Course Code	**HSM_ME601**				
Category	**HumanitiesandSocialSciencesincludingManagement course**				
CourseTitle	**IndustrialEngineering-I**				
S/chemean d/ Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**
	2	**1**	**0**	**3**	
Prere-/*quisites	-				

//*Objectives:**

/*-/To impart knowledge in the area of method study and time study, principles and techniques to improve productivity in manufacturing and Service sectors. To explain the general principles that governs the interaction of humans and their working environment for improving worker performance and safety.

M.No:	Topic	No.ofHrs
Module1.	Introduction to industrial engineering and its various techniques, definitions and explanation ofproductivitywithsignificanceinindustries,productivitymeasurements, factors affecting productivity, basic work content and excess work content, industrial applications to calculate total and partial productivities.	08
Module2.	Introductiontoworkstudyanditsbasicprocedures,definitionsandconceptofwork study with examples, human factors in the application of work study, factors for selecting the work study,ergonomics,scopeandobjectivesofergonomics,application of human factors in engineering workplace design, *etc.*	08
Module3.	Introductiontomethodstudyandtheselectionofjobs,record,examineanddevelop, objectives and basic procedure ofmethodstudy,recordingtechniques(processcharts and diagrams), outline *PC*, flow process charts, two hand process charts, *MAC*, simo chart, flow diagram, string diagram, cycle graph, chronocycle graph, travel chart, principles of motion economy.	12
Module4.	Workmeasurementanditsapplications,timestudy,worksampling,ratingandtheir methods, breaking the jobs into elements, types of elements, allowances and their calculations, calculation of standard time, examples of time study, pmt systems, synthetic data, various applications and examples.	14
TotalnumberofHours		**42**

CourseOutco+mes:

Attheendofthecourse,thestudentwillbeableto:

- Understandtheconceptandapplicationsofindustrialengineeringwithafocusonproductivity,work design and work study. **(L1, L2)**
- Analyse&applythemethodstudytechniquesinrelationtoaparticularjobenvironment.**(L3)**
- Analyse&evaluatevariousengineeringworkmeasurementtechniquesdesignedtoestablishthetimefor a qualified worker to carry out a specific job at a defined level of performance. **(L4)**
- Attainagraspofthefundamentalprinciplesofexperimentaldesign,collectionofdatarelatedtowork study, their analysis and interpretation. **(L3, L4)**

S.No:	TextBooks	Author	Publisher
1.	MotionandTimeStudy,Design& Measurement of Work	Barnes.R.L.	JohnWiley&Sons,1990
	References		
1.	IntroductiontoWorkStudy	International Labor Office, Geneva	Geneva,1991
2.	WorkStudy	CurrieR.M	ELBS&Pitman,London,*1977.*
3.	MotionandTimeStudy,5thEdition	Mundel,M.E.	PrenticeHall,Englewood Cliff, NewYork, *1978.*

Course Co7542107/*-+ de*-*/*-*//*-/	**HSM_ME601L**				
Category	**HumanitiesandSocialSciencesincludingManagement course**				
CourseTitle	**IndustrialEngineering-Ilab**				
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**
	0	**0**	**2**	**1**	

Objectives:

To demonstrate human factors/ergonomic principles (*HF/E*) that influence the design, performance and safety of work systems. To apply *HF/E* guidelines and use standard HF/E in the design of work systems.
To model work systems using standard techniques, such as flow diagrams, process charts, operation charts, activity charts, block diagrams, and process maps, for purposes of work system documentation, analysis,anddesign.Todeterminethetimerequiredtodoajobusingstandarddata,occurrencesampling time study, and predetermined time systems.

