

Semester - IV

Sr. No.	Course Name	Course No.	Credit	L	P	T
1	Farm Machinery and Equipment – II	FMP - 202	3 (2 + 1)	2	1	0
Course content :						
Principles & types of cutting mechanisms. Construction & adjustments of shear & impact-type cutting mechanisms. Crop harvesting machinery mowers, windrowers, reapers, reaper binders and forage harvesters. Forage chopping & handling equipment. Threshing mechanics & various types of threshers. Threshers, straw combines & grain combines, maize harvesting & shelling equipment, Root crop harvesting equipment - potato, groundnut etc., Cotton picking & Sugarcane harvesting equipment. Principles of fruit harvesting tools and machines. Horticultural tools and gadgets. Testing of farm machine. Test codes & procedure. Interpretation of test results. Selection and management of farm machines for optimum performance.						
Planning of lectures						
S.No.	Topics to be covered in Lecture					Proposed No. of Lectures
1	Principles and types of cutting mechanisms					2
2	Construction and adjustment of shear and impact type acting mechanisms					2
3	Crop harvesting machinery- mowers, windrowers, reapers, reaper binders and forage harvesters					2
4	Forage chopping and handling equipments					2
5	Threshing mechanics and various types of threshers, straw combines and grain combines					4
6	Maize harvesting and shelling equipment					2
7	Root crop harvesting equipment – potato, groundnut etc.					3
8	Cotton picking and sugar cane harvesting equipment					4
9	Principles of fruit harvesting tools and machines					3
10	Horticultural tools and gadgets					3
11	Testing of farm machines, related test codes and their use, interpretation of test results					3
12	Selection and management of farm machines for optimum performance					2
Total					32	
Practicals						
S.No.	Topic					No. of Practicals
1	Familiarization with various farm machines related to harvesting, threshing, root harvesting and combine etc.					1
2	Study of different cutting mechanism					1
3	Construction and adjustment of shear and impact type cutting mechanism					1
4	Study the working of crop harvesting machines like mower, windrower and reaper					1
5	Study the working of combine harvester					1
6	Study of various thresher and their working					1
7	Study of maize harvesting and shelling equipment					1
8	Study the working of potato digger					1
9	Study the working of groundnut digger					1
10	Study the working of forage harvester					1
11	Study the working of sugarcane harvester					1
12	Study the cotton picker and harvester					1

13	Constructional details of various types of straw combine	2
14	Study of various types of harvesting equipment	1
15	Field testing of farm machines based on test code	1
	Total	16
Reference Books		
<ul style="list-style-type: none"> • Principle of farm machinery ,By: R.A. Kepner, Roy Bainer & E.L. Berger • Farm machines & equipments ,By: C. P. Nakra • Farm machinery & equipment ,By: Smith H.P. & Wilked L.H. • Agricultural Engg. (through worked examples) ,By: R. Lal & A.C. Datta • Farm machine ,By: Claude Cuplin • Elements of Agril. Engg. ,By: J. Sahay • Elements of farm machinery ,By: A.C. Srivastava 		

Sr. No.	Course Name	Course No.	Credit	L	P	T
2	Renewable Energy Sources	RE - 202	3 (2 + 1)	2	1	0
Course content :						
Classification of energy sources; Introduction to renewable energy sources; characterization of biomass; Types, construction, working principle, uses and safety/environmental aspects of different renewable energy devices like gasifiers, biogas plants, solar passive heating devices, photovoltaic cells and arrays; Brief introduction to wind energy, hydroelectric energy, ocean energy, briquetting and baling of biomass, biomass combustion, biodiesel preparation and energy conservation in agriculture						
Planning of lectures						
S.No.	Topics to be covered in Lecture					Proposed No. of Lectures
1	Classification of energy sources					1
2	Introduction to renewable energy sources					1
3	Characterization of biomass					2
4	Types, construction, working principle, uses and safety/ environmental aspects of different renewable energy devices like					3
5	Gasifiers					5
6	Biogas plants					5
7	Solar passive heating devices					5
8	Photovoltaic cells and arrays					2
9	Brief introduction to					
10	Wind Energy					2
11	Hydroelectric energy					1
12	Ocean energy					1
13	Briquetting and baling of biomass					1
14	Biomass combustion					1
15	Biodiesel preparation, and					1
16	Energy conservation in Agriculture					1
	Total					32
Practicals						
S.No.	Topic					No. of Practicals
1	Introduction of various laboratory facilities of SESA					1
2	Preparation of biomass sample					1
3	Determination of calorific value					1
4	Estimation of ash content of biomass					1
5	Estimation of moisture content of biomass					1
6	Estimation of fixed carbon and volatile matter of biomass					1
7	Demonstration of down draft throatless rice husk gasifier					1
8	Demonstration of down draft gasifier with throat					1
9	Demonstration of rice husk gasifier for thermal use					1
10	Demonstration of working of a fixed dome type biogas plants					1
11	Demonstration of working of a floating drum type biogas plants					1
12	Demonstration of biodiesel preparation					1
13	Measurement of basic solar parameters					1
14	Demonstration of solar water heater					1
15	Demonstration of PVC					1
16	Demonstration of solar cooker.					1
17	Determination of fuel properties.					1

