in the given system.	L1, L2, L3, L4
3	Understand the second laws of thermodynamics and their application to a wide range of systems with calculations of the efficiencies of heat engines and other engineering devices.	L1, L2, L3, L4
4	To Understand the formation of steam.	L1, L2
5	Identify and apply Vapor power laws to various subsystems processes.	L1, L2, L3, L4
6	Identify and apply Gas power laws to various subsystems processes.	L1, L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels as per bloom's Taxonomy
1	Introduction and Basic Concepts	4	L1, L2
	Introduction, thermodynamic system, control volume, macroscopic and microscopic approaches, properties and state of a system, point and path functions, thermodynamic equilibrium, processes and cycles, quasi-static process, properties and types of properties, Zeroth law of thermodynamics, temperature scales, Ideal gas, Equation of state, universal gas constant, thermodynamic heat and work.		
2	First Law of Thermodynamics	6	L1, L2, L3, L4
	First Law of Thermodynamics: Statement and expressions for First Law of Thermodynamics for a Closed System undergoing a Cycle and Change of State, Joule's experiment, Concepts of Energy, Internal Energy, Enthalpy, Specific heats, Latent heats, PMM-I. Steady Flow process, Steady Flow Energy Equation (SFEE), First Law of Thermodynamics (SFEE) applied to various thermal devices such as boilers, nozzles and diffusers, turbines and engines, compressors and pumps, throttling device, condensers and heat exchangers, Joules Thompson Coefficient and its significance		
3	Second Law of Thermodynamics	8	L1, L2, L3, L4
	Limitations of first Law of thermodynamics, Kelvin- Planck and Clausius statements and their equivalence, thermal energy reservoirs, concept of heat engine, refrigerator, heat pump and PMM II, Reversibility and Irreversibility, Causes and conditions of Irreversibility, Carnot Cycle, Reversed Heat Engine, Carnot Theorem and its corollary, Absolute Thermodynamic Temperature Scale. Entropy: Clausius Inequality, Clausius Theorem, Entropy is Property of a system. High grade and Low Grade Energy, Available and Unavailable Energy, Dead State.		
4	Properties of Pure Substance	10	L1, L2, L3, L4
	Properties of Pure Substance: Pure substance and Phase changes: Property diagrams for phase change process (T-s and h-S diagrams), Sensible heat and latent heat, dryness fraction of steam, Understanding of Steam Table and Mollier chart with suitable examples.		
5	Vapor Power cycle	10	L1, L2, L3
	Carnot cycle and its limitations as a vapor cycle, Rankine cycle with different turbine inlet conditions, Mean temperature of heat addition, Methods to improve thermal efficiency of Rankine cycle – Reheat cycle and Regeneration Cycle		
6	Gas Power cycles	10	L1, L2, L3
	Assumptions of Air Standard Cycle, Otto cycle, Diesel Cycle and Dual cycle, Brayton Cycle, Sterling Cycle and Ericsson Cycle		

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Thermodynamics: An Engineering Approach	Yunus Çengel and Michael, Boles	Tata McGraw Hill	3rd Edition	2014
2	Basic and Applied Thermodynamics	Nag P. K	Tata McGraw-Hill	4 th Edition	2014
3	Fundamental of Engineering Thermodynamics	R. Yadav	Central publication house	7th Edition	2012
4	. Engineering Thermodynamics	R.K. Rajput	Laxmi Publication.	5 th Edition	2016

S.E. Semester –III
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy Scheme (w.e.f. A.Y. 2021-22)

B.E. (Mechanical Engineering)					S.E. SEM: III				
Course Name: Strength of Materials					Course Code: ESC- ME302				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	IA		ESE	PR/OR	TW
					ISE	IE			
3	1	2	6	5	20	20	75	25	25

IA – In-Semester Assessment, ESE – End Semester Examination and under IA, 20 marks of ISE (In-Semester Examination) will be conducted for 1 hour and 20 marks of IE (Innovative Examination) whereas, 60 marks of ESE will be conducted for 2 hours

The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%)

Prerequisite: Engineering Mechanics

Course Objectives:

Course intend to deliver the fundamental knowledge of internal resistance offered by the materials, allowable stress for working of beams and machine parts without failure.

Course Outcomes: Students will be able to:

