Shantilal Shah Engineering College, Bhavnagar

Mechanical Engineering Department
PAT Syllabus-2020
Subject Code: 3151911
Semester – V
DYNAMICS OF MACHINERY

Sr.No.	Topics
1	**Dynamic force analysis of mechanisms:** Introduction, D'alembert's principle, equivalent offset inertia force, dynamic analysis of four link mechanism, dynamic analysis of slider crank mechanism, velocity & acceleration of piston, angular velocity & angular acceleration of connecting rod, engine force analysis, dynamically equivalent system inertia of the connecting rod, inertia force in reciprocating engines.
2	**Turning moment diagrams and flywheel** Turning moment diagram for various type of engines, fluctuation of energy, fluctuation of speed, flywheel, energy stored in flywheel, dimensions of flywheel rims, flywheel in punching presses
3	**Balancing:** Introduction, static balancing, dynamic balancing, transference of force from one plane to another plane, balancing of several masses in different planes
4	**Vibration:** Types of vibrations, elements constituting vibration, spring mass system, free undamped vibrations, equation of motion, equivalent spring stiffness, free damped vibrations, equation of motion for viscous damper, damping factor, under damped system, critically damped system, over damped system, logarithmic decrement

Staff Incharge

(B M TRIVEDI)

GUJARAT TECHANOLOGICAL UNIVERSITY AHMEDABAD
SHANTILAL SHAH ENGINEERING COLLEGE BHAVNAGAR
5TH SEMESTER MECHANICAL ENGINEERING
MST SYLLABUS OF CONTROL ENGINEERING 2020-21

SUBJECT: CONTROL ENGINEERING (3151908)

SR.NO	SYLLABUS OF CE
1	**Basic concepts of control system:** Control System, Basic components of control system, classification of control system, Closed loop control versus open loop control, Servomechanism, Regulator and process control, Example of control system
2	**Modelling of control systems:** Transfer function and impulse response function, Procedure for determining the transfer function of a control system, Block diagram of system, signal flow graph representation of physical systems along with rules.
3	**Modelling in time domain and its response analysis**: Standard test signals along with examples of their usage, Poles, Zeros, and System response, First order systems, Second order systems, Higher order systems, Transient response analysis, , steady state errors of feedback control systems.
4	**PID controllers:** Tuning PID controllers, Design PID controllers, Modification of PID control, Two degree of freedom control.
5	**Hydraulic control system:** Basic elements of hydraulic circuit, Principle used in hydraulic circuit, Sources of hydraulic power, Integral, Derivative, PD & PID controller with its transfer function, Comparison between hydraulic and electrical control system.
6	**Pneumatic control system:** Basic elements of pneumatic circuit, Difference between pneumatic and hydraulic control systems, Force balance and force distance type controllers, Nozzle-flapper amplifier, PD, PI and PID control system along with its transfer function.

SUBJECT CO-ORDINATOR

PROF. V.S.CHAUDHARI

Shantilal Shah Engineering College, Bhavnagar

MECHANICAL ENGINEERING DEPARTMENT

B.E. SEMESTER 5th Mechanical Engineering

Syllabus for PAT-1-Exam

AY: 2020-21 (Odd Term)

Subject Name: Heat Transfer (3151909)

Conduction: Fourier's law, effect of temperature on thermal conductivity of different solids, liquids and gases, generalized equation in Cartesian, cylindrical and spherical coordinates and its reduction to specific cases, One dimensional steady state conduction, heat conduction through plane and composite walls, cylinders and spheres, electrical analogy, critical radius of insulation for cylinder and sphere, overall heat transfer coefficient

Radiation: Absorptivity, reflectivity and transmissivity, black, white and grey body, emissive power, emissivity, Kirchhoff's law,Planck's law, Rayleigh-Jeans' law, Wien's law, Wien's displacement law, Stefan-Boltzmann law, intensity of radiation, radiation heat exchange between black bodies, shape factor, electrical analogy, radiation heat exchange between gray bodies, radiosity, irradiation, radiation shields

Heat exchanger: Classification, heat exchanger analysis, LMTD for parallel and counter flow exchanger, condenser and evaporator, overall heat transfer coefficient, fouling factor, correction factors for multi pass arrangement, effectiveness-NTU method for parallel and counter flow heat exchanger, introduction of heat pipe and compact heat exchanger

GUJARAT TECHNOLOGICAL UNIVERSITY
Shantilal Shah Engineering College, Bhavnagar

OPERATION RESEARCH (3151910)
BE Mechanical
Semester- V
PAT SYLLEBUS- ODD TERM 2020

Sr No	Content
1	**Operations Research:** Origin of Operation Research, Historical Standpoint, Methodology, Different Phases, Characteristics, Scope and Application of Operations Research. **Linear Programming Problem:** Introduction, Requirement of LP, Basic Assumptions, Formulation of LP, General Statement of LP, Solution techniques of LP: Graphical Methods.
2	**Transportation and Assignment:** Transportation Problems definition, Linear form, Solution methods: North west corner method, least cost method, Vogel's approximation method. Degeneracy in transportation, Modified Distribution method, Unbalanced problems and profit maximization problems. Transshipment Problems. Assignment Problems and Travelling sales man Problem.
3	**Game Theory:** Introduction, Characteristics of Game Theory, Two Person, Zero sum games, Pure strategy. Dominance theory, Mixed strategies (2x2, M x2), Algebraic and graphical methods.

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3151912

Semester – V

Subject Name: Manufacturing Technology

PAT Syllabus:

1. Manufacturing Technology:Importance of manufacturing, economic and technological definition of manufacturing, Classification of manufacturing processes, Selection of Manufacturing process
2. Foundry Technology: Patterns practices:Types of patterns, allowances and material used for patterns, moulding materials, mouldingsands, Moulding sands; properties and sand testing; grain fineness; moisture content, claycontent and permeability test, core materials and core making, core print; core boxes, chaplets,gating system design
3. Metal Joining Processes:Principle of welding, soldering, Brazing and adhesive bonding. Classification of welding andallied processes. Gas welding and gas cutting, Principle, Oxyacetylene welding equipment, Oxyhydrogen welding. Flame cutting. Arc welding, Power sources and consumables, Gas weldingand cutting, Processes and Equipment. Resistance welding, Principle and Equipment, Spot,Projection and seam welding process, Atomic hydrogen, ultrasonic, Plasma and laser beamwelding, Electron beam welding, and special welding processes e.g. TIG, MIG, friction andexplosive welding, welding of C.I. and Al, Welding defects. Electrodes and Electrode Coatings,Welding positions.
4. Forming and Shaping Processes:Metal working, Elastic and plastic deformation, Concept of strain hardening, Hot and cold Working, Rolling: Principle and operations, Roll pass sequence, Extrusion, Wire and tube drawing processes.Forging: Method of forging, Forging hammers andpresses, Principle of forging tool design,Cold working processes.

Integrated Personality Development Course (3150005)

Mid sem syllabus

1	Restructuring Yourself
2	Power of Habit
3	Learning from Legends Tendulkar & Tata
4	Mass Management ,Project Management
5	Affectionate Relationships
6	Factors Affecting Failures