	Total	17
Reference Books		
<ul style="list-style-type: none"> • Renewable Energy Power for sustainable future. ,By: Godfrey Boyle. • Energy Technology Non-conventional, Renewable and Conventional ,By: S.S. Rao and B.B. Parulekar, • Handbook of Biomass Downdraft Gasifier Engine System, ,By: Thomas B Reed and Aqua Das. • Small scale producer gas engine systems,,By: A Kaupp & J.R.Goss. • Biogas Systems (Principles & Applications) ,By: K.M. Mittal • Hand book of biogas technology, By: N.S. Grewal, S. Ahluwalia, S. Singh and G. Singh. • Solar Energy Fundamentals and Applications, By: H.P. Garg and J. Prakash • Solar energy, By: S.P. Sukhatme, • Principles of Solar Energy. ,By: D. Yogi Goswami • Renewable Energy, ,By: P.D. Dunn. 		

Sr. No.	Course Name	Course No.	Credit	L	P	T
3	Soil and Water Conservation Engineering	SWE - 202	3 (2 + 1)	2	1	0
<p>Course content : II Introduction; soil erosion - causes, types and agents of soil erosion; water erosion - forms of water erosion, mechanics of erosion; gullies and their classification, stages of gully development; soil loss estimation - universal soil loss equation and modified soil loss equation, determination of their various parameters; erosion control measures - agronomical measures - contour cropping, strip cropping, mulching; mechanical measures - terraces - level and graded broad base terraces and their design, bench terraces & their design, layout procedure, terrace planning, bunds - contour bunds, graded bunds and their design; gully and ravine reclamation - principles of gully control - vegetative and temporary structures; wind erosion - factors affecting wind erosion, mechanics of wind erosion, soil loss estimation, wind erosion control measures - vegetative, mechanical measures, wind breaks & shelter belts, sand dunes stabilization; sedimentation - sedimentation in reservoirs and streams, estimation and measurement, sediment delivery ratio, trap efficiency; characteristics of contours and preparation of contour maps; land use capability classification; grassed water ways and their design; introduction to water harvesting techniques; introduction to stream water quality and pollution.</p>						
Planning of lectures						
S.No.	Topics to be covered in Lecture	Proposed No. of Lectures				
1	Introduction; soil erosion - causes, types and agents of soil erosion.	1				
2	Water erosion - forms of water erosion.	1				
3	Mechanics of erosion.	1				
4	Gullies and their classification, stages of gully development.	1				
5	Soil loss estimation - universal soil loss equation and modified soil loss equation, determination of their various parameters.	2				
6	Erosion control measures, agronomical measures; contour cropping, strip cropping, mulching.	1				
7	Mechanical measures - terraces - level and graded broad base terraces and their design.	2				
8	Bench terraces & their design, layout procedure, terrace planning.	2				
9	Bunds - contour bunds, graded bunds and their design.	3				
10	Gully and ravine reclamation - principles of gully control, vegetative and temporary structures.	3				
11	Wind erosion - factors affecting wind erosion, mechanics of wind erosion.	2				
12	Soil loss estimation.	2				
13	Wind erosion control measures - vegetative, mechanical measures, wind breaks & shelter belts, sand dunes stabilization.	2				
14	Sedimentation - sedimentation in reservoirs and streams estimation and measurement sediment delivery ratio, trap efficiency.	2				
15	Characteristics of contours and preparation of contour maps.	2				
16	Land use capability classification.	2				
17	Grassed water ways and their design.	2				
18	Introduction to water harvesting techniques.	2				
19	Introduction to stream water quality and pollution.	1				

