



CO5	To share the Basic concepts simple stresses. Shear force and bending moment diagrams. Stresses in beams. Torsion. Analysis of plane and complex stresses	3	2	2	0	0	0	0	0	0	0	0	0	0
	3: Strong contribution, 2: average contribution, 1: Low contribution													

## Engineering Properties of Biological Materials and Food Quality

Course Code: BE 261

### Course Objective

1. To understand the Importance of engineering properties of biological materials.
2. To get knowledge about Rheological characteristics like stress, strain time effects, rheological models and their equations.
3. To learn aerodynamic characteristics and frictional properties.
4. To know about Application of engineering properties in handling processing machines and storage structures.

### Course Outcome:

*After completion of the course, a student will be able to*

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To Study of different physical and thermal characteristics of important biological materials like shape, size, volume, density etc.
CO2	Understand the concept, objectives and need of quality, quality control, methods of quality control, sampling; purpose, sampling techniques
CO3	Acquaint with aerodynamic characteristics and frictional properties
CO4	Understand about Food grades and standards BIS, AGMARK, PFA, FPO, CAC
CO5	Acquaint with Food Laws and Regulations in India.

### CO-PO MAPPING:



C04	Understand about Food grades and standards BIS, AGMARK, PFA, FPO, CAC	3	3	3	-	-	-	-	3	-	2	2	3	-	3
C05	Acquaint with Food Laws and Regulations in India.	3	3	2	-	-	-	-	3	-	1	2	3	-	3
3: Strong contribution, 2: average contribution, 1: Low contribution															

**Soil Mechanics**  
**Course Code: AE 231**

**Course Objective**

1. To get the introductory knowledge of soil mechanics, field of soil mechanics
2. To get knowledge about theoretical relationship between principle stress circle
3. To learn Consolidation of soils, one dimensional consolidation spring analogy
4. To know the stability analysis of infinite and finite slopes friction circles method Taylor's stability number

**Course Outcome:**

*After completion of the course, a student will be able to*

<b>COURSE OUTCOME (CO)</b>	<b>DESCRIPTION</b>
<b>CO1</b>	To Study of general classification based on particles size, textural classification, and I.S. soil classification system stress condition in soils
<b>CO2</b>	To understand the process of determination of coefficient of consolidation.
<b>CO3</b>	To get Acquaint with aerodynamic characteristics and frictional properties
<b>CO4</b>	To solve the numerical exercise based on various types of tests. Compaction composition of soils standard and modified protector test
<b>CO5</b>	Acquaint with Earth pressure: Plastic equilibrium in soils, active and passive states, Rankine's theory of earth pressure active

**CO-PO MAPPING:**



CO4	To solve the numerical exercise based on various types of tests. Compaction composition of soils standard and modified protector test	3	3	3	-	1	1	-	-	-	2	2	3	-	3
CO5	Acquaint with Earth pressure: Plastic equilibrium in soils, active and passive states, Rankine's theory of earth pressure active	3	3	2	-	2	2	-	-	-	1	2	3	-	3
3: Strong contribution, 2: average contribution, 1: Low contribution															

**Name of Course/subject: Soil and Water Conservation Engineering**

**Course Code: AE232**

**Course Objective:**

1. To introduce the basic concept of Soil and water conservation and erosion control structures.
2. To impart basic knowledge of flow in open channel.
3. To introduce basic knowledge of hydraulic jump and its application.
4. To know about design of different permanent structure of soil erosion control.
5. To know about design of diversions and earth embankment and its type.

**Course Outcome:**

*After completion of the course, a student will be able to*

<b>COURSE OUTCOME (CO)</b>	<b>DESCRIPTION</b>
<b>CO1</b>	know the basic knowledge of soil and water conservation and erosion control structures.
<b>CO2</b>	have the ability to have the knowledge of flow in open channel
<b>CO3</b>	Know the practical application of hydraulic jump.
<b>CO4</b>	have the ability to design of different permanent structure of soil erosion control.
<b>CO5</b>	have the basic knowledge for designing of diversions and earth embankment and its type.