M.No:	**Topic**
Module1.	Ergonomic design study (present/proposed/new) of a product, equipmentorworkenvironment(human-machine interface).
Module2.	To assemble a product (electrical holder, etc.), record the cycle time and drawthelearningcurve of the operator performing the assembly.
Module3.	Drawoutlineprocesschartandtwohandflowprocesschartsfortheassemblyperformed in experiment no. 2, and analyse the present method and also suggest improved method/s.
Module4.	Studyanddrawofflowprocesscharts(somesuitableassemblyoperation)
Module5.	Study and draw a multi activity chartofasuitablemethodandproposebettermethod/s(forman and machine).
Module6.	Study suitable movements/travel ofman,materialorequipment,anddrawstringdiagrams,travel charts and flow diagrams.
Module7	Tocalculatethestandardtimeofasuitablejob,usingpredeterminedtimestandardtechniques.
Module8	DevelopasimulationmodelinWITNESSsoftwareandgetresultsinchartformat.

Course Code	**HSM_ME602**				
Category	**HumanitiesandSocialSciencesincludingManagement courses**				
CourseTitle	**OperationsResearch**				
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**
	2	**1**	**0**	**3**	
Prerequisites	**None**				

Objectives:

To impart knowledge in concepts and tools of operations research and to understand mathematical models for analyzing different situations in the industrial/ businessscenarioinvolvinglimitedresources and finding the optimal solution within constraints.

S.No:	**Topic**	**No.ofHrs**
Module1.	Operations research- introduction, scope, or methodology and application, linear programming problems, formulation of *LPP*, graphical and simplex solutions (bigM method and two phase method), duality.	12

Module2.	Introduction to transportation andtranshipmentproblems,initialbasicfeasible solutions and optimality tests,introductiontoassignmentproblems,Hungarian method.	10
Module3.	Introduction to project management, project life cycle, network diagrams, basic scheduling (deterministic and probabilistic model), time-cost trade-off, resource allocation, project monitoring.	10
Module4.	Jobsequencing, Johnson algorithm, queueing model- Markovian distributions, single server model and applications.	10
TotalnumberofHours		**42**

CourseOutcomes:

Attheendofthecourse,thestudentwillbeableto:

- ***Analyze***areallifesystemwithlimitedconstraintsanddepictitintheformofalinearprogrammingmodel **(L4).**
- ***Obtain***theoptimalsolutionofthatmodel**(L3).**.
- ***Determine***theoptimalsolutionsofAssignmentandTransportationmodels**(L5).**
- ***Plan***,***schedule***and***control***theproject**(L6).**
- ***Understand***differentqueuingsituationsandfindtheoptimalsolutionsusingmodelsfordifferent situations **(L2).**
- ***Utilize***themachinesinanindustryinawaytominimisetheidletime**(L2)**.

S.No:	**TextBooks**	**Author**	**Publisher**
1.	Operations Research- An Introduction	HamdyA. Taha	Pearsoneducation
	References		
1.	OperationsResearch	S.R.Yadav,A.K. Malik	OxfordHigherEducation
2.	Introduction to operations Research	FrederickS. Hillier	TataMcGrawHill
3.	Operationsresearch	P.K.Gupta,D.S.Hira	S.Chand,NewDelhi

Course Code	**PEC1_ME603**					
Category	**ProfessionalElectiveCourses**					
CourseTitle	**InternalCombustionEngines**					
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**	
	2	**1**	**2**	**3**		
Prerequisites	**BasicEngineeringThermodynamics,HeatTransfer**					

Objectives:

To present a problem oriented in depth knowledge of internal combustion engines and to address the underlying concepts, methods and application of internal combustion engines.

M.No:	**Topic**	**No.ofHrs**
Module1.	Classification of engines according to fuels,cycleofoperationandnumberofstrokes, review of air standard cycles, deviation of actual cycles from fuel air cycles, various influencing factors.	06

Module2.	Review of fuels for*IC*engineswithparticularreferencetovelocity,ignitionqualityand knock rating, variable compression ratio engines.	06
Module3.	Air-fuel ratios and mixture requirements of *SI* engines, stoichiometric fuel air ratio, carburetor principle, types and venturi, fuel orifice sizes, charge stratification and distribution.	06
Module4.	Fuel-airrequirement in *CI* engines, methods of fuel oil distribution and injection, flame front and normal combustion, detonation in *SI* and knocking *CI* engines, comparative analysis, ignition systems in *SI* and *CI* engines.	06
Module5.	Enginefrictionandlubrication,effectofenginevariables,totalenginefriction,requirements of lubricants and lubricating systems.	04
Module6	Cooling systems,heat transfer rates, heat rejected to coolant, air and water cooling systems and components, two-stroke engines,scavenging systems, supercharging, methods of supercharging withspecialemphasisonturbochargers,enginetestingand performance.	08
TotalnumberofHours		**42**