		Total	34
Practicals			
S.No.	Topic	No. of Practicals	
1	Study of soil loss measurement techniques.	1	
2	Study of details of Coshocton wheel	1	
3	Study of details of multi-slot runoff samplers.	1	
4	Determination of sediment concentration through oven dry method.	1	
5	Problems on Universal Soil Loss Equation.	1	
6	Preparation of contour map of an area and its analysis.	2	
7	Design of vegetative waterways.	1	
8	Design of contour bonding system.	2	
9	Design of graded bonding system.	2	
10	Design of various types of bench terracing systems.	2	
11	Determination of rate of sedimentation and storage loss in reservoir.	1	
12	Design of Shelter belts.	1	
13	Design of wind breaks.	1	
		Total	17
Reference Books			
<ul style="list-style-type: none"> • Land and water management; Principles and Practices, By: V V N Murthy • Soil and water Conservation engineering, By: R Suresh 			

Sr. No.	Course Name	Course No.	Credit	L	P	T
4	Irrigation Engineering	SWE - 204	4 (3 + 1)	3	1	0
Course content :						
Irrigation Engineering Irrigation, impact of irrigation on Human Environment, some major and medium irrigation schemes of India, purpose of irrigation, sources of irrigation water, present status of development and utilization of different water resources of the country; Measurement of irrigation water, weir, notches, flumes and orifices and other methods; water conveyance, design of irrigation field channels, underground pipe conveyance system, irrigation structures, channel lining; land grading, different design methods and estimation of earth work and cost; soil water plant relationship, soil water movement, infiltration, evapotranspiration, soil moisture constants, depth of irrigation, frequency of irrigation, irrigation efficiencies; surface irrigation methods of water application, border, check basin, furrow and contour irrigation; sprinkler and drip irrigation method, merits, demerits, selection and design; Participatory irrigation management. Economics of water resources utilization.						
Planning of lectures						
S.No.	Topics to be covered in Lecture					Proposed No. of Lectures
1	Irrigation, impact of irrigation on human environment, some major & medium irrigation schemes in India, purpose of Irrigation, source of irrigation water, present status of Development and utilization of different water resources of country					6
2	Measurement of irrigation water, weir, notches, flumes and orifices and other methods					6
3	Water conveyance, design of irrigation field channel, underground pipe conveyance system, irrigation structures, channel lining					6
4	Land grading, different design methods and estimation of earth work and cost.					4

5	Soil water plant relationship, soil water movement, infiltration, evapotranspiration, soil moisture content, depth of irrigation, frequency of irrigation, efficiency of irrigation	8
6	Surface irrigation methods of water application, border, check basin, furrow and contour irrigation	6
7	Sprinkler and drip irrigation methods, merits , demerits, selection and design	8
8	Participatory irrigation management, economics of water resources utilization	4
Total		48
Practicals		
S.No.	Topic	No. of Practicals
1	Measurement of soil moisture by different soil moisture measuring instruments.	2
2	Measurement of irrigation water	2
3	Measurement of infiltration rate	1
4	Computation of evaporation and transpiration	2
5	Land grading exercises	1
6	Design of under ground pipe line system	1
7	Infiltration-advance in border irrigation	2
8	Measurement of advance and recession in furrow irrigation and estimation of irrigation efficiency.	1
9	Measurement of uniformity coefficient of sprinkler irrigation method	1
10	Measurement of uniformity coefficient of drip irrigation method	1
11	Field problems and remedial measures for sprinkler and drip irrigation method.	2
Total		16
Reference Books		
<ul style="list-style-type: none"> • Irrigation Theory and Practice ,By: A M Michael, • Irrigation Engineering and Hydraulic Structures, By: S K Garg, • Irrigation, water resources and water Power Engineering ,By: P N Modi, • Agricultural Engineering through solved Examples ,By: Radhey Lal, • Land and water management; Principles and Practices ,By: V V N Murthy, • Discharge Measurement Structures ,By: M G Bos, 		

