

Name of the Faculty- Mr Lahana Singh
 Discipline - Mechanical Engineering
 Semester - M. Tech 2nd Sem
 Subject and Code - Mechatronics (MTIP-102A)

Lesson Plan Duration - 15 weeks (January,2019 to April, 2019)

Week	Theory	
	Lecture	Topic (Including Assignment/ Test)
1	1st	Introduction: The Mechatronics approach: A methodology for integrated design of Mechanical,
	2nd	Electronics and Electrical Control, Computer and Instrumentation.
2	3rd	Number systems: Binary, Octal, Hexadecimal
	4th	Conversion from Binary to Decimal, Octal and Hexadecimal and vice-versa
3	5th	, Binary arithmetic: Addition, subtraction, Multiplication and division
	6th	Boolean Algebra: Laws, De-Morgan's laws, Logic Gates, Truth tables
4	7th	maps and logic circuits. Generation of Boolean function from truth tables and simplification
	8th	Basic principle of electrical switching, Solenoids, Electrical relays
5	9th	Representation of output devices, Electrical motors: A.C. motors, Stepper motors, Induction motor speed control.
	10th	Poppet Valve, Spool Valve, Sliding Spool type DCV, Check Valve
6	11th	Pilot operated check valve, Restriction check valve, 2 Way vale
	12th	3 way valve, 4 way valve, Manually actuated valve, Mechanically actuated valve
7	13th	Pilot operated DCV, Solenoid Actuated valve, Rotary Valve
	14th	Centre flow path configurations for three position four way valve, Shuttle valve Pressure Control Valve: Simple and compound pressure Relief Valve
8	15th	Pressure Reducing Valve, Unloading valve, sequence valve, counterbalance valve, Brake Valve
	16th	Fixed and non-adjustable valve, adjustable, throttling, non-pressure compensated pressure control valve,
9	17th	Shuttle and Fast exhaust valve, Time delay valve, Flow Control Valves, Fluid Conditioners, Hydraulic Symbols (ANSI),
	18th	ValvesHydraulic Circuit design: Control of Single and double acting cylinders, double pump Hydraulic System
10	19th	Air compressors, Air Receiver, Filters, intercoolers, After-coolers, Relief Valve, Air dryers,
	20th	Air Filters, Air Regulators, Air Lubricator, Actuators and output devices, Direction control valves, Flow control valves
11	21st	junction elements, Pneumatic circuits, Control of Single and double acting cylinders.
	22nd	CNC Machines: NC machines, CNC machines, DNC machines
12	23rd	, Machine structure, Slidways, Guideways, Slide Drives, Spindle, Robotics:Components of robots,
	24th	Introduction - Principles of operation - PLC Architecture and specifications - PLC hardware Components,
13	25th	CPU & memory module - Programming devices - PLC ladder diagram, Converting simple relay ladder diagram in to PLC relay ladder diagram
	26th	. PLC programming Simple instructions - Manually operated switches - Mechanically operated Proximity switches - Latching relays, Applications of PLC.

14	27th	Analog & digital I/O modules,
	28th	Classification of robots, Robots application
15	29th	Pressure/temperature compensated flow control valve,
	30th	Primary and secondary lines, Piping layouts

Name of the Faculty- Mr. Kitab Singh

Discipline - Mechanical Engineering

Semester - M. Tech 2nd Sem

Subject and Code - Industrial Tribology

Lesson Plan Duration - 15 weeks (January,2019 to April, 2019)