CourseOutcomes:

Attheendofthecourse,thestudentwillbeableto:

- ***Understand***workingandperformanceofICEnginesthroughthermodynamiccycles**(L1).**
- ***Identify***thedifferentkindoffuelmeteringandfuelsupplysystemsfordifferenttypesofengines**(L3).**
- ***Understand*** the theories of combustion in *SI* and *CI* engines, methods of reduction of detonation and knock. Combustion chamber types in *SI* and *CI* engines,factors influencing combustion chamber design **(L4).**
- ***Understand***basicknowledgeofsupercharging,turbochargingof*IC*engines**(L6)**
- ***Evaluate***methodsforimprovingthe*IC*engineperformance**(L1&L2).**
- ***Understand***thelatestdevelopmentsin*IC*EnginesandalternatefuelS**(L2).**
- ***Identify*** the necessity of lubrication & cooling systems of *IC* engines. Properties of lubricating oils, lubricating systems, and the basic knowledge of air- and water-cooling systems of *IC* engines **(L5).**

S.No:	TextBooks	Author	Publisher
1.	Internal Combustion Engine Fundamentals	JohnB.Heywood	McGraw-HillBookCompany
	References		
2.	I.C.Engines	V.Ganeshan	TataMcGrawHill
3.	Engineering Fundamentals of I.C. Engines	W.W.Pulkrabek	PrenticeHallIndia
4.	AlternativeTransportationFuels	MKGajendraBabu andK.A. Subramanian	CRCPress

Course Code	**PEC1_ME603L**				
Category	**ProfessionalElectiveCourse**				
CourseTitle	**InternalCombustionEngines Lab**				
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Five)**
	0	**0**	**2**	**1**	
Prerequisites	**-**				

Objectives:

To describe the performance and operating characteristics of internal combustion engines and to explain the parts and type of fuels used in *IC* engines and its performance analysis. To describe combustion process phenomena in IC engines.

M.No:	**Topic**
Module1.	Todeterminethefullloadperformanceof4strokesinglecylindersparkignitionengine.
Module2.	Todeterminethepartloadperformanceof4strokesinglecylindersparkignitionengine
Module3.	Todeterminebrakemeaneffectivepressureof4strokesinglecylindersparkignitionengineat partload.
Module4.	ExperimentalStudyofsparkignitionenginewithalternativefuels.

Course Code	**PEC2_ME603**				
Category	**ProfessionalElectiveCourses**				
CourseTitle	**AutomobileEngineering**				
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**
	2	**1**	**0**	**3**	
Prerequisites	**BasicEngineeringThermodynamics,Mechanics,I.C.Engines**				

Objectives:

Tostudybasicsofprinciples,importanceandfeaturesofactualautomobilesystems*suchas*axle, differential, brakes, Steering, suspension, and balancing *etc.*

M.No:	**Topic**	**No.ofHrs**
Module1.	Introductiontoautomobiles-classificationandbasicstructure,chassisconstruction.	02
Module2.	Transmission- clutches- requirements of clutches, dry friction clutches and types, clutchoperation,clutchcomponentsandmaterials,functionsoftransmissionsystem, resistance to vehicle motion and tractive effort, manual transmission system, sliding mesh and constant mesh gear box, synchromesh gear box, transfer box, all wheel drive, introduction to automatic transmission, epicyclic gear box, freewheel unitand overdrives.	11
Module3.	Driveline-propellershafts,Hooke'jointandanalysis,finaldriveanddifferential, rear axledrivesandrearaxleshaftsupport.	05
Module4.	Braking system- classification of brakes, principle and construction details of drum brakes and disc brakes, brakeactuatingsystem-mechanical,hydraulicandpneumatic, factors affecting brake performance, power brakes, anti-lock braking system.	06
Module5.	Steeringsystem-frontaxleandwheelalignment,steeringrequirements,steering geometry,steeringmechanisms,steeringlinkagesandsteeringgears,powersteering.	07