Sr. No.	Course Name	Course No.	Credit	L	P	T
5	Crop Process Engineering	PFE - 202	3 (2 + 1)	2	1	0
Course content :						
Scope and importance of food processing, principles and methods of food processing. Processing of farm crops; cereals, pulses, oil seeds, fruits and vegetables and their products for food and feed. Processing of animal products, Principal of size reduction, grain shape, size reduction machines; crushers, grinders, cutting machines etc. - operation, efficiency and power requirement – Rittinger's, Kick' s and Bond' s equation, fineness modulus. Theory of mixing, types of mixtures for dry and paste. materials, rate of mixing and power requirement, mixing index. Theory of separation, size and un sized separation, types of separators, size of screens, sieve analysis, capacity and effectiveness of screens, pneumatic separation. Theory of filtration, study of different types of filters, rate of filtration, pressure drop during filtration. Scope & importance of material handling devices, study of different types of material handling systems; belt, chain and screw conveyor, bucket elevator, pneumatic conveying, gravity conveyor- design consideration, capacity and power requirement.						
Planning of lectures						
S.No.	Topics to be covered in Lecture					Proposed No. of Lectures
1	Scope and importance of food processing. Principles and methods of food processing.					4
2	Processing of farm crops; cereals, pulses, oil seeds, fruits and vegetables and their products for food and feed.					6
3	Processing of animal products.					3
4	Principal of size reduction, grain shape. Size reduction machines; crushers, grinders, cutting machines etc. - operation, efficiency and power requirement – Rittinger's, Kick's and Bond's equation, fineness modulus.					4
5	Theory of mixing, types of mixtures for dry and paste. materials, rate of mixing and power requirement, mixing index.					4
6	Theory of separation, size and un sized separation, types of separators, size of screens, sieve analysis, capacity and effectiveness of screens, pneumatic separation.					6
7	Theory of filtration, study of different types of filters, rate of filtration, pressure drop during filtration.					4
8	Scope & importance of material handling devices, study of different types of material handling systems; belt, chain and screw conveyor, bucket elevator, pneumatic conveying, gravity conveyor- design consideration, capacity and power requirement.					5
Total					36	
Practicals						
S.No.	Topic					No. of Practicals
1	Preparation of flow and layout charts of a food processing plant.					2
2	Determination of fineness modulus and uniformity index.					1
3	Performance evaluation of hammer mill.					1
4	Performance evaluation of attrition mill.					1
5	Study of cleaning equipment.					1
6	Separation behaviour in pneumatic separation.					1
7	Study of grading equipment.					2
8	Evaluation of performance of indented cylinder and screen pre-cleaner.					2

9	Mixing index and study of mixers.	1
10	Study of conveying equipments.	2
11	Performance evaluation of bucket elevator.	1
	Total	15
Reference Books		
<ul style="list-style-type: none"> • Unit operations of Agricultural Processing By: Sahay, K. M. & K.K. Singh. • Post harvest technology of cereals, pulses and oilseeds. ,By: Chakraverty, A. • Agricultural process engineering. By: Henderson, S. M. and R. L. Perry. • Unit operations of chemical engineering. ,By: McCabe, W. L. J.C. Smith and Peter Harriott. • The fundamental of food engineering By: Charm, S. E.. 		

Sr. No.	Course Name	Course No.	Credit	L	P	T
6	Theory of Machines	FMP - 204	3 (2 + 1)	2	1	0
<p>Course content : Elements, links, pairs, kinematics chain, and mechanisms. Classification of pairs and mechanisms. Lower and higher pairs. Four bar chain, slider crank chain and their inversions. Determination of velocity and acceleration using graphical (relative velocity and acceleration) method. Instantaneous centers. Types of gears. Law of gearing, velocity of sliding between two teeth in mesh. Involute and cycloidal profile for gear teeth. Spur gear, nomenclature, interference and undercutting. Introduction to helical, spiral, bevel and worm gear. Simple, compound, reverted, and epicyclic trains. Determining velocity ratio by tabular method. Turning moment diagrams, co-efficient of fluctuation of speed and energy, weight of flywheel, flywheel applications. Belt drives, types of drives, belt materials. Length of belt, power transmitted, velocity ratio, belt size for flat and V belts. Effect of centrifugal tension, creep and slip on power transmission, Chain drives. Types of friction, laws of dry friction. Friction of pivots and collars. Single disc, multiple disc, and cone clutches. Rolling friction, anti friction bearings. Types of governors. constructional details and analysis of Watt, Porter, Proell governors. Effect of friction, controlling force curves. Sensitiveness, stability, hunting, isochronism, power and effort of a governor. Static and dynamic balancing. Balancing of rotating masses in one and different planes. Partial primary balancing of reciprocating measures.</p>						
Planning of lectures						
S.No.	Topics to be covered in Lecture					Proposed No. of Lectures
1	Introduction to elements, links, pairs, kinematic chain and mechanism. Classification of pairs, mechanism and their inversion					3
2	Determination of velocity and acceleration using graphical method and instantaneous centers					4
3	Types of gears and law of gearing, involutes and cycloidal profile for gear teeth, spur gear nomenclature, introduction to helical, spiral, bevel and worm gear, simple, compound, reverted and epicyclic train					4
4	Determination of velocity ratio by tubular method, turning moment diagram, coefficient of fluctuation of speed and energy, fly wheel and its application					3
5	Types of belt drives, belt mechanism, belt materials, length of belts, power transmitted, velocity ratio, effect of centrifugal tension, creep and slip, chain drive					4
6	Types of friction, law of dry friction, friction of pivots and collars					2
7	Single disc, multiple disc and cone clutches, rolling friction and antifriction bearing					3
8	Types of governors, constructional details and analysis of watt, porter, proell governors					2
9	Effect of friction, controlling force curve, sensitiveness, stability, hunting, isochronisms, power and effect of governors					3
10	Static and dynamic balancing, balancing of rotating mass in one and different planes					2
11	Partial primary balancing of reciprocating masses					2
Total					32	
Practicals						
S.No.	Topic					No. of Practicals

