GATEWAY INSTITUTE OF ENGINEERING AND TECHNOLOGY, SONIPAT

LESSON PLAN

Name of the Faculty : Mr. Narender Kumar
Discipline : Mechanical Engineering
Semester : 6th
Subject : Dynamics of Machines (ME 302B)
Dynamics of Machines Lab (ME 314B)
Lesson Plan Duration : 15 Weeks (January 2018 to April 2018)
Work Load (Lectures) per week in hours : Lectures – 03, Tutorial – 01, Practical- 02

Week	Theory		Practical	
	Lecture Day	Topic (including assignment/ test)	Practical	Topic
1st	1	Static force analysis in four-bar mechanism	1st	To perform the experiment for static balancing on Static Balancing Machine.
	2	Static force analysis in slider crank mechanism		
	3	Internal force analysis		
2nd	4	Inertia force in four-bar mechanism	2nd	To perform the experiment for dynamic balancing on Dynamic Balancing machine.
	5	Combined static and dynamics force analysis in slider-crank mechanism		
	6	Turning moment on crankshaft		
3rd	7	Turning moment diagrams-single	3rd	Determine the turning moment on crank shaft neglecting weight of the connecting rod in the reciprocating parts of an engine.
		cylinder double acting steam engine		
	8	Four stroke IC engine and multi-cylinder steam engine		
	9	Fluctuation of energy		
4th	10	Flywheel	4th	To perform experiment on Watt Governors to prepare performance characteristic curves.
	11	Static balance		
	12	Dynamic balance		
5th	13	Balancing of rotating masses	5th	To perform experiment on Porter Governors to prepare performance characteristic curves.
	14	Two plane balancing		
	15	Graphical and analytical methods		
6th	16	Balancing machines-static balancing and dynamic balancing machines	6th	To perform experiment on Proell Governor to prepare performance characteristic curves.
	17	Field balancing		
	18	Primary and secondary forces and couples		
7th	19	Partial balancing	7th	To perform experiment on Hartnell Governor to prepare performance characteristic curves.
	20	Effects of partial balancing		
	21	Balancing of single cylinder engine		
8th	22	Balancing of multi cylinder; inline; radial engines, firing order	8th	To study the different types of Brakes and Dynamometers.
	23	Governors: Terminology		
	24	Centrifugal governors-Watt governor		
9th	25	Dead weight Porter governors	9th	To study gyroscopic effects on Aeroplane and Naval ship
	26	Proell governor		
	27	Spring controlled governor Hartnell governor		
10th	28	Sensitivity, Stability, Hunting, Isochronism	10th	To find experimentally the Gyroscopic couple on motorized gyroscope and compare with applied couple.
	29	Effort and Power of governor		
	30	Controlling force diagrams for Porter governor		
11th	31	Controlling force diagrams for Spring controlled governors	11th	
	32	Precession angular motion and gyroscopic couple and their effects on aeroplane		
	33	Ship during steering, rolling and pitching		
12th	34	Stability of two wheel and four wheel vehicles moving on curved paths	12th	
	35	Types of brakes- external shoe brakes		
	36	Band brakes, band and block brakes		
13th	37	Braking of vehicle	13th	
	38	Types of dynamometers-Prony brake, rope brake dynamometers		
	39	Belt transmission dynamometer, torsion dynamometer		
14th	40	Forces on reciprocating parts of an engine neglecting the weight of connecting rod	14th	
	41	Crankshaft torque		
	42	Dynamically equivalent system		
15th	43	Analytical and graphical method	15th	
	44	Correction couple		
	45	Revision of previous question paper		

Name of the Faculty : Mr. Jeetendra Kumar
Discipline : Mechanical Engineering
Semester : 6th
Subject : Heat transfer (ME 306B) and Heat Transfer Lab (ME 316B)

Lesson Plan Duration : 15 Weeks (January 2018 to April 2018)
Work Load (Lectures) per week in hours: Lectures – 03, Tutorial – 01