**CO-PO MAPPING:**

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
		Knowledge of Applied Science in Agricultural Engineering	Knowledge of Basic Engineering	Problem Solving	Field Experimentations	Knowledge of Soil and Water Conservation Engineering	Knowledge of Irrigation and Drainage Engineering	Knowledge of Farm Machinery, equipments and techniques	Knowledge of Process and Food Engineering equipments and techniques	Knowledge of Renewable Energy Engineering	Environment and sustainability	Ethics	Individual and team work	Communication and skill development	Lifelong learning
C01	know the basic knowledge of soil and water conservation and erosion control structures.	3	3	3	-	3	3	-	-	-	1	2	2	-	-
C02	have the ability to have the knowledge of flow in open channel	3	3	3	-	3	2	-	-	-	1	2	3	-	-
C03	Know the practical application of hydraulic jump.	3	3	2	-	3	3	-	-	-	1	2	3	-	-
C04	have the ability to design of different permanent structure of soil erosion control.	3	3	3	-	3	2	-	-	-	2	2	3	-	-
C05	have the basic knowledge for designing of diversions and earth embankment and its type.	3	3	2	-	3	3	-	-	-	1	2	3	-	-
3: Strong contribution, 2: average contribution, 1: Low contribution															

**Name of Course/subject: Farm Machinery and Equipment-I**

**Course Code: AE233**

**Course Objective:**

6. To expose the students to farm mechanization benefits and constraints, farm machinery selection and cost analysis.
7. To introduce the students to the working principles of farm equipment, tillage, sowing, planting machinery.
8. To identify the components of primary, secondary tillage implements, land reclamation and earth moving equipment.
9. To impart the knowledge of numerical analysis based on power, draft, capacity of farm machinery.
10. To provide knowledge about material of construction for farm machinery.

**Course Outcome:**

*At the completion of the course the student will:*

<b>COURSE OUTCOME (CO)</b>	<b>DESCRIPTION</b>
<b>CO1</b>	have knowledge about the present status of farm mechanization, selection of farm machinery and cost analysis.
<b>CO2</b>	be able to know the working principles of farm equipment, tillage, sowing, planting machinery.
<b>CO3</b>	have the basic knowledge of primary, secondary tillage implements, land reclamation and earth moving equipment.
<b>CO4</b>	have the knowledge to solve numerical analysis based on power, draft, capacity of farm machinery.
<b>CO5</b>	be able to select the material of construction for farm machinery.

**CO-PO MAPPING:**

	<b>6</b>
<b>PO1</b>	Knowledge of Applied Science in Agricultural Engineering
<b>PO2</b>	Knowledge of Basic Engineering
<b>PO3</b>	Problem Solving
<b>PO4</b>	Field Experimentations
<b>PO5</b>	Knowledge of Soil and Water Conservation Engineering
<b>PO6</b>	Knowledge of Irrigation and Drainage Engineering
<b>PO7</b>	Knowledge of Farm Machinery, equipments and techniques
<b>PO8</b>	Knowledge of Process and Food Engineering equipments and techniques
<b>PO9</b>	Knowledge of Renewable Energy Engineering
<b>PO10</b>	Environment and sustainability
<b>PO11</b>	Ethics
<b>PO12</b>	Individual and team work
<b>PO13</b>	Communication and skill development
<b>PO14</b>	Lifelong learning

C01	have knowledge about the present status of farm mechanization, selection of farm machinery and cost analysis.	3	3	3	2	-	-	3	2	1	1	2	2	1	-
C02	be able to know the working principles of farm equipment, tillage, sowing, planting machinery.	3	3	3	2	-	-	3	2	1	1	2	3	1	-
C03	have the basic knowledge of primary, secondary tillage implements, land reclamation and earth moving equipment.	3	3	2	3	-	-	3	3	1	1	1	2	3	1
C04	have the knowledge to solve numerical analysis based on power, draft, capacity of farm machinery.	3	3	3	2	-	-	3	1	1	1	2	2	3	1
C05	be able to select the material of construction for farm machinery.	3	3	2	2	-	-	3	2	1	1	1	2	3	1

3: Strong contribution, 2: average contribution, 1: Low contribution

**Name of Course/subject: Farm Power**

**Course Code: AE234**

**Course Objective:**

11. To impart knowledge on various energy sources of farm power, tractors classification.
12. To gain basic knowledge of thermodynamic principle and construction of IC engines.
13. To know the working principles of various systems of engine i.e. valve and valve mechanism, cooling system, fuel and supply, starting and electrical, lubrication system etc.
14. To gain the basic knowledge of fuel, fuel test and its combustion.
15. To impart knowledge of governing system of engine and type of coolant and its properties.

**Course Outcome:**

*At the completion of the course the student will:*

<b>COURSE OUTCOME (CO)</b>	<b>DESCRIPTION</b>
<b>CO1</b>	Have knowledge on various energy sources of farm power and types of tractor.
<b>CO2</b>	Be able to know thermodynamic principle and construction of IC engines.
<b>CO3</b>	be able to know the working principles of various systems of engine i.e. valve and valve mechanism, cooling system, fuel and supply, starting and electrical, lubrication system etc.
<b>CO4</b>	Have the basic knowledge of fuel, fuel test and its combustion.
<b>CO5</b>	Have the basic knowledge governing system of engine and type of coolant and its properties.