SN	Course Outcomes	Cognitive levels as per bloom's Taxonomy
1	Demonstrate fundamental knowledge about various types of loading and stresses induced.	L1, L2
2	Draw SFD andBMDfor different types of loads and support conditions	L1, L2, L3, L4
3	Compute and analyzestressesinducedinbasicmechanical components.	L1, L2, L3, L4
4	Analyze effect of impact & twisting of components	L1, L2, L3
5	Compute Principal Stress & strain for given system	L1, L2, L3
6	Analyzebucklingand bendingphenomenonin columns and beams respectively.	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels as per bloom's Taxonomy
1	Introduction to Stress and Strain	8	L1, L2
	Stress and Strain: Definition, Stress- strain, uni-axial, bi-axial and tri-axial stresses, tensile & Compressive stresses, shear stress-Elastic limit, Hooke's Law. Elastic Constants: Poisson's Ratio, Modulus of elasticity, Modulus of rigidity, Bulk modulus, Yield stress, Ultimate stress. Factor of safety, state of simple shear, relation between elastic constants, Volumetric Strain, Volumetric strain for tri-axial loading, Deformation of tapering members, bars of varying sections, composite sections, Thermal Stress		
2	Shear Force and Bending Moments in Beams	8	L1, L2, L3, L4
	Axial force, shear force and bending moment diagrams for statically Determinate beams including beams with internal hinges for different types of loading, relationship between rates of loading, shear force & bending moment.		
3	Stress in Beams	7	L1, L2, L3, L4
	Theory of pure Bending, Assumptions, Flexural formula for straight beams, moment of resistance, bending stress distribution, Section moduli for different sections, beams for uniform strength, Fletched beams. Shear Stress in Beams: Distribution of shear stress, across plane sections used commonly for Structural purposes, shear connectors.		
4	Torsion Torsion: Torsion of circular shafts-solid and hollow, stresses in shafts when Transmitting power, shafts in series and parallel. Strain Energy: Resilience, proof Resilience, strain energy stored in the member due to Gradually applied load, suddenly applied load, impact load. Strain energy stored due to Shear, Bending and Torsion.	7	L1, L2, L3
5	Compound Stress and Deflection of beams	7	L1, L2, L3
	Compound Stresses: Introduction, state of stress at a point, General two dimensional stress system, Principal stresses and principal planes. Mohr's circle of stresses Deflection of Beams: Differential equation Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L		
6	Application of stresses in cylinders , shells and columns	6	L1, L2, L3
	Thin Cylindrical and Spherical Shells: Cylinders and Spheres due to internal pressure. Cylindrical Shell with hemi spherical End Columns and Struts: Buckling load, Types of end conditions for column, Euler's column theory and its limitations, Rankine- Gordon Formula		

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Strength of Materials	Subramanyam	Oxford University Press	-	2005
2	Mechanics of Materials	S. S. Rattan	TMH Pvt.Ltd.	-	-
3	Strength of Materials	S. Ramamrutham	DhanpatRaiPvt. Ltd.	-	-
4	Mechanics of Materials	B.C PunmiaAshokJain,ArunJain	Lakshmi Publications	-	-
5	Strength of Materials	BasavarajaiahandMahadevappa	Khanna Publishers	-	-
6	Elements of Strength of Materials	Timoshenko and Young	Affiliated East- West Press	-	-

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.nptel.ac.in	https://nptel.ac.in/courses/112107146/	M1, M2
2	www.nptel.ac.in	https://nptel.ac.in/courses/105105108/1	M1- M6

Suggested List of Practicals /Experiments:

Practical Number	Type of Experiment	Practical/Experiment Topic	Hrs.	Cognitive levels as per bloom's Taxonomy
01	Basic Experiments	Tension test on mild steel bar (stress-strain behavior, modulus determination)	02	L1, L2, L3, L4
02		Test on-tor-steel bar	02	L1, L2, L3, L4
03		Torsion test on mild steel bar/cast iron bar	02	L1, L2, L3, L4
04	Design Experiments	Brinell hardness test	04	L1, L2, L3, L4
05		Rockwell hardness test	02	L1, L2, L3, L4
06		Izod impact test	02	L1, L2, L3, L4
07		Charpy impact test	02	L1, L2,
08		Flexural test on beam (central point load)	02	L1, L2, L3, L4,
09	Mini/Minor Projects/Case studies	Flexural test on beam (two pointload)	02	L1, L2, L3,
10		Seminar /Course Project	02	L1, L2, L3, L4

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TCET Autonomy Scheme (w.e.f. A.Y. 2021-22)

B.E. (Mechanical Engineering)					S.E. SEM :III				
Course Name: Materials Science and Metallurgy					Course Code :ESC- ME303				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Or al (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	IA		ESE	PR/O R	TW
					ISE	IE			
3	-	2	5	4	20	20	60	25	25

IA – In-Semester Assessment, ESE – End Semester Examination and under IA, 20 marks of ISE (In-Semester Examination) will be conducted for 1 hour and 20 marks of IE (Innovative Examination) whereas, 60 marks of ESE will be conducted for 2 hours
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%)
Prerequisite: Physics, Applied Mechanics

Course Objectives:

Course intend to deliver introduction to engineering materials, fundamental knowledge of Phase diagrams and various heat treatment processes for specific application.

Course Outcomes: Student shall be able to

SN	Course Outcomes	Cognitive levels as per bloom's Taxonomy
1	Identify various crystal imperfections, deformation mechanisms, and strengthening mechanisms	L1, L2
2	Able to analyze advanced mechanisms for their effectiveness.	L1, L2
3	Interpret Iron-Iron carbide phase diagram, and different phases in microstructures of materials at different conditions.	L1, L2, L3
4	Select appropriate heat treatment process for specific applications.	L1, L2, L3
5	Identify effect of alloying elements on properties of steels	L1, L2
6	Illustrate basics of composite materials, Nano- materials and smart materials.	L1, L2

