# Ch. Ranbir Singh State Institute of Engineering & Technology, Jhajjar

**Department of Mechanical Engineering**

II Yr. III Semester (Mechanical Engineering)

### LESSON PLAN

Program : **B. Tech**

Year & Sem. :  **IV / V11**

Course No : **PCC-ME-413 G**

Course Title : **Tribology**

Max Marks **: 75**

No. of Total Lecture **: 65**

Schedule : **3L+2T=5**

Lecturer : **Dr. Parveen Kumar**

**Recommended Books:**

1. Friction and Lubrication, Bowden F.P. & Tabor D., Heinemann Edu. Books Ltd. 1974

2. Friction & Wear of Material, Ernest Rabinowiez

3. Tribology – Handbook, Neal M.J., Butterworth, 1973

**Lesson Plan:**

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| Lect. No(s) | Topics to be covered |
| 1. | Introduction of Tribology |
| 2 | General tribological considerations in the design of bearings |
| 3 | gears, cams, reciprocating components, etc. |
| 4 | tribology / aspects of engine components such as bearings, piston assembly, valve train and drive train components |
| 5 | tribology / aspects of engine components such as bearings, piston assembly, valve train and drive train components |
| 6 | Natural of metal surfaces |
| 7 | Surface properties |
| 8 | Surface parameters and measurements |
| 9 | Friction – Sliding friction |
| 10 | Rolling friction characteristics of common metals and non-metals |
| 11 | friction under environments |
| 12 | Engine friction – Losses and engine design parameters. |
| 13 | Economic role of wear |
| 14 | type of wear- wear mechanism, factors affecting wear |
| 15 | selection of materials for different wear situations |
| 16 | measurement of wear |
| 17 | tribometers and tribometry |
| 18 | Engine wear, mechanisms, wear resistance material |
| 19 | coatings and failure mode analysis |
| 20 | Lubricants, type of lubricants |
| 21 | properties and testing, service classification of lubricants |
| 22 | lubrication of tribological components, lubrication system |
| 23 | lubricant monitoring, SOAP |
| 24 | ferrography and other rapid testing methods for lubricants contamination. |
| 25 | Theory of hydrodynamic lubrication |
| 26 | generalized Reynolds equation |
| 27 | slider bearings, fixed & pivoted shoe bearings |
| 28 | hydrodynamic journals bearings |
| 29 | short and finite bearings, thrust bearings |
| 30 | Sintered bearing, non-circular bearings and multi side surface bearings. |
| 31 | Hydrostatic bearing, basic concepts |
| 32 | bearing pads, coefficients, restrictors |
| 33 | capillary, orifice and flow control valve |
| 34 | bearing characteristics number and performance coefficients |
| 35 | flat, conical and spherical pad thrust bearing |
| 36 | multi-recess journal and thrust bearings |
| 37 | air and gas lubricated bearings. |
| 38 | Ball and roller element bearings, classification |
| 39 | selection and life estimation |
| 40 | fatigue, monitoring of ball / roller bearings, diagnostics |
| 41 | Non-Newtonian fluids, characteristics |
| 42 | general recommendations of lubricants, SAE & other cloud numbers |
| 43 | thixotopic, materials and Bingham solids |
| 44 | grease lubrication and care stability, |
| 45 | tribology components in extreme environments like vacuum |
| 46 | tribology components in extreme environments like pressure |
| 47 | tribology components in extreme environments like temperature |
| 48 | tribology matching and selection |
| 49 | tribolo-testing and standards |
| 50 | tribolo-testing and standards |

**(Dr. Parveen Kumar)**

Guest Faculty

Department of ME

CRSSIET, Jhajjar