**CO-PO MAPPING:**

	<b>6</b>
<b>PO1</b>	Knowledge of Applied Science in Agricultural Engineering
<b>PO2</b>	Knowledge of Basic Engineering
<b>PO3</b>	Problem Solving
<b>PO4</b>	Field Experimentations
<b>PO5</b>	Knowledge of Soil and Water Conservation Engineering
<b>PO6</b>	Knowledge of Irrigation and Drainage Engineering
<b>PO7</b>	Knowledge of Farm Machinery, equipments and techniques
<b>PO8</b>	Knowledge of Process and Food Engineering equipments and techniques
<b>PO9</b>	Knowledge of Renewable Energy Engineering
<b>PO10</b>	Environment and sustainability
<b>PO11</b>	Ethics
<b>PO12</b>	Individual and team work
<b>PO13</b>	Communication and skill development
<b>PO14</b>	Lifelong learning

CO1	Have knowledge on various energy sources of farm power and types of tractor.	3	3	3	2	-	-	3	2	1	1	2	2	1	-
CO2	Be able to know thermodynamic principle and construction of IC engines.	3	3	3	2	-	-	3	2	1	1	2	3	1	-
CO3	be able to know the working principles of various systems of engine i.e. valve and valve mechanism, cooling system, fuel and supply, starting and electrical, lubrication system etc.	3	3	2	3	-	-	3	3	1	1	2	3	1	-
CO4	Have the basic knowledge of fuel, fuel test and its combustion.	3	3	3	2	-	-	3	1	1	2	2	3	1	-

CO5	Have the basic knowledge governing system of engine and type of coolant and its properties.														
		3	3	2	2	-	-	3			1	2	3	1	-
3: Strong contribution, 2: average contribution, 1: Low contribution															

## Watershed Hydrology

Course Code: AE 235

### Course Objective

1. To impart knowledge hydrologic cycle; precipitation-forms, rainfall measurement, mass curve, hydrograph
2. To get knowledge about test for consistency of rainfall records; interception; infiltration; evaporation
3. To understand stream length, stream area, stream slope and Horton's laws; runoff-factors affecting
4. To learn about hydrology of dry land areas-drought and its classification
5. To get introductory knowledge about watershed management and planning

### Course Outcome:

*After completion of the course, a student will be able to*

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand the basic concepts of hydrologic cycle; precipitation-forms, rainfall measurement
CO2	Apply the principles of Horton's laws; runoff-factors affecting, measurement
CO3	Acquaint with the watershed management and planning
CO4	Understand about rational method, Cook's method, SCS method, Curve number method
CO5	Acquaint with the stage and velocity, rating curve, extension of rating curve; estimation of peak runoff rate and volume

### CO-PO MAPPING:



C04	Understand about rational method, Cook's method, SCS method, Curve number method	3	3	3	-	1	1	-	-	-	2	2	3	-	-
C05	Acquaint with the stage and velocity, rating curve, extension of rating curve; estimation of peak runoff rate and volume	3	3	2	-	2	2	-	-	-	1	2	3	-	-
3: Strong contribution, 2: average contribution, 1: Low contribution															

## Engineering Mathematics in Agriculture-III

Course Code: MT 215

### Course Objective

1. To impart knowledge of numerical analysis: Finite differences, various difference operators and their relationships
2. To get knowledge about Newton's forward and backward interpolation formulae,
3. To learn about Bessel's and Stirling's central difference interpolation formulae
4. To get knowledge about laplace, transforms of unit step function, unit impulse function, periodic function

### Course Outcome:

*After completion of the course, a student will be able to*

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To understand the basic concepts of Numerical analysis
CO2	To apply the Newton's divided difference formula, Lagrange's interpolation formula
CO3	Acquaint with the watershed management and planning
CO4	Understand about Definition of Laplace transform, Laplace transforms of elementary functions
CO5	Acquaint with the Taylor's series method, Euler's method, modified Euler's method, Runge-Kutta method.

### CO-PO MAPPING:



C04	Understand about Definition of Laplace transform, Laplace transforms of elementary functions	3	3	3	-	-	-	-	-	2	2	3	1	-
C05	Acquaint with the Taylor's series method, Euler's method, modified Euler's method, Runge-Kutta method.	3	3	2	-	-	-	3	2	1	2	3	1	-
3: Strong contribution, 2: average contribution, 1: Low contribution														

## **B. Tech. II year II Sem (As per Fourth Dean Committee)**

**Name of Course/subject: Tractor Systems and Controls**

**Course Code: AE240**

### **Course Objective:**

16. To impart knowledge on various systems and their controls in Agricultural Tractors.
17. To gain basic knowledge of tractor operation with safety precautions.
18. To know the working principles of various systems of tractor i.e. transmission system, cooling system, hydraulic system etc.
19. To gain the basic knowledge of care and maintenance of tractor.
20. To impart knowledge tractor chassis mechanics and design for tractor stability.