1	Study and demonstration of different kinematic mechanism	2
2	Analysis of 4-bar mechanism and its inversions	1
3	Graphical solution of velocity diagram of Practical linkage mechanism.	2
4	Graphical solution of Acceleration diagram of Practical linkage mechanism.	2
5	Design and drawing of spur gear train	1
6	Design and drawing of epicyclic gear train	1
7	Study of cam and follower, its Practical utility	2
8	Study and demonstration of flywheel and governor	1
9	Study and demonstration of static and dynamic balancing.	2
	Total	14

Reference Books

- Theory of Machine ,By: R.S. Kurmi & Gupta
- Theory of Machine ,By: B. L. Ballani
- Theory of Machine ,By: Green
- Engg. Dynamics ,By: Thomas J.M.

Sr. No.	Course Name	Course No.	Credit	L	P	T
7	Heat and Mass Transfer	PFE - 204	2 (2 + 0)	2	0	0
Course content :						
Introductory concepts, modes of heat transfer, thermal conductivity of materials, measurement. General differential equation of conduction. One dimensional steady state conduction through plane and composite walls, tubes and spheres with and without heat generation. Electrical analogy. Insulation materials, critical thickness of insulation. Fins, Free and forced convection. Newton' s law of cooling, heat transfer coefficient in convection. Dimensional analysis of free and forced convection. Useful non dimensional numbers and empirical relationships for free and forced convection. Equation of laminar boundary layer on flat plate and in a tube. Laminar forced convection on a flat plate and in a tube. Combined free and forced convection. Introduction. Absorptivity, reflectivity and transmissivity of radiation. Black body and monochromatic radiation, Planck' s law, Stefan-Boltzman law, Kirchoff' s law, grey bodies and emissive power, solid angle, intensity of radiation. Radiation exchange between black surfaces, geometric configuration factor. Heat transfer analysis involving conduction, convection and radiation by networks. Types of heat exchangers, fouling factor, log mean temperature difference, heat exchanger performance, transfer units. Heat exchanger analysis restricted to parallel and counter flow heat exchangers. Steady state molecular diffusion in fluids at rest and in laminar flow, Flick' s law, mass transfer coefficients. Reynold' s analogy.						
Planning of lectures						
S.No.	Topics to be covered in Lecture					Proposed No. of Lectures
1	Introductory concepts, modes of heat transfer.					2
2	Thermal conductivity of materials, measurement. General differential equation of conduction. One dimensional steady state conduction through plane and composite walls, tubes and spheres with and without heat generation. Electrical analogy.					4
3	Insulation materials, critical thickness of insulation.					2
3	Fins.					2
4	Free and forced convection. Newton' s law of cooling, heat transfer coefficient in convection.					3
5	Dimensional analysis of free and forced convection.					
6	Useful non dimensional numbers and empirical relationships for free and forced convection.					2
7	Equation of laminar boundary layer on flat plate and in a tube.					2
8	Laminar forced convection on a flat plate and in a tube.					1
9	Combined free and forced convection.					1
10	Introduction Absorptivity, reflectivity and transmissivity of radiation. Black body and monochromatic radiation, Planck' s law, Stefan-Boltzman law, Kirchoff' s law, grey bodies and emissive power, solid angle, intensity of radiation.					3
11	Radiation exchange between black surfaces, geometric configuration factor.					1
12	Heat transfer analysis involving conduction, convection and radiation by networks					2
13	Types of heat exchangers, fouling factor, log mean temperature difference, heat exchanger performance, transfer units.					4
14	Heat exchanger analysis restricted to parallel and counter flow heat exchangers.					2
15	Steady state molecular diffusion in fluids at rest and in laminar flow, Flick' s law, mass transfer coefficients. Reynold' s analogy.					3

