

**Course Description & Objective:**

*To acquaint and equip with the latest design procedures of tractor and its systems.*

**Course outcomes:**

At the completion of the course the student will:

1. *have knowledge and skills on power transmission system of a tractor*
2. *know the design procedures of hydraulic systems and steering system.*
3. *understand design features and selection of engine for tractor.*
4. *know the testing procedures for tractor*
5. *knowing the design of engine components*
6. *knowledge and skills on, hydraulic, pumps used in machinery.*
7. *knowledge on different kinds of valves.*
8. *skills on trouble shooting in valves.*
9. *knowledge on safety features and service requirements of various hydraulic and pneumatic circuits*

**UNIT I**

Technical specifications of tractors available in India, modern trends in tractor design and development, special design features of tractors in relation to Indian agriculture.

**UNIT II**

Engine performance. Selection of engine for tractors. Design of principal engine components. Design of engine systems. Parameters affecting design of tractor engine and their selection.

**UNIT III**

Hydraulic system & hitching, chassis, Tractor stability analysis. Single and three point hitch systems. Drawbar performance. Quick attaching couplers.

**UNIT IV**

Tractor clutches and brakes. Design of power transmission systems. Power measurement of tractor, Tire selection

**UNIT V**

Design and performance evaluation of traction and transport devices. Human factors engineering in tractor design. Driver's seat, work-place area and controls. Computer application and automation in tractor design

**Practical:**

1. Measurement of Rolling resistance and slip
2. Measurement of engine performance parameters
3. Study of dynamometers
4. Measurement of draft of tillage implement
5. Design problems of hydraulic system
6. Design problems of hydraulic system
7. Design problems of tractor mechanics

8. Design problems of tractor mechanics
9. Design problems of tractor transmission
10. Design problems of tractor transmission

**Suggested Readings**

1. Arther W Judge 1967. *High Speed Diesel Engines*. Chapman & Hall.
  2. Barger EL, Liljedahl JB &McKibben EC. 1967. *Tractors and their Power Units*. Wiley Eastern.
  3. Macmillan RH. *The Mechanics of Tractor - Implement Performance, Theory and Worked Example*. University of Melbourne.
  4. Maleev VL. 1945. *Internal Combustion Engines*. McGraw Hill.
- Ralph Alcock 1986. *Tractor Implements System*. AVI Publ. Co.