### **Course Outcome:**

*At the completion of the course the student will:*

<b>COURSE OUTCOME (CO)</b>	<b>DESCRIPTION</b>
<b>CO1</b>	have knowledge on various systems and their controls in Agricultural Tractors.
<b>CO2</b>	be able to know the tractor operation with safety precautions.
<b>CO3</b>	be able to know the working principles of various systems of tractor i.e. transmission system, cooling system, hydraulic system etc.
<b>CO4</b>	have the basic knowledge of care and maintenance of tractor.
<b>CO5</b>	have the basic knowledge tractor chassis mechanics and design for tractor stability.

**CO-PO MAPPING:**

<b>CO</b>		<b>PO1.</b> Knowledge of Applied Science in Agricultural Engineering.	<b>PO2.</b> Knowledge of Basic Engineering.	<b>PO3.</b> Problem Solving.	<b>PO4.</b> Field Experimentations.	<b>PO5.</b> Design and Development of Engineering.	<b>PO6.</b> Knowledge of Irrigation and Drainage Engineering.	<b>PO7.</b> Knowledge of Farm Machinery, equipment and techniques.	<b>PO8.</b> Knowledge of Process and Food Engineering equipment and techniques.	<b>PO9.</b> Knowledge of Renewable Energy Engineering.	<b>PO10.</b> Environment and sustainability.	<b>PO11.</b> ETHICS.	<b>PO12.</b> Individual and team work	<b>PO13.</b> Communication and skill development.	<b>PO14.</b> Lifelong learning.
<b>CO1</b>	have knowledge on various systems and their controls in Agricultural Tractors.	3	3	3	2	-	-	3					2		2
<b>CO2</b>	be able to know the tractor operation with safety precautions.	3	3	2	3	-	-	3					3		2
<b>CO3</b>	be able to know the working principles of various systems of tractor i.e. transmission system, cooling system, hydraulic system etc.	3	2	2	3	-	-	3					3		2
<b>CO4</b>	have the basic knowledge about care and maintenance of tractor.	2	2	3	3	-	-	3					2		3
<b>CO5</b>	have the basic knowledge tractor chassis mechanics and design for tractor stability.	2	3	2	2	-	-	3					1		2
3: Strong contribution, 2: average contribution, 1: Low contribution															

**Name of Course/subject: Farm Machinery and Equipment-II**

**Course Code: AE241**

**Course Objective:**

21. To impart knowledge on various cutting principle of Agricultural machinery.
22. To gain basic knowledge of operation of crop harvesting machinery and root crop harvesting equipment.
23. To know the working principles of mower, reaper, potato digger, sugarcane harvester, thresher etc.
24. To gain the basic knowledge on testing of farm machinery.
25. To impart the basic knowledge about selection and management of farm machines for optimum performance.

**Course Outcome:**

*At the completion of the course the student will:*

<b>COURSE OUTCOME (CO)</b>	<b>DESCRIPTION</b>
<b>CO1</b>	have knowledge on various cutting principle of Agricultural machinery.
<b>CO2</b>	be able to know the operation of crop harvesting machinery and root crop harvesting equipment.
<b>CO3</b>	be able to know the working principles of mower, reaper, potato digger, sugarcane harvester, thresher etc.
<b>CO4</b>	have the basic knowledge of on testing of farm machinery
<b>CO5</b>	have the basic knowledge about selection and management of farm machines for optimum performance.

**CO-PO MAPPING:**

CO		PO1. Knowledge of Applied Science in Agricultural Engineering.	PO2. Knowledge of Basic Engineering.	PO3. Problem Solving.	PO4. Field Experimentations.	PO5. Knowledge of Soil and Water Conservation Engineering.	PO6. Knowledge of Irrigation and Drainage Engineering.	PO7. Knowledge of Farm Machinery, equipment and techniques.	PO8. Knowledge of Process and Food Engineering equipment and techniques.	PO9. Knowledge of Renewable Energy Engineering.	PO10. Environment and sustainability.	PO11. Ethics.	PO12. Individual and team work	PO13. Communication and skill development.	PO14. Lifelong learning.
CO1	have knowledge on various cutting principle of Agricultural machinery.	3	2	3	2	-	-	3					1		3
CO2	be able to know the operation of crop harvesting machinery and root crop harvesting equipment.	3	3	2	3	-	-	3					3		2
CO3	be able to know the working principles of mower, reaper, potato digger, sugarcane harvester, thresher etc.	3	2	2	3	-	-	3					3		2
CO4	have the basic knowledge of on testing of farm machinery	2	3	3	3	-	-	3					2		3
CO5	have the basic knowledge about selection and management of farm machines for optimum performance.	2	3	2	2	-	-	3					1		2
3: Strong contribution, 2: average contribution, 1: Low contribution															