	Total	34
Reference Books		
<ul style="list-style-type: none"> • Heat transfer, By: Holman, J. P. • Process Heat Transfer ,By: Kern. • Heat Transfer ,By: Pitts and Sissom (1983). • Heat and Mass Transfer ,By: Eckert E.R.G. and Drake, R.M. (1972).. • Mass Transfer operations By: Treybal, R.E. (1981). • Fundamentals of Engineering heat transfer By: Sachdeva (1986). • Introduction to Heat Transfer. ,By: Incropera, F.P. (2001). • Convective Heat Transfer. ,By: Bejan, A. (1994). • Radiation Heat Transfer., By: Sparrow, E.M. and Cess, R.D. (1978). 		

Sr. No.	Course Name	Course No.	Credit	L	P	T
8	Database Management and Internet	PFE - 206	2 (0 + 2)	0	2	0
Course content :						
Basic database concepts, introduction to RDBMS, SQL Commands, Data constraints, Joins, set operations, working with forms, Basics of HTML, developing web pages using meta tags, dynamic pages using Java scripts, connectivity with RDBMS, Project. Basic database concepts; Introduction to RDBMS; SQL Commands DDL, DML; Select command, Joins and functions; Group functions, Set functions; Working with Forms; Basic of HTML; Development of Web pages using meta tags; Dynamic pages using Java Scripts; Connectivity of Web pages with databases; Project.						
Practicals						
S.No.	Topic					No. of Practicals
1	Basic Database Concepts					2
2	Introduction to RDBMS					2
3	SQL Commands DDL, DML					2
4	Select Command, Joins and functions					3
5	Group functions, Set functions					3
6	Working with Forms					2
7	Basic of HTML					2
8	Development of Web pages using meta tags.					3
9	Dynamic pages using Java Scripts					2
10	Connectivity of Web pages with databases					2
11	Project.					7
Total					30	
Reference Books						
<ul style="list-style-type: none"> • Commercial application Development ,By: Ivan Bayross • SQL / PL SQL ,By: Ivan Bayross • Absolute beginner's Guide to Creating Web Pages ,By: Todd Stauffer • Java Scripts & DHTML Cookbook ,By: Danny Goodman • Dynamic Web Forms Professional Projects ,By: Dan Ransom 						

Sr. No.	Course Name	Course No.	Credit	L	P	T
9	Field Operation and Maintenance of Tractors and Farm Machinery - I	FMP-206	1 (0 + 1)	0	1	0
Course content :						
Introduction to various systems of a tractor viz. fuel, lubrication, cooling, electrical, transmission, hydraulic & final drive system. Familiarization with tractor controls & learning procedure of tractor starting and stopping. Driving in forward and reverse gears. Driving safety rules. Hitching, adjustments, settings and field operation of farm machinery. Familiarization with different makes & models of 4- wheeled tractors. Starting & stopping practice of the tractor. Familiarization with instrumentation panel & controls; Road signs, traffic rules, road safety, driving & parking of tractor; Tractor driving practice forward & reverse driving practice; Tractor driving practice with two wheeled tractor trailer forward & reverse; Study and practicing the hitching and dehitching of implements; Study operation and field adjustments of m.b. plough & disk plough; Field operation of trailing & mounted disk harrow; Field operation and adjustments of seed drill/planter/sprayer.						
Only practicals are in the course						
Practicals						
S.No.	Topic					No. of Practical
1	Introduction to fuel system					1
2	Introduction to lubrication system					1
3	Introduction to Cooling system					1
4	Introduction to electrical system					1
5	Introduction to transmission system					1
6	Introduction to hydraulic system and final drive					2
7	Familiarization with tractor controls , starting stopping etc.					2
8	Driving of tractors (forward and reverse)					2
9	Hitching system, setting and field operation of farm machinery					3
10	Familiarization with different makes and models of tractors available					1
11	Hitching and operation of M.B. plough adjustment					1
12	Hitching and operation of trailing and mounted disc harrow					1
13	Field operation and adjustments of seed drills, planter, sprayers					3
Total					15	
Reference Books						
<ul style="list-style-type: none"> • Elements of Agril. Engg. ,By: J. Sahay • A course in Industrial safety , By: K.U. Mistry • Farm machines and equipment , By: C.P. Nakra 						