Module6.	Suspension systems- need of suspension system, types of suspensions, factors influencing ride comfort, suspension spring- construction details and characteristics of leaf springs.	07
Module7.	Wheels and tyres- types of wheels, types of tyres andtheirconstructiondetails,tyre materials and designation, wheel balancing, tyre rotation, tyre wear, effect of air pressure and temperature on tyre performance.	04
TotalnumberofHours		**42**

CourseOutcomes:

Attheendofthecourse,thestudentwillbeableto:

- ***Understand***thebasicfundamentalsandanatomyofAutomobileEngineering**(L2).**
- ***Understand***thelocationandimportanceofeachautomobileparts**(L2)**
- ***Apply***knowledgeofautomotiveengineering&practicestopursueasuccessfulcareerinthefieldof automotive technology **(L6).**
- ***Understand***thefunctioningoftheengineanditsaccessories,gearbox,clutch,brakes,steering,axlesand wheels **(L2).**
- ***Understand***suspension,frame,springsandotherconnections**(L2).**
- ***Understand***Emissions,ignition,controls,electricalsystemsandventilation**(L2).**

S.No:	**TextBooks**	**Author**	**Publisher**
	AutomobileEngineering,VollandII.	DrKripalSingh	Standardpublications
	References		
	AutomotiveMechanics	Crouse/Anglin	TMH
	MotorVehicle.	GarrettT.K.,Newton, K., & Steeds W	Butterworth-Heinemann
	AutomobileEngineering	AnilChhikara	SatyaPrakashan,NewDelhi

Course Code	**PEC2_ME603L**				
Category	**ProfessionalElectiveCourse**				
CourseTitle	**AutomobileEngineeringLab**				
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**
	0	**0**	**2**	**1**	
Prerequisites					

M.No:	**Topic**
Module1.	Studyofanautomobilechassis.
Module2.	StudyofDifferentialMechanismofanAutomobile.
Module3.	StudytheclutchofanAutomobile.
Module4.	Studyofbrakingsystems(Hydraulic/AirBrake).
Module4.	Studyanddemonstrationofdifferentcircuitsofcarburetors.
Module5.	CalibrationofBourdon'stubepressuregauge.
Module6.	Studytheassemblyofcarengines.
Module7.	AirPollutiontestingofCO,CO_x,HC,NO,NO_x.

Course Code	**PEC3_ME603**				
Category	**ProfessionalElectiveCourses**				
CourseTitle	**ElectricalEngineering Technology**				
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**
	2	**1**	**0**	**3**	
Prerequisites	**PrinciplesofElectricalEngineering**				

Objectives:

To introduce fundamental concepts and analysis techniques in electrical engineering such asabout domestic wiring, various electrical apparatus and their safety measures, basic knowledge of electrical quantities such as current,voltage,power,energyandfrequency,knowledgeaboutthebasicDCandACelectriccircuitsandmagnetic circuits, concepts of generators, motors, transformers and their applications.

M.No:	Topic	No.ofHrs
Module1.	*DC*circuit analysis- loop and nodal methods of circuit analysis, superposition theorem,Thevenin'sandNorton'stheorems,maximumpowertheorem,delta -star(y)transformation;	7
Module2.	*AC* circuit analysis- basic terminology and definitions, phasor and complex number representation, solutions of sinusoidally excited *RLC* circuits, power andenergyrelationsin*AC*circuits,seriesandparallel*AC*circuits(*RL,RC,RLC*), powerfactor,conceptsofactive&reactivepowers.	9
Module3.	Introductiontoelectricalmachines,*AC*circuits&magneticcircuits	4
Module4.	Transformers-construction,classifications,*emf*equations, equivalent circuit, open and short circuit tests, losses and efficiency.	6
Module5.	*DC*machines-generatorsandmotors,classificationandprincipleofoperation, Emfandtorqueequation,characteristics,speedcontrolof*DC*motor, applications.	8
Module6.	*AC*machine-*AC*machineryfundamentals,types,principleofoperation,losses andefficiency,speedcontrolof*AC*motor,applications.	8
TotalnumberofHours		**42**