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels as per bloom's Taxonomy
1	1.1 Classification of Materials: Metallic materials, Polymeric Materials, Ceramics and Composites: Definition, general properties, applications with examples	8	L1, L2
	1.2 Lattice Imperfections: Definition, classification and significance of Imperfections Point defects: vacancy, interstitial and impurity atom defects, Their formation and effects, Dislocation - Edge and screw dislocations Burger's vector, Motion of dislocations and their significance, Surface defects - Grain boundary, sub-angle grain boundary and stacking faults, their significance, Generation of dislocation, Frank Reed source, conditions of multiplication and significance.		
	1.3 Deformation: Definition, elastic and plastic deformation, Mechanism of deformation and its significance in design and shaping, Critical Resolved shear stress, Deformation in single crystal and polycrystalline materials, Slip systems and deformability of FCC, BCC and HCP lattice systems.		
	1.4 Strain Hardening: Definition importance of strain hardening, Dislocation theory of strain hardening, Effect of strain hardening on engineering behavior of materials, Recrystallization Annealing: stages of recrystallization annealing and factors affecting it		
2	Failure Mechanisms	8	L1, L2
	2.1 Fracture: Definition and types of fracture, Brittle fracture: Griffith's theory of fracture, Orewa's modification, Dislocation theory of fracture, Critical stress and crack propagation velocity for brittle fracture, Ductile fracture: Notch effect on fracture, Fracture toughness, Ductility transition, Definition and significance		
	2.2 Fatigue Failure: Definition of fatigue and significance of cyclic stress, Mechanism of fatigue and theories of fatigue failure, Fatigue testing, Test data presentation and statistical evolution, S-N Curve and its interpretation, Influence of important factors on fatigue, Notch effect, surface effect, Effect of pre-stressing, corrosion fatigue, Thermal fatigue.		
	2.3 Creep: Definition and significance of creep, Effect of temperature and creep on mechanical behaviors of materials, Creep testing and data presentation and analysis, Mechanism and types of creep, Analysis of classical creep curve and use of creep rate in designing of products for loadbearing applications, Creep Resistant materials		
3	Theory of Alloys & Alloys Diagrams	10	L1, L2, L3
	3.1 Significance of alloying, Definition, Classification and properties of different types of alloys, Solidification of pure metal, Different types of phase diagrams (Isomorphous, Eutectic, Peritectic, Eutectoid, Peritectoid) and their analysis, Importance of Iron as engineering material, Allotropic forms of Iron, Influence of carbon in Iron- Carbon alloying Iron-Iron carbide diagram and its analysis, TTT diagram, CCT diagram Hardenability concepts and tests		
	3.2 Graphitization of Iron- Grey iron, white iron, Nodular and malleable irons, their microstructures, properties and applications		
4	Heat treatment Process	8	L1, L2, L3
	4.1 Technology of heat treatment, Classification of heat treatment process, Annealing- Principle process, properties and applications of full annealing, Diffusion annealing, process annealing and Cyclic annealing, Normalizing, Hardening heat treatment, Tempering, Subzero treatment, Austempering, Martempering, Maraging and Ausforming process,		

	4.2 Surface hardening: Hardening and surface Hardening methods. Carburizing, Nitriding, Cyaniding, Carbonitriding, induction hardening and flame hardening processes		
5	Effect of Alloying Elements in Steels 5.1 Limitation of plain carbon steels, Significance of alloying elements, Effects of major and minor constituents, Effect of alloying elements on phase transformation Classification of tool steels and metallurgy of tool steels and stainless steel, High strength steels such as HSS 800 & DOMEX 650	4	L1, L2
6	Introduction to New materials 6.1 Composites: Basic concepts of composites, Processing of composites, advantages over metallic materials, various types of composites and their applications 6.2 Nano Materials: Introduction, Concepts, synthesis of nanomaterials, examples, applications and Nano composites 6.3 An overview to Smart materials	7	L1, L2

Books and References:

Sr.No.	Title	Authors	Publisher	Edition	Year
1	Materials Science and Engineering	William D. Callister, Jr. – Adapted by Balasubramanian	Wiley India (P) Ltd	2 nd Edition	2014
2	Material Science and Metallurgy	V.D. Kodgire	Everest Publishing House	--	2013
3	Mechanical Metallurgy	G.E. Dieter	McGraw Hill International New Delhi	--	2007
4	Introduction of Engineering Materials	B.K. Agrawal	McGraw Hill Pub. Co. Ltd	--	2017

Online References:

Sr.No.	Website Name	URL	Modules Covered
1	https://nptel.ac.in	https://nptel.ac.in/courses/113106032/	M1-M6

Suggested List of Practical /Experiments:

Practical Number	Type of Experiment	Practical/Experiment Topic	Hrs.	Cognitive levels as per bloom's Taxonomy
01	Basic Experiments	Study of Metallurgical Microscope	02	L1, L2
02		Metallographic sample preparation and etching	02	L1, L2, L3, L4
03		Microstructures of plain carbon steels	02	L1, L2, L3
04		Microstructures of cast irons	04	L1, L2, L3
05		Annealing, Normalizing and Hardening of medium carbon steel and observation of Microstructures	02	L1, L2, L3
06		Study of tempering characteristics of hardened steel	02	L1, L2, L3
07		Determination of hardenability of steel using Jominy end Quench Test	02	L1, L2, L3, L4
08	Design Experiment	Fatigue test – to determine number of cycles to failure of a given material at a given stress	02	L1, L2, L3,
09		Case study on New Materials	02	L1, L2, L3,
10	Mini/Minor/Projects/Case studies	Seminar /Course Project	02	L1, L2, L3 ,