Week	Theory		Practical	
	Lecture Day	Topic (including assignment/ test)	Practical Day	Topic
1st	1	Thermodynamics Vs Heat transfer, Define Heat Transfer, thermal conductivity Vs diffusivity, basic modes of heat transfer		
	2	Combined heat transfer.	1st	To determine the thermal conductivity of a metallic rod.
	3	Introduction, I-D heat conduction through a plane wall		
2nd	4	Introduction, I-D heat conduction- long hollow cylinder		
	5	Introduction, I-D heat conduction -hollow sphere	2nd	To determine the thermal conductivity of an insulating power
	6	Conduction equation in Cartesian,		
3rd	7	Conduction equation in polar coordinate		
	8	Introduction, I-D heat conduction -spherical co-ordinate systems,	3rd	To determine the thermal conductivity of a solid by the guarded hot plate method
	9	Numericals		
4th	10	Numericals		
	11	STEADY STATE CONDUCTION WITH HEAT GENERATION: Introduction, 1-D heat conduction with heat sources		
	12	Extended surfaces (fins)	4th	To find the effectiveness of a pin fin in a rectangular duct natural convective condition and plot temperature distribution along its length.
5th	13	Fins with uniform cross-sectional area		
	14	Fin effectiveness		
	15	Brief introduction of 2-D	5th	To find the effectiveness of a pin fin in a rectangular duct under forced convective and plot temperature distribution along its length
		heat conduction		
6th	16	Numericals		
	17	TRANSIENT HEAT CONDUCTION (1-D): Lumped capacitance	6th	To determine the surface heat transfer coefficient for a heated vertical tube under natural convection and plot the variation of local heat transfer coefficient along the length of the tube.
	18	semi-infinite and infinite solid conduction modes for walls		
7th	19	semi-infinite and infinite solid conduction modes for cylinders		
	20	spheres; Chart solution,	7th	To determine average heat transfer coefficient for a externally heated horizontal pipe under forced convection & plot Reynolds and Nusselt numbers along the length of pipe.
	21	Relaxation Method, Numericals,		
8th	22	**CONVECTION**: Forced convection-Thermal and hydro-dynamic		
	23	Equation of continuity, Momentum and Energy equations	8th	To measure the emissivity of the gray body (plate) at different temperature and plot the variation of emissivity with surface temperature
	24	Internal flow through circular tube and external flow over a flat plate		
9th	25	Fluid friction and heat transfer (Colburn analogy)		
	26	introduction to participating media	9th	To find overall heat transfer coefficient and effectiveness of a heat exchange under parallel and counter flow conditions
	27	Free convection from a vertical flat plate		
	28	Empirical relations for free		
10th		convection from vertical and horizontal planes & cylinders,	10th	To verify the Stefan-Boltzmann constant for thermal radiation
	29	Empirical relations for free convection from vertical and horizontal		
	30	**THERMAL RADIATION**: Basic laws, Black body radiation, intensity and emissive power		
11th	31	Diffuse and gray surfaces, Shape factors and network analogy,		
	32	Radiation shields, applications to two and three surface enclosures	11th	
	33	Numericals		
12th	34	HEAT EXCHANGERS: Classification, Performance variables,		
	35	Analysis of a parallel/ counter flow heat exchanger,	12th	
	36	Numericals		
13th	37	Heat exchanger effectiveness		
	38	Pressure drop	13th	
	39	Laminar film condensation on a vertical plate		
14th	40	Drop-wise condensation,		
	41	Pool boiling regimes,	14th	
	42	Nucleate boiling and critical heat flux,		
15th	43	critical heat flux,		
	44	Flow boiling	15th	
	45	Numericals		

Name of the Faculty : Mr. Lalit Kumar
Discipline:- B. Tech. (ME)
Semester : 6th
Subject : MACHINE DESIGN –II (ME 304B)
Lession Plan Duration: 15 Weeks (from January,2018 to April,2018
Work Load (Lectures) per week in hours: Lectures – 04, Tutorial – 01