CourseOutcomes:

Attheendofthecourse,thestudentwillbeableto:

- ***Recall***basicconceptsofElectricalEngineering**(L1).**
- ***Illustrate***basicsofACcircuits**(L4).**
- ***Explain***operativeprincipleoftransformerwithbackgroundofmagneticcircuits**(L5).**
- ***Classify***andcomparedifferenttypesofElectricalmachines**(L2).**
- ***Demonstrate***anunderstandingofbasicconceptsoftransformersandtheirapplicationintransmissionand distribution of electric power **(L2, L4).**
- ***Apply***thebasicconceptsinElectricalengineeringformulti-disciplinarytasks**(L4).**

S.No:	TextBooks	Author	Publisher
1.	FundamentalofElectric Circuits	CharlesK.Alexander,Matthew N.O.Sadiku	McGrawHillEducation
2.	ElectricalMachinery Fundamentals	Chapman	McGrawHillEducation
	References		
1.	ElectricMachines	NagrathandKothari	McGrawHillEducation
2.	Electric Machine and Power Electronics	PCSen	Wiley

Course Code	**PEC3_ME603L**				
Category	**EngineeringScienceCourse**				
CourseTitle	**ElectricalEngineeringTechnologyLab**				
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**
	0	**0**	**2**	**1**	

M.No:	**Topic**
Module1.	ToverifySuperpositionprinciple.
Module2.	ToverifytheTheveninandNortonTheorem.
Module3.	Toverifythemaximumpowertransfertheorem.
Module4.	Tomeasurepowerfactorandacpowerinsinglephasecircuitswithdifferentlinearloads.
Module5.	Toperformpolaritytestonsinglephasetransformer.
Module6.	Toperformopenandshortcircuittestsonsinglephasetransformer.
Module7.	Tostudytheconstructionaldetailsofthe*DC*machines.
Module8.	Tostudytheconstructionaldetailsoftheinductionmachine.
Module9.	Tostudytheconstructiondetailsofsynchronousmachines.
Module10.	Toplotexternalcharacteristicsof*DC*machines.
Module11.	Toperformnoloadandblockrotortestonaninductionmachine.
Module12.	Todeterminethetorquespeedcharacteristicsoftheinductionmotor.

Course Code	**PCC_ME604**				
Category	**ProfessionalCoreCourse**				
CourseTitle	**DesignofMachineElements-I**				
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**
	2	**1**	**0**	**3**	
Prerequisites	**EngineeringMechanics,SolidMechanics**				

Objectives:

This course seeks toprovideanintroductiontothedesignofmachineelementscommonlyencountered in mechanical engineering practice through strong background in mechanics of materials based failure criteria underpinning the safety-critical design of machine components.

M.No:	**Topic**	**No.ofHrs**
Module1.	Introductiontodesign,needofdesign,basicprocedureofmachinedesign.	02
Module2.	Review of static theories of failure, introduction to dynamic load, stress concentration, rotating beam test and *S-N* curve, endurance strength and its modifyingfactors,designforfiniteandinfinitelife,failurecriteriaforfluctuating stresses(Goodman,SoderbergandGerber).	08
Module3.	Rivetedjointsanditstypes,failuremodesofrivetedjointand strength equations, weldedjointsandtypes,strengthequations.eccentricloadinginrivetedandwelded joints.	08
Module4.	Threadedfasteners-typesanddesign,threadforms,eccentricloading,boltofuniform strength, bolt tightening and initial tension, design of power screws.	05
Module5.	Designofshafts-strengthandrigidityconsiderations,keys-typesanddesign.	08
Module6.	Designofknucklejoint,cotterjoint,gibandcotterjoint.	04

Module7	Springs-types and materials, design of helical springs under static and dynamic load, design of leaf springs.	07
TotalnumberofHours		**42**

CourseOutcomes:

Attheendofthecourse,thestudentwillbeableto:

- ***Understand***theorigins,natureandapplicabilityofempiricaldesignprinciples,basedonsafety considerations **(L1)**
- ***Understand***componentbehaviorsubjectedtoloadsandidentifythefailurecriteria**(L2).**
- ***Analyze***thestressesandstrainsinducedinamachineelement**(L4).**
- ***Overview***ofcodes,standardsanddesignguidelinesfordifferentelements**(L3).**
- ***Understand***theconceptsofprincipalstresses,theoriesoffailure,stressconcentrationandfatigueloading **(L2).**
- ***Appreciation***ofparameteroptimizationanddesigniteration(**L5)**
- ***Appreciation***oftherelationshipsbetweencomponentleveldesignandoverallmachinesystemdesignand performance (**L5)**
- ***Overview***ofthedesignmethodologiesemployedforthedesignofvariousmachinecomponents (**L5)**.

S.No:	**TextBooks**	**Author**	**Publisher**
1.	DesignofMachineElements	V.B.Bhandari	TataMcGrawHill,NewDelhi
	References	**Author**	**Publisher**
1.	MachineElementsinMechanical Design	RobertL.Mott	PearsonEducation
2.	MechanicalEngineering Design	Shigley,Budynas,Nisbett	McGrawHill,NewYork
3.	Machinedesign	RobertL.Norton	PearsonEducation

Course Code	**PCC_ME605**				
Category	**ProfessionalCoreCourse**				
CourseTitle	**CompressibleFlowand Machines**				
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**
	3	**1**	**0**	**4**	
Prerequisites	**FluidMechanics,BasicEngineeringThermodynamics**				

Objectives:

This course seeks to provide an introduction to compressible flows, and understand some important features of different categories of compressible flows of idealgas,isentropicandnonisentropicflows including flows across normal shock waves and its application to gas turbinesjet and rocket propulsion, fans and compressors.

M.No:	**Topic**	**No.ofHrs**
Module1.	Basicsofcompressibleflow,velocityofsound,compressibilityeffectsinfluidsand mach number, isentropic flow, stagnation conditions.	07
Module2.	Onedimensionalflowforconstantareaduct,onedimensionalflowwithheat addition(Rayleighflow),onedimensionalflowwithfriction(Fannoflows),normal shock relations, oblique shock and expansion waves.	12
Module3.	Quasionedimensionalflow,isentropicflowthroughvariableareaduct(without friction),diffusers.	07

Module4.	Gas turbine, Brayton cycle and modification, velocity triangles, stage parameters, performance characteristics, jet propulsion, thrust power and propulsive efficiency, ramjet, turbojet, turbofan and turboprop engines, rocket engines.	10
Module5.	Centrifugalandaxialfans,velocitydiagrams,specificwork,stageparameters,slip factor, performance characteristics.	08
Module6.	Centrifugalandaxialcompressors,specificwork,stageparameters,performance characteristics, reciprocating compressors.	08
TotalnumberofHours		**52**

CourseOutcomes:

Attheendofthecourse,thestudentwillbeableto:

- ***Recognize*** the basicdifferencesbetweenincompressibleandcompressibleflowsandbeableto***derive***the governing equations for compressible flows **(L2)**.
- ***Analyze***compressibleflowhavingnormalshock**(L4)**
- ***Apply***governingequationstocompressibleflowthroughaconstantareaductwithfrictionandheat addition **(L3)**.
- ***Analyze***one-dimensionalisentropicflows,flowacrossanormalshockandflowwithfrictionandheat addition **(L4)**.
- **Apply**gasdynamicsprinciplestojetandspacepropulsionsystems**(L3)**
- ***Describe***thedifferentthermodynamiccyclesofgasturbine**(L1)**
- ***Analyze***thevelocitytrianglesforastageforgasturbines**(L4)**
- ***Understand***theperformancecharacteristicsofgasturbines**(L2)**
- ***Explain***theapplicationsofEuler'sequationforcentrifugalandaxialcompressors**(L2)**
- ***Demonstrate***thespecificworkon*h-s*diagramforcentrifugal/axialcompressorsandfans**(L3)**
- ***Analyze***thevelocitytrianglesforastageforcentrifugal/axialcompressorsandfans**(L4)**
- ***Describe***theperformancecharacteristicsofcompressorsincludingchoking,surgingandstalling phenomenon.