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TCET Autonomy Scheme (w.e.f. A.Y. 2021-22)

B.E. (Mechanical Engineering)					S.E. SEM :III				
Course Name: Manufacturing Process- I					Course Code :PCC- ME 301				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	IA		ESE	PR/OR	TW
					ISA	IE			
3	-	2	5	4	20	20	60	25	25
IA – In-Semester Assessment, ESE – End Semester Examination and under IA, 20 marks of ISE (In-Semester Examination) will be conducted for 1 hour and 20 marks of IE (Innovative Examination) whereas, 60 marks of ESE will be conducted for 2 hours The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%) Prerequisite: Engineering drawing, ,Physics ,Workshop Practices									

Course Objective:

Course intend to study basic production processes. Able to select appropriate production processes for a specific application.

Course Outcomes: Students will able to:

SN	Course Outcomes	Cognitive levels as per bloom's Taxonomy
1	Demonstrate various concepts of cold and hot working operations	L1
2	Demonstrate applications of various types of welding processes.	L1, L2, L3, L4
3	understanding of casting process	L1
4	Illustrate the concept of producing polymer components and ceramic	L1, L2
5	Demonstrate chip forming processes turning, drilling	L1, L2, L3, L4
6	Differentiate such as milling, shaping, grinding etc.	L1, L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels as per bloom's Taxonomy
1	Hot and cold working of metals Principles of rolling, forging, drop, press, upset, roll forging, extrusion, drawing, spinning, and effect of hot working. Cold working processes, Cold rolling, swaging, forging, extrusion- forward, backward and impact roll forming, tube drawing, wire drawing, spinning, shot penning, high energy rate forming, sheet metal working, types of presses, drives, different operations and types of dies.	7	L1, L2
2	Joining processes Arc welding- Theory, SMAW, GTAW, GMAW, FCAW, Submerged arc welding, Stud welding Resistance welding- Theory, spot and seam projection welding processes Gas welding Friction welding, Ultrasonic welding, Thermit welding, EBW and LASER welding Use of adhesive for joining, classification of adhesives, types of adhesive and their application, surface preparation and various joints welding defects and quality.	7	L1, L2, L3, L4
3	Foundry- Pattern making, moulding and casting Sand casting, types of pattern material, pattern making allowances, core print moulding, sand properties and testing, hand and machine moulding, core boxes, core making, melting and pouring, melting furnaces- Cupola, fuel fired, electric arc and induction furnaces. Cleaning, finishing and heat treatment of casting, defects in casting lost foam processes, shell moulding and investment casting. Permanent mould dies casting- Die-casting, low-pressure permanent mould casting, hot and cold chamber processing, centrifugal casting, semi centrifugal casting and continuous casting. Gating system design, Riser design, product design for sand casting.	7	L1, L2
4	Processing of Powder metals, Ceramics and Glass Powder-metallurgy process & its applications, Production of metal powders, compaction of metal powder, sintering, design considerations, process capabilities, shaping ceramics, forming and shaping of glass, designing consideration for ceramics and glasses	8	L1, L2
5	Lathe and drilling Machine Turning and boring, lathe construction, accessories and operations. Thread cutting- single and multi start threading, concept of speed, feed and depth of cut. Introduction to boring Machines, Capstan and Turret lathe. Fundamentals of drilling processes, hoist, drill geometry, tool holder, types of drilling machines, operations performed on drilling machines, type of drill. Reaming processes and reamer types.	8	L1, L2, L3, L4, L5, L6
6	Milling, shaping and planning Fundamental aspects, cutter types and geometry, Operations performed on milling machine, dividing head method of indexing. Construction, working and operations performed on shaper, planer, and broaching machines. Grinding : Wheels, wheel marking, wheel selection, wheel mounting, types of grinding machines. Honing, lapping, super finishing, buffing and burnishing processes.	8	L1, L2, L3, L4, L5, L6

Books and References/Online Resources:

SN	Title	Authors	Publisher	Edition	Year
1	“Workshop technology” Vol. I, II & III;	Chapman	Edward Arnold Publications Ltd. London.	2 nd Edition	2013
2	“Workshop Technology” Vol. I & II	Hajara Chaudhary S. K	Media Prom & Publication, Mumbai.	3 rd Edition	2015
3	Production Technology”;	R. K. Jain	Khanna Publications	3 rd Edition	2017
4	“Introduction to Jigs and fixtures”;	Hoffman	Galgotia Publishers	2 nd Edition	2012
5	“Manufacturing processes for engineering materials	Serope Kalpakjian & Steven R. Schmid,	-	-	-
6	“Production technology”;	HMT Hand book	Tata Mcgraw Hill Education Pvt. Ltd.	3 rd Edition	2015
7	“Manufacturing processes”;	S. E. Rusinoff	Times India Press.	2 nd Edition	2015
8	“Manufacturing processes and materials for engineers”;	Doyle	Prentice Hall of India Press	3 rd Edition	2012