Week	Theory	
	Lecture Day	**Topic (including assignment/test)**
1st	1st	**DESIGN ASPECTS**: Ergonomic and value engineering considerations in design,
	2nd	Design for manufacturability, assembly
	3rd	Interchangeability, Statistical consideration in design,
2nd	4th	Considerations for casting, forging and machining
	5th	Problems
	6th	**VARIABLE LOADING**: Different types of fluctuating/ variable stresses,
3rd	7th	Fatigue strength considering stress concentration factor
	8th	surface factor, size factor,
	9th	reliability factor etc., Fatigue design for finite and infinite life
4th	10th	Goodman and Soderberg's Criterion,
	11th	Fatigue design using Miner's equation,
	12th	Problems
5th	13th	**SHAFTS**: Detailed design of shafts for static and dynamic loading,
	14th	Rigidity and deflection consideration.
	15th	Design Problem
6th	16th	Design Problem
	17th	**SPRINGS** : Types of Springs, Design for helical springs against tension and their
	18th	compression and fluctuating loads,
7th	19th	Design of leaf springs, Surging in springs, Design Problem
	20th	Design Problem
	21st	Design Problem
8th	22nd	**BEARINGS**: Classification,
	23rd	Design of pivot and collar bearing,
	24th	Selection of ball and roller bearing based on static Charts, ,
9th	25th	Design Problems.
	26th	Design Problems.
	27th	Dynamic load carrying capacity
10th	28th	load-life relationship, Selection of Bearings from manufacturer's catalogue,
	29th	Lubricants and their properties,
	30th	Selection of lubricants, Types of lubrication – Boundary, mixed and
11th	31st	Hydrodynamic lubrication, Design of journal bearings using Raimondi and Boyd's
	32nd	Design Problems.
	33rd	Design Problems.
12th	34th	**GEARS**: Classification
	35th	Selection of gears, Terminology of gears,
	36th	Force analysis, Selection of material for gears,
13th	37th	Beam & wear strength of gear tooth,
	38th	Form or Lewis factor for gear tooth,
	39th	Dynamic load on gear teeth -Barthequation
14th	40th	Buckingham equation and their comparison,
	41st	Design of spur, helical,
	42nd	bevel & worm gear including the
15th	43rd	Consideration for maximum power transmitting capacity,
	44th	Gear Lubrication, Design Problems
	45th	Design Problems

Name of Faculty: Ms REKHA MANN
Discipline:- Mechanical Engineering
Semester: 2nd
Subject:- REPORT WRUTING AND ORAL PRESENTATION SKILLS
Lession Plan Duration: 15 Weeks (from January,2018 to April,2018
Workload(Lecture/Practical) per week (in hours) : Lecture-03 ,Practicals -02 hours

Week	Theory		Practical	
	Lecture Day	**Topic (including assignment/test)**	**Practical Day**	**Topic**
1st	1st	Introduction to unit-1	1st	Group discussion
	2nd	Meaning of Report		
	3rd	Importance of report		
2nd	4th	test	2nd	Purpose and process of GD
	5th	Types of Report		
	6th	Revision		
3rd	7th	test	3rd	Test
	8th	Informational and Analytical report		
	9th	Routine report		
4th	10th	oral report	4th	What and why of group discussion
	11th	Revision		
	12th	Test		
5th	13th	Written report	5th	Do's and donot of GD
	14th	Diffrence between orao and written report		
	15th	formal report		
6th	16th	Informal report	6th	Test
	17th	Diffrence between formal and informal report		
	18th	Revision		
7th	19th	Test	7th	More about GD
	20th	Other types of report		
	21st	Format of report		
8th	22nd	letter report	8th	Revision
	23rd	Memo format		
	24th	inspection report		
9th	25th	Manuscript format	9th	Test
	26th	Revision		
	27th	ORAL TEST		
10th	28th	Written test	10th	Importance of GD
	29th	Structure of the report		
	30th	Structure of the formal and informal report		
11th	31st	Text of the report	11th	Oral communication skills
	32nd	Supplementary parts		
	33rd	Revision		
12th	34th	Test	12th	Group etiquette
	35th	Introduction to unit-2		
	36th	Procedure of writing report		
13th	37th	Reports on technical topics	13th	Mock interview
	38th	Report on business topics		
	39th	Test		
14th	40th	Revision of section-1	14th	Mock interview activity
	41st	Test		
	42nd	Revision of full syllabus		
15th	43rd	Revision of full syllabus	15th	TEST
	44th	Revision of full syllabus		
	45th	Test		

Name of Faculty: Mr. Nikhil Rohilla
Discipline:- B. Tech. (ME)
Semester: 6th
Subjects: Industrial Engineering (ME 312B)
Lession Plan Duration: 15 Weeks (from January,2018 to April,2018
Workload(Lecture/Practical) per week (in hours) : Lecture-04, Practicals -02 hours

