ST. JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAM

III SEMESTER **AGRICULTURE AND RURAL DEVELOPMENT** Time: 3hrs/week

AENG251(1) **FARM MACHINERY AND POWER** Marks: 100

w.e.f AJ 2022-2023

**OBJECTIVES:**

* To study about difference between EC engine and constructional details of IC engine.
* To study about Air cleaning and maintenance
* To study about secondary tillage implements and its constructional details
* To study about Familiarization with seed metering mechanism and its calibration.

**Course Outcomes:**

Upon completion of the course, students will be able to

**CO1:** Explain the working principles of different farm engines.

**CO2:** Outline the ignition and power transmission system of I.C engines.

**CO3:** Summarize ploughing, sowing, plant protection, harvesting and threshing equipment and seed cum fertilizer drills.

**CO4:** Explain dusters and tractor mounted equipments.

**THEORY**

**UNIT-I: (3Hrs)**

1. Farm power – Source of different farm power, advantages and disadvantages.

2. Internal combustion engine - Different components and their functions - Working principle of four stroke and two stroke cycle engine - Comparison between diesel and petrol engine - Difference between four and two stroke engines.

3. Terminology related to engine power - IHP, BHP, FHP, DBHP, compression ratio, stroke bore ratio, piston displacement, and mechanical efficiency - Numerical problems on calculation of IHP, BHP, C.R., stroke bore ratio, piston displacement volume.

4. Fuel supply and cooling system of I.C. engine – Types, components and their functions, working principle of forced circulation cooling system.

**UNIT–II: (2Hrs)**

1. Ignition and power transmission system of I.C engine – Types, components and their functions, working principle of battery ignition system.

2. Lubrication system of I.C. engine – Types, purpose, components and their functions, working principle of forced feed system - Tractors classification, types, points to be considered in selection of tractors, estimating the cost of operation of tractor power.

3. Tillage - Primary and secondary tillage - M.B. plough – Functions, constructional features, operational adjustments and maintenance.

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**UNIT–III: (5Hrs)**

1.Disc plough – Functions, constructional details, operational adjustments and maintenance.

2. Numerical problems on M.B. plough and disc plough.

3. Harrows – Types, functions, operation of disc harrows - Cultivators – Rigid and spring loaded tynes - Puddlers, cage wheel, rotovators - Intercultural implements – Hoes and weeders for dry and wetland cultivation.

**UNIT – IV: (2Hrs)**

4. Sowing equipment - Seed cum fertilizer drills – Types, functions, types of metering mechanisms, functional components, calibration - Paddy transplanters.

5. Harvesting equipment – Sickles, self-propelled reaper, alignment and registration - Combines, functions of combines.

6. Plant protection equipment – Types of sprayers, constructional features of knapsack sprayer, hand compression sprayer, foot sprayer, rocker sprayer and power sprayer, care and maintenance of sprayers.

**UNIT–V: (3Hrs)**

1. Dusters – Hand rotary and power operated dusters, care and maintenance of dusters.

2. Tractor mounted equipments for land development and soil conservation – Functions of bund former, ridger, and leveling blade.

3. Threshing equipment and principles of combine harvester

**References Text Books:**

1. JagadishwarSahay - Elements of Agricultural Engineering.

2. Surendra Singh. Farm Machinery - Principles and Applications. ICAR Publication.

3. S.C. Jain and C.R. Rai. Farm Tractor – Maintenance and Repair. Standard Publishers, 1705-B, NaiSarak, Delhi – 110006

4. Ojha, T. P. and Michael, A.M. Principles of Agricultural Engineering. Vol. I, Jain Brothers, 16/893, East Park Road, Karol Bagh, New Delhi – 110005

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