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.nptel.ac.in	https://nptel.ac.in/courses/112105127/	M1-M6
2	www.nptel.ac.in	http://www.nptelvideos.in/2012/12/manufacturing-processes-ii.html	M1-M6

Suggested List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/Experiment Topic	Hrs.	Cognitive levels as per bloom's Taxonomy
01	Basic Experiments	Study of Safety & Working instruction in Machine shop.	02	L1, L2
02		Study of Measuring Instruments and cutting tools	02	L1, L2, L3, L4
03	Design Experiments	Report on machining processes performed on lathe machine.	02	L1, L2, L3, L4
04		One Job consisting of Plain and Taper Turning operations performed on mild steel, cylindrical component on lathe Machine.	05	L1, L2,
05		Report on machining processes performed on Shaping Machine.	02	L1, L2, L3, L4
06		Fabrication of one job on shaping machine to make horizontal and inclined surface on MS Steel component.	05	L1, L2, L3, L4
07		Fabrication of one simple job on Milling machine	04	L1, L2, L3, L4
08		Report on forging tools.	02	L1, L2, L3, L4,
09		Fabrication of one on Forging of Single point cutting tool used on Lathe Machine.	04	L1, L2, L3, L4,
10	Mini/Minor Projects/Case studies	Preparation of lap joint of GI sheet using Spot compressive Welding	02	L1, L2, L3, L4

Semester –III

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)

Approved by Adhoc Board of Studies and Academic Council under TCET Autonomy Scheme (w. e. f. A.Y. 2019-20)

B.E. (Mechanical Engineering)						S.E. SEM : III				
Course Name : Environmental Studies						Course Code :MC 301				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory (100)		Practical/Oral (25)	Term Work (25)	Total	
Theory	Tutorial	Practical	Contact Hours	Credits	IA	ESE	PR/OR	TW	25	
1	-	-	1	1	-	-	-	25		
IA:In-Semester Assessment ESE : Semester End Examination The weightage of marks for evaluation of Term work/ Report: Formative (40%), Timely completion of Case Study (40%) and Attendance (20%)										
Prerequisite: NA										

Course Objectives:

Course intend to develop an understanding of effect of Population on environment, Renewable and Non-renewable resources, Ecosystem, Pollution and Sustainable Social and Environmental Development

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels as per bloom's Taxonomy
1	Able to understand effect of population on environment	L1, L2
2	Able to understand Renewable and Non-renewable resources	L1, L2, L3, L4
3	Able to understand structure, function and energy flow in ecosystem	L1, L2, L3, L4
4	Able to understand biodiversity at local, national and global level	L1, L2, L3, L4
5	Able to understand cause, effect and controlling measures of Pollution	L1, L2, L3, L4
6	Able to understand sustainable social and environmental development	L1, L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	RBT Levels
1	The Multidisciplinary nature of environmental studies	2	L1,
	Definition, scope and importance. Need for public awareness Human population and the environment: - Population growth, variation among nations - Population Explosion- family welfare program - Environment and human health - Women and child welfare - Role of information technology in environment and human health		
2	Natural resources	2	L1,
	Renewable and non-renewable resources Natural resources & associated problems: - Forest resources: - Water resources: - Mineral resources: - Food resources: - Energy resources: Role of an individual in conservation of natural resources: - Equitable use of resources for sustainable lifestyles.		
3	Ecosystems	2	L1, L2, L3, L4
	- Concepts of an ecosystem. - Introduction, types, characteristic features, structure and function of the following ecosystem: - Forest ecosystem - Grassland ecosystem - Desert ecosystem - Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries) Case study on various ecosystems in India.		
4	Biodiversity and its conservation	3	L1,
	Introduction-Definition: genetic species and ecosystem diversity Bio-geographical classification of India Value of biodiversity : Consumptive use, productive use, social, ethical, aesthetic and option values, Bio-diversity at global, national, local levels India as a mega diversity nation Case study on Bio diversity in India.		
5	Environmental Pollution Definition	3	L1, L2, L3, L4

	- Causes, effects and control measures of: - Air pollution - Water pollution - Soil pollution Solid waste management: Causes, effect and control measures of urban and industrial wastes Role of an individual in prevention of pollution Case study on Pollution Disaster management: floods, earthquake, cyclone and land slides Carbon Credits for pollution prevention		
6	Social issues and environment - From unsustainable to sustainable development - Urban problems related to energy - Water conservation, rain water harvesting, watershed management - Environmental ethics: issues and possible solution Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. - Consumerism and waste products - Environment protection act - Public awareness Case study on Environmental Ethics	3	L1, L2

Books and References:

Sr. No.	Title	Author	Publisher	Edition	Year
1	Text book of environmental studies	ErachBharucha	Universities Press/Orient Blackswan	First	2005
2	Environmental Studies	D L Manjunath	Pearson	First	2006
3	Environmental Studies	Benny Joseph	Tata McGRAW HILL	Second	2009
4	Environmental Studies	JagdishKrishnaswami, R J Ranjit Daniels	Wiley India Private Ltd. New delhi	First	2009
5	Environmental Studies	AninditaBasak	Pearson	First	2009
6	The Environmental Studies	Deeksha Dave	Cengage learning, Thomason India edition	Second	2012

S.E. Semester –III
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy Scheme (w.e.f. A.Y. 2021-22)

B.E. (Mechanical Engineering)							S.E. SEM :III			
Course Name :Computer Aided Machine Drawing							Course Code: HSD-MEPS301			
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory (100)		Practical/Oral (25)	Term Work (25)	Total	
Theory	Tutorial	Practical	Contact Hours	Credits	IA	ESE	Presentation	Report	75	
1	-	2	3	2	-	-	50	25		
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%)										
Prerequisite: Manufacturing Process – I, Manufacturing Process – II, Material Science & Metallurgy										

Course Objectives: Course intend to deliver the fundamental knowledge of various machine parts , their assembly and proper reading of the drawing sheets so that student should be able to use different machine parts as per the application.