**Name of Course/subject: Renewable Energy Sources**

**Course Code: AE242**

**Course Objective:**

26. To introduce the basic concept of Energy sources, Introduction, Classification, Energy from Biomass.
27. To impart basic knowledge of gasifiers and Briquetting
28. To introduce basic knowledge of Solar energy, Solar flat plate and focusing plate collectors
29. To know about Brief introduction to wind energy, hydroelectric energy, ocean energy
1. To know about biomass combustion, biodiesel preparation and energy conservation in agriculture.

**Course Outcome:**

*After completion of the course, a student will be able to*

<b>COURSE OUTCOME (CO)</b>	<b>DESCRIPTION</b>
<b>CO1</b>	know the basic knowledge of Energy from Biomass, Types of biogas plants, constructional details
<b>CO2</b>	have the ability to have the knowledge of Constructional details and application of wind mills
<b>CO3</b>	Know the practical application of Solar energy applications / Solar energy gadgets, Solar cookers,
<b>CO4</b>	have the ability to understand biomass combustion, biodiesel preparation
<b>CO5</b>	have the basic knowledge for Solar photo voltaic systems, solar lantern

**CO-PO MAPPING:**

<b>CO</b>	<b>PO1</b> Basic Agriculture knowledge
	<b>PO2</b> Problem Solving
	<b>PO3</b> Field Experimentations
	<b>PO4</b> Modern implements usage
	<b>PO5</b> Modern Agricultural / Horticultural implements
	<b>PO6</b> Modern plant protection implements
	<b>PO7</b> Extension Programme
	<b>PO8</b> Environment and sustainability
	<b>PO9</b> Ethics
	<b>PO10</b> Individual and team work
	<b>PO11</b> Communication
	<b>PO12</b> Lifelong learning

C01	know the basic knowledge of Energy from Biomass, Types of biogas plants, constructional details	3	2	3	2	2	2				2	3
C02	have the ability to have the knowledge of Constructional details and application of wind mills	2	3	1	3	3					3	2
C03	Know the practical application of Solar energy applications / Solar energy gadgets, Solar cookers	3	2	3	3	3	3				2	3
C04	have the ability to understand biomass combustion, biodiesel preparation	2	1	1	2	2	3				2	3
C05	have the basic knowledge for Solar photo voltaic systems, solar lantern	2	1	2	3	2	2				2	2
3: Strong contribution, 2: average contribution, 1: Low contribution												

**Name of Course/subject: Irrigation Engineering**

**Course Code: AE243**

**Course Objective:**

1. To introduce the basic concept of Irrigation engineering and its impact on human environment
2. To impart basic knowledge of Open channel water conveyance system: design and lining of irrigation field channels
3. To introduce basic knowledge of Soil water plant relationship: soil properties influencing irrigation management
4. To know about Surface irrigation methods of water application, border, check basin
5. To know about Irrigation requirement of crops, depth of irrigation, frequency of irrigation

**Course Outcome:**

*After completion of the course, a student will be able to*

<b>COURSE OUTCOME (CO)</b>	<b>DESCRIPTION</b>
<b>CO1</b>	basic knowledge of water resources utilization & Irrigation development, Major and medium irrigation schemes of India
<b>CO2</b>	have the ability for land levelling, land levelling design methods, estimation of earth work
<b>CO3</b>	Know the practical application of soil water movement, infiltration, soil water potential, soil moisture characteristics
<b>CO4</b>	have the knowledge about sprinkler and drip irrigation method, merits, demerits
<b>CO5</b>	have the basic knowledge for irrigation efficiencies Surface methods of water application, border, check basin and furrow irrigation adaptability

**CO-PO MAPPING:**

<b>CO</b>	<b>PO1</b> Basic Agriculture knowledge
	<b>PO2</b> Problem Solving
	<b>PO3</b> Field Experimentations
	<b>PO4</b> modern implements usage
	<b>PO5</b> Modern Agricultural / Horticultural implements
	<b>PO6</b> Modern plant protection implements
	<b>PO7</b> Extension Programme
	<b>PO8</b> Environment and sustainability
	<b>PO9</b> Ethics
	<b>PO10</b> Individual and team work
	<b>PO11</b> Communication
	<b>PO12</b> Lifelong learning

