GATEWAY INSTITUTE OF ENGINEERING AND TECHNOLOGY, SONIPAT

LECTURE PLAN

Name of the Faculty : Mr. Jeetendra Kumar
Discipline : Mechanical Engineering
Semester : 8th
Subject : FLEXIBLE MANUFACTURING SYSTEM (ME 438B)
Lesson Plan Duration : 15 Weeks (January 2018 to April 2018)
Work Load (Lectures) per week in hours: Lectures – 03, Tutorial – 01

Week	Theory	
	Lecture Day	Topic (including assignment/ test)
1st	1	Automation and types, reasons for automation
	2	Basic elements of an Automated System: Sensors, Actuators, Analog-to-Digital and Digital-to-Analog
	3	Definition of Manufacturing Flexibility, Need of Manufacturing flexibility, Types of Manufacturing
2nd	4	Classification of Manufacturing systems on Flexibility types, Resources and Processes to increase
	5	GT and its benefits
	6	Parts classification and coding systems
3rd	7	GT based Machine cell design through Cluster Analysis and Hollier's Algorithm
	8	Numerical problems
	9	GT and its benefits
4th	10	Parts classification and coding systems
	11	Fundamentals of NC Technology and advantages in Manufacturing
	12	NC Machines and types
5th	13	Computer Numerical Control
	14	Distributed Numerical Control
	15	brief introduction of NC Part Programming
6th	16	Components of an FMS, FMS work stations
	17	Material handling and storage system: Functions of material handling system
	18	FMS layout configurations
7th	19	Computer control system: Computer function
	20	FMS data file, system reports
	21	Planning the FMS
8th	22	FMS applications and benefits
	23	Common robot configurations, Joints and links
	24	work volume
9th	25	types of robot control
	26	accuracy and repeatability, interlocks, advantages and disadvantages
	27	Brief review of Robot programming and languages: Motion programming, simulation
10th	28	offline programming
	29	Automated flow lines, methods of work part transport
	30	Transfer Mechanisms, buffer storage
11th	31	automation for machining operations
	32	part feeding devices
	33	Brief review of Automated assembly systems and types
12th	34	Elements of CIM
	35	Brief Review of Computer aided process Planning
	36	Computer Integrated Production Management Systems,
13th	37	MRP
	38	Capacity Planning,
	39	MRPII
14th	40	Shop floor Control systems
	41	Computer Process Monitoring
	42	Computer aided quality control,
15th	43	Adaptive Control of Manufacturing
	44	Class test
	45	Class test

Name of Faculty: Mr. Vivek Garg

Discipline:- B. Tech. (ME)
Semester: 8th
Subjects: Computer Aided Design (ME 402 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 D	Topic
1st	1st	INTRODUCTION:- Introduction to CAD / CAM, Historical developments	1st	Basic of Autocad like
	2nd	**Assignment:-**Industrial look at CAD / CAM		
	3rd	Basics of geometric and solid modelling, explicit, Implicit		
2nd	4th	intrinsic and parametric equations coordinate systems.	2nd	Practice on Draw toolbar
	5th	2-D TRANSFORMATIONS: Introduction, transformation of points and line		
	6th	2-D translation and its numerical		
3rd	7th	2-D rotation and its numerical	3rd	Practice on isometric
	8th	2-D scaling and its numerical		
	9th	Numerical on combined transformation		
4th	10th	Numerical on homogeneous coordinates	4th	Practice on Creating
	11th	Numerical on homogeneous coordinates contt.		
	12th	Numerical on homogeneous coordinates contt.		
5th	13th	3- D Transformation:- 3-D scaling and its numerical	5th	Practice on Providing
	14th	3-D scaling and its numerical		
	15th	3-D scaling and its numerical		
6th	16th	3-D scaling and its numerical	6th	3 Dimensional
	17th	combined transformations numerical		
	18th	combined transformations contt.		
7th	19th	**Assignment:-**reconstruction of 3-D objects.	7th	3D Solid Models contt.
	20th	orthographic and perspective projections		
	21st	**CURVES:-** Algebraic and geometric forms		
8th	22nd	tangents and normal, blending functions	8th	3D Solid Models contt.
	23rd	re- parametrization,straight lines, conics,		
	24th	cubic splines		
9th	25th	Numerical on Cubic spline	9th	
	26th	Derivation of Bezier curves		
	27th	Numerical on Bezier spline		
10th	28th	Numerical on Bezier spline	10th	
	29th	B-spline curves.		
	30th	Numerical on B-spline curve		
11th	31st	Numerical on B-spline curve	11th	
	32nd	**SURFACES:-** Algebraic and geometric forms, tangents and normal		
	33rd	blending functions,tabulated cylinder		
12th	34th	reparametrization, sixteen point form, four curve form	12th	
	35th	plane surface, ruled surface Surface of revolution,		
	36th	**Assignment:**-Sweep representation		
13th	37th	bi-cubic surface	13th	
	38th	bezier surface		
	39th	B-spline Surface.		
14th	40th	**SOLIDS:-** Solid models and representation scheme, boundary representation	14th	
	41st	**Assignment:**-constructive Solid geometry		
	42nd	cell decomposition, spatial occupancy Enumeration		
15th	43rd	**FINITE ELEMENT MODELLING-** Type of FE analysis; Degree of freedom	15th	
	44th	Influence coefficient,Element and stiffness equations		
	45th	Assignment:- General structure of FE analysis procedure.		

