

| AE-422: Tractors and Farm Equipment and Off-Road Vehicles | | | | | | | | | | |
|---|-----|-----|--------|------|--|-------|------|-------|-------|-----|
| L | T | P | Credit | Area | | CWS | PRS | MTE | ETE | PRE |
| 3 | 0/1 | 2/0 | 4 | DEC | | 15/25 | 25/- | 20/25 | 40/50 | - |

Objectives: This course introduces to general design of tractors, farm equipments; engine framework, off road vehicles and maintenance machines

| AE-422: Tractors and Farm Equipment and Off-Road Vehicles | | | | | | | | | | Contact Hours |
|---|---|--|--|--|--|--|--|--|--|---------------|
| Unit-1 | General Design of Tractors: Classification of Tractors-Main Components of Tractor-Safety Rules. Control of the Tractor and Fundamentals of Engine Operation: Tractor Controls and the Starting of the Tractor Engines-Basic Notions and Definition-Engine Cycles Operation of Multi cylinder Engines-General Engine Design - Basic Engine Performance Characteristics | | | | | | | | | 8 |
| Unit-2 | Engine Frame Work and Valve Mechanism of Tractor: Cylinder and Pistons-Connecting Rods and Crank shafts Engine Balancing – Construction and Operation of the Valve Mechanism-Valve Mechanism Components – Valve Mechanism Troubles. Cooling System, | | | | | | | | | 6 |
| Unit-3 | Lubrication System and Fuel System of A Tractor: Cooling System – Classification – Liquid Cooling System – Components, Lubricating System Servicing and Troubles – Air Cleaner and Turbo Charger – Fuel Tanks and Filters –Fuel Pumps | | | | | | | | | 6 |
| Unit-4 | Farm Equipment's: Working Attachment of Tractors-Farm Equipment – Classification – Auxiliary Equipment – Trailers and Body Tipping Mechanism | | | | | | | | | 8 |
| Unit-5 | Introduction of off-Road Vehicles: Classification of off-Road Vehicles and their Application Excavator: Different Types of Shovel and Dragline, Their Construction, Operating Principles, Operating Cycles. Production Capacity and cost of Production Transport Equipment: Various Types of Dumpers, Main System, Components and Carrying Capacity of Dumper | | | | | | | | | 8 |
| Unit-6 | Road Making and Maintenance Machines: Different Types of Dozer, Grader, and Their Construction. Operating Principles, Production Capacity and Application Mechanism. Other Equipment: Scraper and Front-End Loader, Their Construction and Operation Maintenance: Maintenance Aspect of off Road Vehicles | | | | | | | | | 6 |
| | Total | | | | | | | | | 42 |

Reference Books:

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| 1 | Abrosimov, K. Bran Berg, A and Katayer, K. Road Making Machinery, M I R. Publishers Moscow. 1971 |
| 2 | De, A. Latest Development of Heavy Earth Moving Machinery, Annapurna Publishers, Dhanbad 1995 |
| 3 | Nichols, Herber L (Jr.), Moving the Earth, Galgotia Publishing House, New Delhi, 1962 |
| 4 | Rudnev, V. K. , Digging of Soils by Earthmover With Power Parts, Oxanian Press Pvt. Ltd., New Delhi |
| 5 | Rodichev and G.Rodicheva, Tractor and Automobiles, Mir Publishers, 1987 |
| 6. | Kolchin. A., and V.Demidov Design of Automotive Engines for Tractor, Mir Publishers, 1972 |

Course Outcomes

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| CO1 | To study basic of Tractors, classification and its components. |
| CO2 | To discuss engine components and its mechanism. |
| CO3 | To explain lubrication system and fuel system of a tractor |
| CO4 | To analyze Working Attachment of Tractors-Farm Equipment |
| CO5 | To implement off-Road Vehicles and their Application Excavator |
| CO6 | To apply Road Making and Maintenance Machines, Maintenance Aspect of off-Road Vehicles. |

CO-PO/PSOMatrix

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 |
| CO2 | 3 | 3 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 |
| CO3 | 3 | 3 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 3 | 2 |
| CO4 | 3 | 3 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 3 | 2 |
| CO5 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 |