Week	Theory	
	Lecture Day	**Topic (including assignment/test)**
1st	1st	Introduction to industrial engineering
	2nd	Definition and brief history of industrial engineering
	3rd	Objective and relevance of industrial engineering for achieving
2nd	4th	Decisions in industrial engineering
	5th	Value addition, products and services
	6th	Conversion process
3rd	7th	Production system
	8th	Types of production system
	9th	Productivity and its measurement
4th	10th	Factors effecting productivity and strategies for improving productivity
	11th	Teams, Employee empowerment
	12th	Quality circle, incentive plans
5th	13th	Job decision, Job specialization
	14th	Job enlargement, Job rotation, Job enrichment
	15th	Method study, Principles of motion economy
6th	16th	Techniques of method study – various charts, therbligs
	17th	Work measurement – various methods, time study
	18th	PMTS, determining time
7th	19th	Work samplings
	20th	Elements of cost, overheads estimation
	21st	Types of cost, cost variance analysis
8th	22nd	Fixed and variable costs, break even analysis
	23rd	Strategic importance of materials in industry, pressure for high and low inventory, relevant cost
	24th	Basic inventory control model – EOQ, EBQ with and without shortage
9th	25th	Purchase discounts, sensitivity analysis, inventory control systems – P
	26th	Service level, stockout risk, determination of order point and safety
	27th	Selective inventory control – ABC, FSN, SDL, VED
10th	28th	Introduction to forecasting – Simple and weighted moving average methods, objectives and variable of PPC
	29th	Aggregate planning – basic concept and its relation with each other decision areas, master production schedule
	30th	Schedule operations, various methods for line and intermittent
11th	31st	Gantt charts, sequencing – Johnson algorithm for n jobs and 2 machines, n jobs and 3 machines
	32nd	2 jobs and n machines, n jobs and m machines
	33rd	Various means of measuring effectiveness of PPC
12th	34th	Various approaches
	35th	Product life cycle
	36th	Role of 3s
13th	37th	Standardization, simplification, specialization
	38th	Introduction to value engineering
	39th	Role of ergonomics in product design
14th	40th	Introduction to JIT, TPM
	41st	Fundamentals of quality and TQM
	42nd	Kaizan – elements, benefits and implementation aspects
15th	43rd	Overview of supply chain managment
	44th	Management information system and its role in decision making
	45th	Revision (Previous year papers)

Name of Faculty: Ms.Pallavi
Discipline:- B. Tech. (ME)
Semester: 6th
Subjects: Measurement & Instrumentation (ME 310 B, ME 318 B)
Lession Plan Duration: 15 Weeks (from January,2018 to April,2018
Workload(Lecture/Practical) per week (in hours) : Lecture-04, Practicals -02 hours

Week	Theory		Practical	
	Lecture Day	**Topic (including assignment/test)**	**Practical Day**	**Topic**
1st	1st	Introduction, Typical Applications of Instrument Systems	1st	To study the working of Pressure Gauge
	2nd	Functional Elements of a Measurement System		
	3rd	Classification of Instruments, Standards and Calibration		
2nd	4th	Test	2nd	To study LVDT for measuring displacement
	5th	Types of Measured Quantities (Discrete and Continuous)		
	6th	Central Tendency of Data, Mode		
3rd	7th	Median, Arithmetic Mean	3rd	File Check & Viva
	8th	Problems on central tendency of data		
	9th	Best Estimate of true Value of Data		
4th	10th	Measures of Dispersion, Range, Mean Deviation	4th	To measure load using load cell.
	11th	Variance, Standard Deviation		
	12th	Problems on measure of dispersion		
5th	13th	Normal Distribution,	5th	To measure torque of a rotating shaft using strain gauge torque transducer.
	14th	Central Limit Theorem, Significance Test		
	15th	Method of Least Squares,Graphical representation and curve fitting of data		
6th	16th	Test	6th	File Check & Viva
	17th	Introduction, Accuracy, Precision, Resolution, Threshold		
	18th	Sensitivity, Linearity, Hysteresis, Dead Band, Backlash, Drift		
7th	19th	Formulation of Differential Equations for Dynamic Performance- Zero Order,	7th	To measure speed of a motor shaft with the help of magnetic pick up transducer.
	20th	First Order system		
	21st	Second order systems		
8th	22nd	Response of First and Second Order Systems to Step, Ramp,	8th	To measure stress and Strain using strian gauges.
	23rd	Impulse and Harmonic Functions		
	24th	Response of First and Second Order Systems to Impulse and Harmonic Functions		
9th	25th	Problems on Dynamic performance, Test	9th	File Check & Viva
	26th	Introduction, Types and Classification of Transducers,		
	27th	Selection of Transducers		
10th	28th	Strain Gauges and Rosettes,	10th	To measure static and dynamic pressure of fluid in pipe using pressure tranducer.
	29th	Linear Variable Differential Transformer, Rotary Variable Differential		
	30th	Transformer		
11th	31st	Peizo-electric Transducers, Optical Transducers and Opto-electric Transducers	11th	To study the vibration measurement by dual trace DSO
	32nd	Mechanical, Hydraulic Amplifying elements, Compensators		
	33rd	Pneumatic Amplifying elements, Compensators		
12th	34th	Data Transmission Elements	12th	File Check & Viva
	35th	Data Display andStorage, Data Acquisition Systems		
	36th	Test		
13th	37th	Force Measurement: Hydraulic Load Cell, Pneumatic Load Cell	13th	To study temperature measuring instruments
	38th	ElasticForce Devices, Separation of Force Components		
	39th	Torque Measurement: Torque Reaction Methods and Torque MeasurementMethods		
14th	40th	Pressure Measurement: Introductory Review of Moderate Pressure Measurement using Manometers andElastic Elements	14th	To study the working of Bourdan Pressure gauge.
	41st	Vacuum Measurement using Mcleod, Pirani, Ionisation and Knudsen Gauges		
	42nd	Vacuum Measurement using Ionisation and Knudsen Gauge		
15th	43rd	High Pressure Measurement,Pressure Calibration	15th	File Check & Viva
	44th	Flow Measurement: Drag Force Flow Meter, Turbine Flow Meter,		
	45th	Electronic Flow Meter, Electro MagneticFlow meter		