Course Outcomes: Students will able to:

SN	Course Outcomes	Cognitive levels as per bloom's Taxonomy
1	Acquire the knowledge of various standards and specifications about standard machine components.	L1, L2
2	Read and interpret the drawing	L1, L2, L3, L4
3	Draw details and assembly of different mechanical systems	L1, L2, L3, L4
4	Convert detailed drawing into assembly drawing using modelling software	L1, L2, L3, L4
5	Convert assembly drawing into detailed drawing using modelling software	L1, L2, L3, L4
6	Prepare detailed drawing of any given physical object/machine element with actual measurements	L1, L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels as per bloom's Taxonomy
1	Introduction to Machine Drawing	3	L1, L2, L3, L4
	Introduction to Machine Drawing: Introduction, Importance, Classifications of machine drawings with examples, Different of Sections, Dimensioning methods: Counter Sunk, Counter Bores, Spot Faces, Chamfers, Screw Threads, Tapered Features, Conventional Representation of Materials and Machine Components. Interpenetration of Surfaces (Emphasis on Applied Cases) Line or curve of intersection of two penetrating cylinders, Cone and cylinder, prism and a cylinder, cone and prism, Forged ends, etc.		
2	Screwed Fastenings and Joints	2	L1, L2
	Screwed Fastenings - Screw Thread Nomenclature and types, Bolted Joints, Riveted Joints, Locking Arrangements for Nuts, Foundation Bolts and Key, Cotter, Riveted joints, Welded joints. Pipe Joints, Pulleys and Couplings.		
3	Preparation of details and assembly drawings	3	L1, L2, L3, L4
	Preparation of details and assembly drawings of Clapper block, Single tool post, Lathe tail stock, jigs and fixtures, Simple, solid, Bushed bearing, I.S. conventional representation of ball and roller bearing, Pedestal bearing, footstep bearing, IC Engine Parts.		
4	Valves	2	L1, L2, L3, L4
	Expansion joints, stuffing box and glands, piping layouts, conventional representation of pipe fittings, valves etc.		
5	Limits, Fits and Tolerances	3	L1, L2, L3, L4
	ISO system of tolerance, Tolerance charts, Hole - base and shaft -base system of tolerance, Types of fits, symbols and applications. Geometric Tolerances : Introduction, Nomenclature, Rules, Symbols, values obtained from various manufacturing processes, Surface Textures, Roughness values and Roughness Grades.		
6	Reverse Engineering of a physical model	2	L1, L2, L3, L4
	disassembling of any physical model having not less than five parts, measure the required dimensions of each component, sketch the minimum views required for each component, convert these sketches into 3-D model and create an assembly drawing with actual dimensions.		
	Reading of Industry Drawings		

Books and References/Online Resources:

SN	Title	Authors	Publisher	Edition	Year
1	Machine Drawing	N.D. Bhatt	Charotar Publishing House Pvt Ltd	6 th	2015
2	A textbook of Machine Drawing	Laxminarayan and M.L. Mathur	Jain brothers Delhi	7 th	2016
3	Machine Drawing	K.I.Narayana, P. Kannaiah, K.Venkata Reddy	New Age Publications	3 rd	2006

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.nptel.ac.in	https://nptel.ac.in/courses/112106075/	M1-M6

Suggested List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/Experiment Topic	Hrs.	Cognitive levels as per bloom's Taxonomy
01	Basic Experiments	Solid works Introduction and Tutorials 1 & 2	02	L1, L2
02		To prepare 3-dimensional models of Nut-Bolt-Washer assembly (comprising of Hexagonal & Square Bolt, Wing nut) and its 2- dimensional drawings	03	L1, L2, L3, L4
03		To prepare 3-dimensional model of an assembly of Single Tool Post/Clapper Block and its 2- dimensional drawings.	03	L1, L2, L3, L4
04		To prepare 3-dimensional model of an assembly of Drill Jig/ Bench or machine Vice and its 2- dimensional drawings	03	L1, L2,
05		To prepare 3-dimensional model of an assembly of Universal Coupling and its 2-dimensional drawings.	03	L1, L2, L3, L4
06		To prepare 3-dimensional models of component parts of Expansion Joint/ Socket and Spigot Joint and their 2-dimensional drawings.	03	L1, L2, L3, L4
07		To prepare 3-dimensional models of component parts of Non-Return Valve and their 2- dimensional drawings.	03	L1, L2, L3, L4
08		Four Problems on Intersection of Solids of different combinations on A3 Size Sketch Book.	03	L1, L2, L3, L4,
09		Any two types of Screwed	03	L1, L2, L3, L4,
	Design Experiments	Fastenings and Joints each and types of fits with applications on A3 Size Sketch Book.		
10		Mini- Project : 3-D model of Engine Block	04	L1, L2, L3, L4