Week	Theory	
	Lecture	Topic (Including Assignment/ Test)
1	1st	Introduction to tribology and its historical background
	2nd	Economic Importance of Tribology.Friction and Wear:Genesis of friction
2	3rd	friction in contacting rough surfaces, sliding and rolling friction, various laws and theory of friction.
	4th	
3	5th	Stick-slip friction behavior, frictional heating and temperature rise. Friction measurement techniques.
	6th	Wear and wear types. Mechanisms of wear - Adhesive, abrasive,
4	7th	corrosive, erosion, fatigue, fretting, etc., Wear of metals and non-metals.
	8th	constant and variable wear rate, geometrical influence in wear models
5	9th	wear damage. Wear in various mechanical components, wear controlling techniques.
	10th	An overview of engineering materials having potential for tribological application.
6	11th	Characterization and evaluation of Ferrous and non-ferrous materials for tribological requirements/applications,
	12th	Composite materials (PM, CMC and MMC) for tribological applications.
7	13th	Surface treatment techniques such as carburising, nitriding, induction hardening, hard facing, laser surface treatments
	14th	etcwith applications, Surface coating techniques such as electrochemical depositions,
8	15th	anodizing, thermal spraying, Chemical Vapour Deposition (CVD),
	16th	Boundary Lubrication, Mixed Lubrication, Full Fluid Film Lubrication, Hydrodynamic,
9	17th	Primary role of lubricants in mitigation of friction and wear & heat transfer medium, Composition and properties of lubricants
	18th	Fundamentals - Mineral oil based liquid lubricants, Synthetic liquid lubricants, Solid lubricants,
10	19th	greases and smart lubricants, Characteristics of lubricants and greases
	20th	Rheology of lubricants, Evaluation and testing of lubricants
11	21st	Introduction to lubricant additives, Antioxidants and bearing corrosion inhibitors
	22nd	Rust inhibitors, Viscosity improvers, Extreme pressure additives.

12	23rd	Lubricants for industrial machinery, Maintenance and conservation of lubricating oils
	24th	Storage and Handling of lubricants, Used lubricating oil, Environment and health hazards
13	25th	Disposability and Recycling, Technical regulation for lubricants
	26th	Test specifications and standards for maintenance and management of industrial lubricants including greases and used oils
14	27th	Selection of optimum lubricant for given application.
	28th	Physical Vapour Deposition (PVD), etc. and their applications
15	29th	Wear models - asperity contact,
	30th	Elastohydrodynamic lubrication

Name of the Faculty- Mr.Jasbir Singh

Discipline - Mechanical Engineering

Semester - M. Tech 2nd Sem

Subject and Code - Metrology

Lesson Plan Duration - 15 weeks (January,2019 to April, 2019)

Week	Theory	
	Lecture	Topic (Including Assignment/ Test)
1	1st	Definition, types, need of inspection, terminologies
	2nd	methods of measurement, selection of instruments
2	3rd	measurement errors, units, Measurement standards
	4th	calibration, statistical concepts in metrology
3	5th	Introduction, nominal size, tolerance limits, deviations
	6th	fits and their types – unilateral and bilateral tolerance system
4	7th	allowance, hole and shaft basis systems – interchangeability and selective assembly
	8th	Indian standard Institution system – British standard system
5	9th	International standard system for plain and screwed work
	10th	Taylor’s principle – Design of limit gauges, computer aided tolerancing.
6	11th	Length standard, line and end standards, slip gauges – calibration of the slip gauges
	12th	dial indicator, micrometres. Measurement of angles and tapers
7	13th	Different methods – bevel protractor – angle slip gauges – spirit levels– sine bar – sine plate, rollers and spheres.
	14th	Measurement of flat surfaces – instruments used – straight edges– surface plates – optical flat and auto collimator.
8	15th	Tool maker’s microscope and its uses, collimators, optical projector, optical flats and their uses, interferometer.
	16th	Introduction, terminology, specifying roughness on drawings, surface roughness parameters,
9	17th	factors affecting surface roughness, ideal surface roughness, roughness measurement methods
	18th	; ,precautions in measurement, surface microscopy, surface finish softwares.

10	19th	Elements of measurement – errors in screw threads – measurement of effective diameter
	20th	angle of thread and thread pitch, profile thread gauges.
11	21st	Comparator: Features of comparators, classification of comparators
	22nd	different comparators, advanced comparators, thread comparators.
12	23rd	Alignment and practical tests
	24th	Gear measuring instruments, gear tooth profile measurement
13	25th	;, measurement of diameter, pitch, pressure angle and tooth thickness.
	26th	Advanced measuring machines, CNC systems, Laser vision, In-process gauging, 3D metrology,
14	27th	metrology softwares, Nano technology instrumentation, stage position metrology, testing and certification services,
	28th	optical system design, lens design, coating design
15	29th	;, precision lens assembly techniques, complex opto mechanical assemblies
	30th	contact bonding and other joining technologies.

