**Lesson Plan**

**Name of faculty: Visiting Faculty**

**Discipline: Mechanical**

**Semester: 4th**

**Subject: Dynamics of Machines**

Lesson Plan Duration: 15 weeks (from January, 2018 to April, 2018)

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| **Week** | **Theory** | | **Practical** | |
|  | **Lecture day** | **Topic(Including assignment/ test)** | **Practical day** | **Topic** |
| 1st |  | **Chapter 1 : Static force analysis:** Static equilibrium, Equilibrium of two and three force members, Principle of Superposition |  | To find out critical speed experimentally and to compare the whirling speed of a shaft with theoretical values |
|  | Members with two forces and a torque, Equilibrium of four force members |
|  | Free body diagram |
| 2nd |  | Static forces Analysis of four bar mechanisms and slider crank mechanism |  | To find experimentally the Gyroscopic couple on Motorized Gyroscope and compare with applied couple |
|  | Numericals & Problems |
|  | **Chapter 2 : Dynamic Force Analysis:** D’Alembert’s principle, Equivalent offset inertia force, ,), , |
| 3rd |  | Dynamic force analysis of four bar mechanism and slider crank mechanism |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Engine force analysis, Turning moment on crank shaft |
|  | Dynamic Equivalent systems, Inertia of connecting rods |
| 4th |  | Inertia force in reciprocating engines(Graphical and Analytical methods |  | To perform the experiment of balancing of rotating parts and finds the unbalanced couple and forces |
|  | Turning moment diagrams, fluctuation of energy |
|  | Flywheels, Flywheel dimensions, Punching Press |
| 5th |  | **Chapter 3 : Gears:** Classification of gears, Gear terminology |  | To determine experimentally the unbalance forces and couples of reciprocating parts |
|  | Fundamental law of gearing, Forms of Teeth, Cycloidal and involutes profiles of gear teeth |
|  | Interchangeable Gears, , Path of contact, arc of contact, number of pairs of teeth in contact (Contact Ratio) |
| 6th |  | Interference in involute gears, minimum number of teeth, undercutting |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | **Chapter 4 : Helical, Spiral, Bevel and worm & worm gears** : Terminology |
|  | Efficiency of Helical, Spiral, Bevel and worm & worm Gear |
| 7th |  | **Chapter 5 : Gear trains:** Simple, compound |  | To calculate the torque on a planet carrier and torque on internal gear using Epicyclic gear train and holding torque apparatus. |
|  | Reverted, Planetary or Epicyclic gear trains |
|  | Analysis of Epicyclic Gear trains, Torques in Epicyclic gear trains |
| 8th |  | Sun and Planet gear |  | To study the different types of centrifugal and inertia governors and demonstrate any one |
|  | Automotive transmissions gear train. Differential |
|  | **Chapter 6 : Brakes:** Types of brakes, Block and shoe brake,., , , |
| 9th |  | Band brake, band and block brakes, internal expanding shoe brake |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Effect of Braking |
|  | **Chapter 7 : Dynamometers:** Types of Dynamometers, Pony and Rope Brake Dynamometer |
| 10th |  | Hydraulic Dynamometer, Belt Transmission Dynamometer |  | To study the Automatic transmission unit |
|  | Epicyclic train Dynamometer, Bevis Gibson torsion dynamometer |
|  | **Chapter 8 : Governors:** Types of Governors, Watt, Porter |
| 11th |  | Proell, Hartnell, Hartung Governor |  | To study the differential types of brakes |
|  | Wilson-Hartnell, Inertia Governor |
|  | Sensitiveness, Hunting, Isochronism, Stability of Governors |
| 12th |  | Effort and Power of a Governor, Controlling Force. |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | **Chapter 9 : Balancing of rotating masses:** Static and Dynamic Balancing |
|  | Single Rotating mass, Many Masses rotating in same plane and in different planes |
| 13th |  | Analytical method for balancing of rotating masses |  | To determine the MOI of given flywheel using analytical method |
|  | **Chapter 10 : Balancing of reciprocating masses:** Reciprocating Engine, Partial Primary balance |
|  | Balancing of Multi-cylinder in line engines, Balancing of Radial Engines |
| 14th |  | Balancing of V-Engines, Balancing of Rotors |  | To study the various types of dynamometers |
|  | Numericals & Problems |
|  | **Chapter 11 : Gyroscope:** Angular Velocity, Angular Acceleration, pitching and rolling |
| 15th |  | Gyroscopic couple and its effect on Aero planes, Naval ships |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Stability of an automobile (2 & 4-wheeers) , taking a turn |
|  | Gyroscopic effect in stone crusher |