Name of Faculty: Ms.Pallavi
Discipline:- B. Tech. (ME)
Semester: 6th
Subjects: Automatic Controls (ME 308 B)
Lession Plan Duration: 15 Weeks (from January,2018 to April,2018
Workload(Lecture/Practical) per week (in hours) : Lecture-04, Practicals -02 hours

Week	Theory	
	Lecture Day	**Topic (including assignment/test)**
1st	1st	Typical Block Diagram : Performance Analysis
	2nd	Representation of Processes & Control Elements – Mathematical Modeling.
	3rd	Block Diagram Representation, Representation of Systems or processes
2nd	4th	Comparison Elements
	5th	Representation of Feedback Control systems – Block Diagram & Transfer Function
	6th	Signal Flow Graphs, Mason's Formula, Problems.
3rd	7th	Test
	8th	**TYPES OF CONTROLLERS**: Types of Control Action; Proportional Controller,
	9th	Derivative Controller, On-off controller, PD
4th	10th	PID Controller, Hydraulic Controllers; Electronic Controllers;
	11th	Pneumatic Controllers; Problems
	12th	Test
5th	13th	**TRANSIENT AND STEADY STATE RESPONSE**
	14th	First order system
	15th	Unit Step, Unit Ramp Response of First Order system
6th	16th	Unit Impulse
	17th	Response of First Order system
	18th	Second Order System
7th	19th	Step Response of Second Order System
	20th	Delay Time, Rise
	21st	Time,
8th	22nd	Peak Time, Settling Time
	23rd	**FREQUENCY RESPONSE ANALYSIS**: Introduction, Closed and Open Loop
	24th	Bode Diagram
9th	25th	Polar Plots
	26th	Rectangular Plots; Nichols Plots
	27th	Test
10th	28th	**STABILITY OF CONTROL SYSTEMS**: Characteristic Equation
	29th	Routh's Criterion
	30th	Problems
11th	31st	Nyquists Criterion,
	32nd	Problems
	33rd	**ROOT LOCUS METHOD** : Introduction; Root Loci of a Second Order System
12th	34th	General Case; Rules for Drawing Forms of Root Loci
	35th	Relation between Root Locus Locations and Transient Response
	36th	Parametric Variation;
13th	37th	Problems On complete unit
	38th	Test
	39th	**STATE SPACE ANALYSIS OF CONTROL SYSTEMS:** Introduction;
14th	40th	Techniques for Deriving System State – Space Equations
	41st	Transfer Function from State Equations
	42nd	Solution of State Vector
15th	43rd	Differential Equations
	44th	Discrete Systems; Problems
	45th	Test