Name of the Faculty- Mr.Neeraj Vashishth
Discipline - Mechanical Engineering
Semester - M. Tech 2nd Sem
Subject and Code - QUALITY ENGINEERING AND MANAGEMENT
Lesson Plan Duration - 15 weeks (January,2019 to April, 2019)

Week	Theory	
	Lecture	Topic (Including Assignment/ Test)
1	1st	Introduction to Quality: An Historical Overview:Defining Quality
	2nd	The Total Quality System, Total Quality Management,
2	3rd	Productivity, and Competitive Position, Quality Costs, Success Stories.
	4th	Statistics for Quality: Variability in Populations, Some Definitions
3	5th	Quality vs. Variability, Section I: Empirical Methods for Describing Populations
	6th	Section II: Mathematical Models for Describing Populations
4	7th	Section III: Inference of Population Quality from a Sample.
	8th	Quality in Design: Planning for Quality
5	9th	Product Planning, Product Design, Process Design
	10th	Quality in Production-Process Control I: Process Control
6	11th	The Control Charts, Measurement Control Charts
	12th	Attribute Control Charts, Summary on Control Charts
7	13th	Process Capability, Measurement System Analysis,

	14th	Quality in Production-Process Control II: Derivation of Limits
8	15th	Operating Characteristics of Control Charts,
	16th	Quality in Procurement: Importance of Quality in Supplies
9	17th	Establishing a Good Supplier Relationship,
	18th	Specifying the Supplies Completely, Auditing the Supplier
10	19th	Supply Chain Optimization Using Statistical Sampling for Acceptance,
	20th	Continuous Improvement of Quality: The Need for Continuous Improvement
11	21st	The Problem-Solving Methodology, Quality Improvement Tools, Lean Manufacturing
	22nd	A System for Quality: The Systems Approach
12	23rd	Dr. Deming's System, Dr.Juran's System, Dr.Feigenbaum's System
	24th	Baldrige Award Criteria, ISO 9000 Quality Management Systems
13	25th	ISO 9001:2008 Requirements, The Six Sigma System
	26th	Measurement Control Charts for Special Situations
14	27th	Economics of Quality, Quality
	28th	Choosing and Certifying Suppliers

Name of the Faculty- Mr. V.K.Ahuja

Discipline - Mechanical Engineering

Semester - M. Tech 2nd Sem

Subject and Code - CONSTITUTION OF INDIA

Lesson Plan Duration - 15 weeks (January,2019 to April, 2019)

Week	Theory	
	Lecture	Topic (Including Assignment/ Test)
1	1st	History of Making of the Indian Constitution: History,
	2nd	Drafting Committee, (Composition & Working)
2	3rd	Philosophy of the Indian Constitution: Preamble, Salient Features
	4th	Contours of Constitutional Rights & Duties: Fundamental Rights
3	5th	Right to Equality, Right to Freedom , Right against Exploitation
	6th	Right to Freedom of Religion,
4	7th	Right to Constitutional Remedies
	8th	Directive Principles of State Policy , Fundamental Duties
5	9th	Organs of Governance: Parliament
	10th	Composition, Qualifications and Disqualifications
6	11th	Powers and Functions, Executive

	12th	President, Governor, Council of Ministers
7	13th	Judiciary, Appointment and Transfer of Judges
	14th	Qualifications. Powers and Functions
8	15th	Local Administration: District's Administration head: Role and Importance
	16th	Municipalities: Introduction, Mayor and role of Elected Representative CEO of Municipal Corporation
9	17th	Pachayati raj: Introduction, PRI: ZilaPachayat,
	18th	CEO ZilaPachayat: Position and role. Block level: Organizational Hierarchy
10	19th	Different departments), Village level: Role of Elected and Appointed officials,
	20th	Importance of grass root democracy
11	21st	Election Commission: Election Commission: Role and Functioning
	22nd	Chief Election Commissioner and Election Commissioners
12	23rd	State Election Commission: Role and Functioning
	24th	Elected officials and their roles
13	25th	Institute and Bodies for the welfare of SC/ST/OBC and women.
	26th	Cultural and Educational Rights