S.E. Semester –III

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)

Approved by Adhoc Board of Studies and Academic Council under TCET Autonomy Scheme (w. e. f. A.Y. 2019-20)

B.E. (Mechanical Engineering)							S.E. SEM: III		
Course Name: Project Based Learning I							Course Code: HSD-MEPBL301		
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week							Practical/Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	IA	ESE	AX	AC	25
-	-	2	2	1	-	-	25	-	
AC- Activity evaluation									
The weightage of marks for continuous evaluation of term work/report: Formative (40%), Timely completion of practical (40%) and Attendance/learning Attitude (25%)									
Prerequisite: Core Subjects									

Course Objectives: Course intends to convert theoretical concepts into practical ideas.

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive Levels as per bloom's Taxonomy
1	Demonstrate a systematic understanding of project contents	L1, L2, L3, L4
2	Understand methodologies and professional way of documentation	L1, L2, L3, L4
3	Know the meaning of different project contents	L1, L2, L3, L4
4	Understand established techniques of project report development.	L1, L2, L3, L4
5	Application of knowledge and techniques learnt in theoretical classes for developing the Machine/Mechanism for real problems.	L1, L2, L3, L4
6	Gaining deeper understanding in specific functional areas	L1, L2, L3, L4

INTRODUCTION:

The project report should be documented with an engineering approach to the solution of the problem that you have sought to address. The project report should be prepared in order to solve the problem in a methodical and professional manner, making due references to appropriate techniques, technologies and professional standards. You should also include the details from your project notebook, in which you would have recorded the progress of your project throughout the course. The project report should contain enough details to enable examiners to evaluate your work. The details, however, should not render your project report as boring and tedious. The important points should be highlighted in the body of the report, with details often relegated to appendices. This unit covers all the details on the structure of mini project report contents; it also contains detailed explanations on each of these contents.

IMPORTANCE OF THE MINIPROJECT:

The Mini Project is not only a part of the course work, but also a mechanism to demonstrate your abilities and specialization. It provides the opportunity for you to demonstrate originality, teamwork, inspiration, planning and organization in a Mechanism/Machine project, and to put into practice some of the techniques you have been taught throughout the previous courses. The Project is important for a number of reasons. It provides students with:

- Opportunity to specialize in specific areas of Engineering science
- Future employers will most likely ask you about your project at interview
- Opportunity to demonstrate a wide range of skills and knowledge learned, and
- Encourages integration of knowledge gained in the previous course units.

The project report is an extremely important aspect of the project. It serves to show what you have achieved and should demonstrate that:

REQUIREMENT ANALYSIS:

Problem Definition:

Define the problem on which you are working in the project. Provide details of the overall problem and then divide the problem into sub problems. Define each sub-problem clearly. Requirements Specification: In this phase you should define the requirements of the system, independent of how these requirements will be accomplished. The Requirements Specification describes the things in the system and the actions that can be done on these things. Identify the operation and problems of the existing system. Planning and Scheduling: Planning and scheduling is a complicated part of project development. Planning, for our purposes, can be thought of as determining all the small tasks that must be carried out in order to accomplish the goal. Planning also takes into account, rules, known as constraints, which, control when certain tasks can or cannot happen. Scheduling can be thought of as determining whether adequate resources are available to carry out the plan. You should show the Gantt chart and Program Evaluation Review Technique (PERT).

Software and Hardware Requirements: Define the details of all the software and hardware needed for the development and implementation of your project.

- Hardware Requirement: In this section, the equipment, graphics card, numeric co-processor, mouse, disk capacity, RAM capacity etc. necessary to run the software must be noted.
- Software Requirements: In this section, the operating system, the compiler, testing tools, linker, and the libraries etc. necessary to compile, link and install the software must be listed.

GUIDELINES FOR THE PROJECT FORMULATION:

Every student is required to carry out Project work in a group of 4 under the supervision of a Mentor provided by the Project Coordinator.

The mentor shall monitor progress of the student continuously. A candidate is required to present the progress of the Project work during the semester as per the schedule provided by the Project Coordinator.

PROJECT SYNOPSIS CONTENT:

Project proposal should be prepared in consultation with the Mentor. It should clearly state the objectives and environment of the proposed Project to be undertaken. Ensure to include the following items while submitting your Project synopsis. Project synopsis may contain 10-20 pages and sequence of contents strictly should be in the following order:

- 1) Title of the Project
- 2) Synopsis Approval Form
- 3) Index
- 4) Acknowledgement
- 5) Introduction and Objective of the Mini Project
- 6) Analysis (Feasibility Study, Diagram etc)
- 7) H/W and S/W Requirement
- 8) Table and Structure, Number of Modules, Detail of Modules
- 9) Types of Reports
- 10) Future Scope

MINI PROJECT EVALUATION :

As per the TCET College norms Project based learning Report shall be evaluated by the examiner at the end of the semester. However there will be continuous monitoring of the Mini Project progress report during the semester.