C01	basic knowledge of water resources utilization & Irrigation development, Major and medium irrigation schemes of India	3	2	3	2	2	2				2	3
C02	have the ability for land levelling, land levelling design methods, estimation of earth work	2	3	1	3	3					3	2
C03	Know the practical application of soil water movement, infiltration, soil water potential, soil moisture Characteristics	3	2	3	3	3	3				2	3
C04	have the knowledge about sprinkler and drip irrigation method, merits, demerits	2	1	1	2	2	3				2	3
C05	have the basic knowledge for irrigation efficiencies Surface methods of water application, border, check basin and furrow irrigation adaptability	2	1	2	3	2	2				2	2
3: Strong contribution, 2: average contribution, 1: Low contribution												

**Name of Course/ Subject: Crop Process Engineering**

**Course Code: AE244**

**Course objective:**

1. To give knowledge about importance and scope of food processing, post-harvest losses, principles and methods of food processing.
2. To provide the knowledge about moisture content, determination methods and its importance in harvesting, post-harvesting and processing of crops and Processing of farm crops: cereals, pulses, oil seeds, fruits and vegetables and their products for food and feed.
3. To educate the students about filtration and conveying equipments and different types of filter and conveyers.
4. To aware the students about the size reduction and size reduction laws and machines for size reduction.
5. To provide Knowledge regarding mixing, mixing index, mixing rate, types of mixing and different types of mixers for mixing of liquid and solids.

**Course Outcome**

After completion of course, a student will be able to

<b>COURSE OUTCOME (CO)</b>	<b>DESCRIPTION</b>
<b>CO1</b>	Students able to understand the conceptual knowledge about importance and scope of food processing, post-harvest losses, principles and methods of food processing.
<b>CO2</b>	Able to know about moisture content, determination methods and its importance in harvesting, post-harvesting and processing of crops and Processing of farm crops: cereals, pulses, oil seeds, fruits and vegetables and their products for food and feed.
<b>CO3</b>	Student able to understand about filtration and conveying equipments and different types of filter and conveyers.
<b>CO4</b>	Able to know about about the size reduction and size reduction laws and machines for size reduction.
<b>CO5</b>	Students able to understand the basic Knowledge regarding mixing, mixing index, mixing rate, types of mixing and different types of mixers for mixing of liquid and solids.

**CO-PO MAPPING:**

	<b>6</b>
<b>PO1</b>	Knowledge of Applied Science in Agricultural Engineering
<b>PO2</b>	Knowledge of Basic Engineering
<b>PO3</b>	Problem Solving
<b>PO4</b>	Field Experimentations
<b>PO5</b>	Knowledge of Soil and Water Conservation Engineering
<b>PO6</b>	Knowledge of Irrigation and Drainage Engineering
<b>PO7</b>	Knowledge of Farm Machinery, equipments and techniques
<b>PO8</b>	Knowledge of Process and Food Engineering equipments and techniques
<b>PO9</b>	Knowledge of Renewable Energy Engineering
<b>PO10</b>	Environment and sustainability
<b>PO11</b>	ETHICS
<b>PO12</b>	Individual and team work
<b>PO13</b>	Communication and skill development
<b>PO14</b>	Lifelong learning

CO1	Students able to understand the conceptual knowledge about importance and scope of food processing, post-harvest losses, principles and methods of food processing	3	3	3	2	-	-	-	3	-	3	3	2	3	2
CO2	Able to know about moisture content, determination methods and its importance in harvesting, post-harvesting and processing of crops and Processing of farm crops: cereals, pulses, oil seeds, fruits and vegetables and their products for food and feed.	3	3	3	2	-	-	-	3	-	2	2	3	2	3
CO3	Student able to understand about filtration and conveying equipments and different types of filter and conveyers.	3	3	2	2	-	-	-	3	-	3	2	3	2	3
CO4	Able to know about about the size reduction and size reduction laws and machines for size reduction.	3	3	3	1	-	-	-	3	-	3	2	3	2	3
CO5	Students able to understand the basic Knowledge regarding mixing, mixing index, mixing rate, types of mixing and different types of mixers for mixing of liquid and solids.	3	3	2	3	-	-	-	3	-	3	2	3	2	3

3: Strong contribution, 2: average contribution, 1: Low contribution

**Name of Course/subject: Engineering Mechanics**

**Course Code: ME226**

**Course Objective:**

1. To introduce the basic knowledge about Properties of fluids: Ideal and real fluid
2. To impart basic knowledge of Kinematics of fluid flow: Lagrangian and Eulerian description of fluid motion
3. To introduce basic knowledge of Dynamics of fluid flow, Bernoulli' s theorem, venturimeter, orifice-meter and nozzle, siphon
4. To know about Laminar and turbulent flow in pipes, general equation for head loss-Darcy
5. To Study of manometers and pressure gauges