S.No:	**TextBooksRecommended**	**Author**	**Publisher**
1.	Modern Compressible Flow with Historical perspective	John.DAnderson	McGrawHill
2.	Turbomachinery	ManeeshDubeyBVSSS Prasad Archana Nema	McGrawHillEducation/2019
S.No:	**References**		
1.	The-Dynamics-andThermodynamics-of Compressible Fluid-Flow	AscherHShapiro	RonaldPressCompany
2.	*Compressiblefluidflow*	MichealASaad	PrenticeHall/1993
3.	Gasturbinetheory	Cohen, Rogers and Saravanamuttoo	PHI
4.	FundamentalsofGas Turbines	Bathie	

Course Code	**PCC_ME605L**				
Category	**ProfessionalCoreCourse**				
CourseTitle	**CompressibleFlowandMachinesLab**				
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**
	0	**0**	**2**	**1**	

M.No:	**Topic**
Module1.	Tostudythevelocityofsoundindifferentsolidsandfluids.
Module2.	Tostudythewavepropagationatdifferent MachNo.
Module3.	TostudyIsentropicflowfromvariableareaducts.
Module4.	Tostudyflowthroughaconstantareaductwith Friction(FannoFlow).
Module5.	Tostudyflowthroughaconstantareaductwithheataddition(RayleighFlow).
Module6.	TostudyIsothermalflowfromaconstantareaduct.
Module7.	TostudyShockwavesgeneratedintheflowfield.
Module8.	Tostudyflowthroughsupersonicwindtunnels.
Module9.	Tostudythrustgeneratedbyjetengines.
Module10.	Tostudyperformanceofcentrifugalandaxialcompressors.

Course Code	**PSI_ME606**				
CourseCategory	**Projectwork,Seminarand internship**				
CourseTitle	**Seminar**				
Schemeand Credits	**L**	**T**	**P**	**Credits**	**Semester-6(Six)**
	0	**0**	**6**	**3**	
Prerequisites	**NA**				

CourseObjectives:

The seminar curriculum pedagogy is designed to understand core concepts, principles, and practices underlying effective professional communication.The course focuses on approaches for planning, creating, and transmitting technical information within a variety of technical situations found in the global employment and professional marketplaceandmarketspace.The seminar curriculum will adhere to the domains of workplace professional writing, employment communication, successful and effective presentation design (verbal, non-verbal and data visualisation) in the emerging communication scenario.

CoursePlan:

Each student shall identify a topic of current relevance mechanical engineering branch, get approval of faculty concerned, collect sufficient literature on the topic, studyitthoroughly,prepareapresentationandreportandwill be later on assessed before an expert committee constituted by the concerned department on the basis of:

- Qualityofcontentpresented
- Properplanningforpresentation.
- Effectivenessofpresentation.
- ReportwritingbasedontheLiterature,fundamentalsofthetopic,andstateofartapplication.

CourseOutcomes:

Theobjectivesandlearningoutcomesoftheseminarare:

- To ensure that students are made ***aware*** about the basic and core communication frameworks, tools, frameworks and typologies.
- To ensure that students are able to ***enhance*** their personal, professional communication skills through seminar mode teaching-learning pedagogy.
- To ***understand*** the individual and team/group level communication styles through experiential understanding, learning and application of emerging communication techniques.
- To ***develop*** problem solving and analytical skills in global-cross cultural business communication and awareness of challenges required for successful communication within and outside multinational organizations.
- To***enhance***thecommunicationskillsacrossvarietyofformalandinformalnetworks.
- To ***understand*** the ethical approachforrolesandresponsibilitiesasbusinesscommunicatorsthroughcase discussions of technical/business dilemmas and problems
- To ensure ***application*** of the modern data analysis and visualisation software's for enhanced presentation/communication modules so that to incorporate the professional use of technology in communications.