S.E. Semester –III
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)

TCET Autonomy Scheme (w.e.f. A.Y. 2021-22)

B.E. (Mechanical Engineering)							S.E. SEM: III			
Course Name: Activity Based Learning III							Course Code:HSD-MEABL301			
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory (100)		Practical/Oral (25)	Term Work (25)	Total	
Theory	Tutorial	Practical	Contact Hours	Credits	IA	ESE	PR/OR	TW	25	
-	-	2	2	1	-	-	-	25		
The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)										
Prerequisite: Basics of Computer Programming, General knowledge, Social awareness,										

Course Objectives:

- The larger objective of the course is to prepare students for Leadership and Excellence in their life roles by continually engaging students in both individual and team activities that explore important issues or phenomena, use multiple media and technologies, create products that embody the results of the students explorations, and call the students to explain their work and products to adult and student audience.
- Further the course also aims to develop the Society Sensitive Citizens by creating awareness among students and take up the initiatives in the Activity mode for the needy.
- The course intends to deliver the understanding of the concepts of critical thinking, encourage the students to look beyond their textual knowledge, establish the relationship between theory and the applications of the learned concepts.
- It also intends to address the social issues and help the society in the area of work.

Course Outcomes:

SN	Course Outcome	Cognitive Levels as per bloom's Taxonomy
1	Student will be able to outline the procedures for debate and demonstrate parliamentary debate and policy debate styles Learn on multidisciplinary subjects. This brings out the excellence attribute in students with updated awareness in either topics technical or current affairs.	L1, L2, L3
2	Student will in the process figure out the various benefits of quiz competitions, also Work as a team.	L1, L2, L3
3	Students will be to make the society awareness about various social issues which teaches them a overall team spirit with decisive acumen qualities for excellence .	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive Levels as per bloom's Taxonomy
1	Extempore/Debate I. Introduction to debate , Definition and types of Debate Brainstorming session among students on various topics floated for debate. Topics can be Academic or Parliamentary, Financial, International affairs, technology trends, Technical or philosophical. Expressing views by each student for /against topic for 1 minute. II. Debate competition. Formation of four teams for two topics. Two teams (For and against) for topic I will debate first and the other two team will be audience and for topic II vice-versa. Evaluation by faculty as per format.	4	L1, L2, L3
2	General Knowledge (Technical and Current Affairs) I. Introduction to Quiz , Definition, Types of quiz, Rules of quiz, quiz rounds. Quiz competition on Technical topic with 50MCQ. II. Quiz competition on current affairs with 50MCQ. Evaluation by faculty as per format.	2	L1, L2, L3
3	Personality Development I. Word association (Test Sentence Building) (2 Hrs.) Students are shown 60 English words one after other and a short sentence using the words shown are to be written. Each word will appear for 15 seconds and sentence is to be written within this period only. At least 45 words are to be attempted to get goodmarks II. Thematic Apperception Test (Short Story Writing)(2Hrs.) 12 Slides will be projected, and stories are to be written in 03 Minutes. Discussions on Stories written by students Evaluation by faculty as per format.	2 2	L1, L2, L3
4	TURNING A WASTE INTO USEFUL PRODUCTS/ RENEWABLE ENERGY I Introduction: Minimize the generation of wastes and to reuse and recycle them. This activity brings out the excellence in critical thinking and application in team. This is to be practised for designing the flow chart for application and not to develop product. 1. A physical beneficiation of automobile, electrical and electronic waste. 2. Reduction of automobile emission is an important aspect of Mechanical Engineering. 3. Another area one can look into is power generation and biogas production using waste produced in institute. 4. Designing of plants also welcome with unique ideas. Example A captive power plant, also called autoproducer or embedded generation, is an electricity generation facility used and managed by an industrial or commercial. A design can be worked out at initial stage for college self sustaining electric power generation with the resources like solar energy etc.	2	L1, L2, L3
5	Game Based Learning I Introduction :Games provide a different pedagogical perspective within a higher education context. They provide an stimulating environment with an learning outcome in fun style.. Different Games viz. Puzzle, Scribblenaut, computer aided design assembly delivery using the game in mechanical engineering branch, can be played in class with a game concept document as a learning outcome	2	L1, L2, L3

6	Extended Work		
	I. Introduction to Role play)(4 Hrs.), types of Role play. Writing and demonstration of street Play on socialIssues Water Conservation Waste Management Plastic Ban etc.	2	
	II. Education forneedy Education on social Issues like social media, youth related issues etc. Education on healthissues Education on issues related to senior citizen etc.	6	
	III. The education/ awareness needs to be conducted in campus through presentation (placards, posters etc.), survey's, data analysis and evaluation by faculty as performat	6	
	Total	30	L1, L2, L3

Books and References:

Sr. No.	Title	Author	Publisher	Edition	Year
1	Competitive Debate	Richard Earl	-	-	-
2	Times Quiz book by Times Mind Games	OLovBjortomt	-	-	-
3	Cracking the coding	Gayle Laakmann	-	-	-

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.cleverism.com	https://www.cleverism.com/18-best-idea-generation-techniques/	M1-M4
2	www.thebetterindia.com	https://www.thebetterindia.com/111/teaching-street-children-a-thing-or-two/	M1-M4