**Course Outcome:**

*After completion of the course, a student will be able to*

<b>COURSE OUTCOME (CO)</b>	<b>DESCRIPTION</b>
<b>CO1</b>	know the basic knowledge of Pressure and its measurement, Pascal's law, pressure forces on plane and curved surfaces
<b>CO2</b>	have the knowledge of Types of fluid flow, translation, rotation, circulation and vorticity, Vortex motion.
<b>CO3</b>	Know the Stress-strain relationships, flow between infinite parallel plates
<b>CO4</b>	have the ability to understand Minor and major hydraulic losses through pipes and fittings, flow through network of pipes
<b>CO5</b>	have the basic knowledge for Determination of efficiency of hydraulic ram; Performance evaluation of Pelton and Francis turbine

**CO-PO MAPPING:**

		<b>CO</b>													
		<b>PO1</b> Knowledge of Applied Science in Agricultural Engineering	<b>PO2</b> Knowledge of Basic Engineering	<b>PO3</b> Problem Solving	<b>PO4</b> Field Experimentations	<b>PO5</b> Knowledge of Soil and Water Conservation Engineering	<b>PO6</b> Knowledge of Irrigation and Drainage Engineering	<b>PO7</b> Knowledge of Farm Machinery, equipments and techniques	<b>PO8</b> Knowledge of Process and Food Engineering equipments and techniques	<b>PO9</b> Knowledge of Renewable Energy Engineering	<b>PO10</b> Environment and sustainability	<b>PO11</b> Ethics	<b>PO12</b> Individual and team work	<b>PO13</b> Communication and skill development	<b>PO14</b> Lifelong learning
<b>CO1</b>	know the basic knowledge of Pressure and its measurement, Pascal's law, pressure forces on plane and curved surfaces	3	3	2	1	-	-	3	1						3
<b>CO2</b>	have the knowledge of Types of fluid flow, translation, rotation, circulation and vorticity, Vortex motion.	3	3	2	1	-	-	1	-						3
<b>CO3</b>	Know the Stress-strain relationships, flow between infinite parallel plates	3	3	2	1	-	-	2	-						3
<b>CO4</b>	have the ability to understand Minor and major hydraulic losses through pipes and fittings, flow through network of pipes	3	3	3	1	-	-	2	-						3
<b>CO5</b>	have the basic knowledge for Determination of efficiency of hydraulic ram; Performance evaluation of Pelton and Francis turbine	3	3		1	-	-		-						3
		3: Strong contribution, 2: average contribution, 1: Low contribution													

**COURSE: Theory of Machines**

**COURSE CODE: ME227**

**COURSE OBJECTIVES:**

1. To impart understanding of different types of Mechanisms and its inversion.
2. To analyze the velocity and acceleration of planar mechanisms.
3. To synthesize planar mechanisms based on motion requirements.
4. Understanding of gear drives and analysis of gear trains.
5. Understanding of governors and static and dynamic balancing

**COURSE OUTCOMES (CO):**

*After completion of the course, a student will be able to*

<b>COURSE OUTCOME (CO)</b>	<b>DESCRIPTION</b>
<b>CO1</b>	Ability to identify and analyze the mechanisms required for a particular motion requirement.
<b>CO2</b>	Capability to analyze and synthesize the velocity and acceleration of planar mechanisms.
<b>CO3</b>	Know about gears like helical, spiral, bevel and worm gear. Simple, compound, reverted, and epicyclic trains.  Ability to understand the suitability of different gear drives for motion/power transmission and to analyze different types of gear trains.
<b>CO4</b>	Identify different types of governors and their applications
<b>CO5</b>	Ability to understand the static and dynamic balancing, Balancing of rotating masses in one and different planes, Partial primary balancing of reciprocating masses



CO1	Ability to identify and analyze the mechanisms required for a particular motion requirement.	3	3	2	1	-	-	3	1	3								3
CO2	Capability to analyze and synthesize the velocity and acceleration of planar mechanisms.	3	3	2	1	-	-	1	-	3								3
CO3	Know about gears like helical, spiral, bevel and worm gear. Simple, compound, reverted, and epicyclic trains.  Ability to understand the suitability of different gear drives for motion/power transmission and to analyze different types of gear trains.	3	3	2	1	-	-	2	-	3								3
CO4	Identify different types of governors and their applications	3	3	3	1	-	-	2	-	3								3
CO5	Ability to understand the static and dynamic balancing, Balancing of rotating masses in one and different planes, Partial primary balancing of reciprocating masses	3	3		1	-	-		-	3								3
	3: Strong contribution, 2: average contribution, 1: Low contribution																	