Name of Faculty: Mr. Nikhil Rohilla
Discipline:- B. Tech. (ME)
Semester: 8th
Subjects: Modern Manufacturing Process (ME 446B)
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	Limitations of conventional manufacturing processes
	2nd	Need of unconventional manufacturing processes
	3rd	Classification of modern manufacturing processes
2nd	4th	Future possibilities
	5th	Introduction, basic principle of USM
	6th	Elements of process, tool feed mechanism
3rd	7th	Cutting tool system design
	8th	Effect of parameters on MRR
	9th	Economic consideration
4th	10th	Applications and limitations, advantages and disadvantages
	11th	Basic techniques of chemical machining
	12th	Mechanism of metal removal process variables, advantages and applications
5th	13th	Electrochemical machining, principle of ECM process, ECM process details
	14th	Chemical reactions in ECM, tool work gap
	15th	Process variables and characteristics of ECM
6th	16th	Advantages, disadvantages and applications of ECM
	17th	Electrochemical grinding
	18th	Material removal, surface finish
7th	19th	Accuracy, advantages, applications
	20th	Process description, features of AJM, parameters in AJM
	21st	Metal removal rate (MRR) in AJM, advantages, limitations and practical applications of AJM
8th	22nd	Water jet machining – jet cutting equipment, process details
	23rd	Electric discharge machining (EDM) or spark erosion machining process, practical aspects of spark erosion machining
	24th	Mechanism of metal removal, spark erosion generators, electrode feed control
9th	25th	Dielectric fluids, flushing, electrodes for spark erosion, selection of electrode material, tool electrode design
	26th	Surface finish, machining accuracy, machine tool selection, applications
	27th	Wire cut EDM, advantages and disadvantages of spark erosion machining
10th	28th	Introduction, lasing process
	29th	Laser machining system, thermal effect on workpiece
	30th	Calculation of MRR
11th	31st	Description of laser drilling machine
	32nd	Cutting speed and accuracy of cut
	33rd	Advantages and limitations
12th	34th	Introduction, non-thermal generation of plasma
	35th	Types of plasma arc, the stabilized arc
	36th	Mechanism of plasma torch, mechanism of metal removal
13th	37th	PAM parameters, equipments for DC
	38th	Plasma torch unit, safety precautions
	39th	Economics, other applications of plasma jets
14th	40th	Description of the process
	41st	Need for high vacuum in EBM
	42nd	Process parameters in EBM
15th	43rd	Advantages and disadvantages of EBM
	44th	Electron beam welding
	45th	Revision (Previous year papers)

Name of faculty:- Mr. Vikram Kapoor (Theory)
Discipline:-Mechanical
Semester:- 8th
Subject:-Mechanical Vibration (ME404B)
Lesson Plan Duration:-15 week (January 2018 to April 2018)
Work Load (Lecture/Practical) per week (in hours):- Lectures -03, Tutorial – 01

Week	**Theory**	
	Lecture (Da	**Topic (including assignment /test)**
1st	**1st**	Classifications of Vibrations
	2nd	Free and Forced
	3rd	Undamped and Damped, Linear and Non-linear

2nd	1st	Deterministic and Random
	2nd	Harmonic Motion, numerical
	3rd	Vector and Complex Number Representations, Assignment: Numerical , Classifications of Vibrations
3rd	1st	Governing equations using D'Alemberts Principal
	2nd	Concept of viscous damping
	3rd	Response of Free Damped Vibrations (Under Damping, Critical and Over Damping)
4th	1st	Logarithmic Decrement
	2nd	Determination of Structural damping, Determination of natural frequency of vibratory systems using Energy Method
	3rd	Equivalent systems
		Assignment: Numerical, Under Damping, Critical and Over Damping
5th	1st	Forced vibrations
	2nd	Governing equation under harmonic excitation
	3rd	Response using techniques of calculus and phasor
		diagram, Magnification factor
6th	1st	Active and passive vibration isolation
	2nd	Forced and Motion
		Transmissibility
	3rd	Rotating and Reciprocating unbalance, Critical Speeds
7th	1st	Whirling of Rotating Shafts Vibration isolation materials
	2nd	Impulse Excitation
	3rd	Response to Step Excitations
8th	1st	Assignment: Numerical
	2nd	Normal Mode Vibrations
	3rd	Coordinate Coupling,
9th	1st	Principal Coordinates
	2nd	Free Vibrations in Terms of Initial Conditions
	3rd	Forced Harmonic Vibrations, Simple Vibration Absorber
10th	1st	Eigen value problems
	2nd	Close coupled system and far coupled systems using influence coefficient
	3rd	Natural Frequencies and Normal Modes, Orthogonality of Normal Modes
11th	1st	Method of Matrix Iteration, Introduction to vibration of continuous system with the help of lateral vibration of Beam
	2nd	Dunkerley's method , Rayleigh's method,
	3rd	Assignment: Numerical, Dunkerley's method
12th	1st	Vibration Measurement
	2nd	Principle of seismometer
	3rd	Principle of Accelerometer
13th	1st	Basic Vibration measuring set ups- amplitude and phase measurement
	2nd	Vibration pick-ups
	3rd	Working principle of piezoelectric
14th	1st	Working principle of accelerometer
	2nd	Eddy current based displacement probe
	3rd	Bending critical speed of simple shaft
15th	1st	Condition monitoring- its need and types, Concept of 1X, 2X,3X, Vibration signals in a rotating machines
	2nd	Assignment: Numerical, working principle of piezoelectric, eddy current based displacement probe
	3rd	Test