**Course Name: Farm Operation and Maintenance of Tractors and Farm Machinery-II**  
**Course Code: AE245**

**Course Objective:**

1. To expose the student with the Introduction to tractor maintenance procedure and trouble shooting. Scheduled maintenance after 10, 50, 100, 250, 500 and 1000 hrs of operation. Safety hints. Top end overhauling. Overhauling of fuel tank, mechanical fuel Pump, electrical pump, fuel filters, carburetors Testing of fuel pumps for proper functioning.
2. To educate the students about Introduction of fuel saving by idle away, air conditioning, use overdrive, observe the speed limit, tire pressure, reduce weight, regular care and constant speed, preparing the tractor for storage
3. To impart the knowledge about Care and maintenance procedure of agricultural machinery during operation and off-season. Maintenance, Servicing of different types of air cleaner, turbocharger, intercooler, throttle body, intake manifold, exhaust systems, exhaust manifold, catalytic converter, resonator and muffler
4. To impart the knowledge of Maintenance, diagnosis and servicing of basic petrol fuel system components, conventional diesel fuel system and its components, lubrication system
5. To provide knowledge about cooling system and servicing battery maintenance and servicing of starting system, charging system. and conventional ignition system. Repair and maintenance of workshop requirements

**Course Outcome:**

COURSE OUTCOME (CO)	DESCRIPTION
<b>CO1</b>	Student able to know with the Introduction to tractor maintenance procedure and trouble shooting. Scheduled maintenance after 10, 50, 100, 250, 500 and 1000 hrs of operation. Safety hints. Top end overhauling. Overhauling of fuel tank, mechanical fuel Pump, electrical pump, fuel filters, carburetors Testing of fuel pumps for proper functioning
<b>CO2</b>	Have educate the students about Introduction of fuel saving by idle away, air conditioning, use overdrive, observe the speed limit, tire pressure, reduce weight, regular care and constant speed, preparing the tractor for storage
<b>CO3</b>	Have the knowledge about Care and maintenance procedure of agricultural machinery during operation and off-season. Maintenance, Servicing of different types of air cleaner, turbocharger, intercooler, throttle body, intake manifold, exhaust systems, exhaust manifold, catalytic converter, resonator and muffler.
<b>CO4</b>	Have the knowledge of Maintenance, diagnosis and servicing of basic petrol fuel system components, conventional diesel fuel system and its components, lubrication system
<b>CO5</b>	Be able to know about To provide knowledge about cooling system and servicing battery maintenance and servicing of starting system, charging system. and conventional ignition system. Repair and maintenance of workshop requirements

At the completion of the course the student will:

**CO-PO MAPPING:**

		<b>CO</b>													
		PO1. Knowledge of Applied Science in Agricultural Engineering.	PO2. Knowledge of Basic Engineering.	PO3. Problem Solving.	PO4. Field Experimentations.	PO5. Knowledge of Soil and Water Conservation Engineering.	PO6. Knowledge of Irrigation and Drainage Engineering.	PO7. Knowledge of Farm Machinery, equipment and techniques.	PO8. Knowledge of Process and Food Engineering equipment and techniques.	PO9. Knowledge of Renewable Energy Engineering.	PO10. Environment and sustainability.	PO11. ETICS.	PO12. Individual and team work	PO13. Communication and skill development.	PO14. Lifelong learning.
<b>CO1</b>	Student able to know with the Introduction to tractor maintenance procedure and trouble shooting. Scheduled maintenance after 10, 50, 100, 250, 500 and 1000 hrs of operation. Safety hints. Top end overhauling. Overhauling of fuel tank, mechanical fuel Pump, electrical pump, fuel filters, carburetors Testing of fuel pumps for proper functioning	2	1	3	2	-	-	3				1		3	
<b>CO2</b>	Have educate the students about Introduction of fuel saving by idle away, air conditioning, use overdrive, observe the speed limit, tire pressure, reduce weight, regular care and constant speed, preparing the tractor for storage	3	3	2	3	-	-	3				3		2	

CO3	Have the knowledge about Care and maintenance procedure of agricultural machinery during operation and off-season. Maintenance, Servicing of different types of air cleaner, turbocharger, intercooler, throttle body, intake manifold, exhaust systems, exhaust manifold, catalytic converter, resonator and muffler.	3	3	2	3	-	-	3						3	3
CO4	Have the knowledge of Maintenance, diagnosis and servicing of basic petrol fuel system components, conventional diesel fuel system and its components, lubrication system	3	3	3	3	-	-	3						2	3
CO5	Be able to know about To provide knowledge about cooling system and servicing battery maintenance and servicing of starting system, charging system. and conventional ignition system. Repair and maintenance of workshop requirements	3	3	2	2	-	-	3						2	2
3: Strong contribution, 2: average contribution, 1: Low contribution															