SYLLABUS

B. Voc/ B. Voc (Hons)

Farm Equipments Operation and Maintenance Programme

(Effect From July 2024)

DEEN DAYAL UPADHYAY – KAUSHAL KENDRA

THE GANDHIGRAM RURAL INSTITUTE

(DEEMED TO BE UNIVERSITY)

GANDHIGRAM – 624 302, DINDIGUL DISTRICT,

TAMIL NADU.

Semester – wise Credit Distribution with Scheme of Evaluation for **B. Voc / B. Voc (Hons) - Farm Equipments Operation & Maintenance Programme**
(Effect from July 2024)

I SEMESTER									
NSQF Level:4.0 /NCrF Level:4.5			**JOB ROLE: Agriculture Machinery Operator**						
Category	**NEP-Nomenclature**	**Course Code**	**Title of Course**	**Credits**	**No. of. Contact hours per week**		**Marks Distribution**		
					Theory	**Practical**	**MSE**	**ESE**	**Total**
General Education Components	Major -1	24FEVC1101	Principles of Agriculture	04	04	-	40	60	100
	Major – 2	24FEVC1102	Work Shop Calculation and Science - I	03	03	-	40	60	100
	Ability enhancement course – 1	24ENVA1101	Essential English : Basic	03	03	-	40	60	100
	Value added course -1	24PEUV0001	Yoga and Fitness	02	02	-	50	-	50
			Total (GEC)	**12**	-	-	-	-	-
Skill Components	Major- 3	24FEVC1103	Operational Safety &Health Education in Farm Machineries.	02	-	02	20	30	50
	Major- 4	24FEVC1104	Selection and Operation of Farm Machineries	03	-	03	60	40	100
	Major- 5	24FEVC1105	Basic Workshop	03	-	03	60	40	100
	Major- 6	24FEVC1106	Engineering Drawing -I	03	-	03	60	40	100
	Major- 7	24FEVC1107	Operation and Maintenance of Power Tiller	03	-	03	60	40	100
	OJT – 1	24FEVC1108	Internship – I	04	-	04	-	100	100
			Total (SC)	**18**	-	-	-	-	-
			Total (GEC+SC) Credits	**30**	-	-	**Total Marks**		**900**

II SEMESTER									
NSQF Level:4.0 /NCrF Level: 4.5			**JOB ROLE: Agriculture Machinery Mechanic**						
Category	**NEP-Nomenclature**	**Course Code**	**Title of Course**	**Credits**	**No. of. Contact hours per week**		**Marks Distribution**		
					Theory	**Practical**	**MSE**	**ESE**	**Total**
General Education Components	Major- 8	24FEVC1201	Workshop Calculation and Science - II	03	03	-	40	60	100
	Ability enhancement course - 2	24ENVA1201	Essential English : Intermediate	03	03	-	40	60	100
	Value added course - 2	24FEVC1202	Environmental Studies	04	04	-	40	60	100
	Value added course - 3	24GTPIV1001	Let Us Know Gandhi	02	02	-	20	30	50
			Total (GEC)	**12**	-	-	-	-	-
Skill Components	Major- 9	24FEVC1203	Personality Development	03	-	03	60	40	100
	Major – 10	24FEVC1204	Servicing and Maintenance of Farm Machineries	04	-	04	60	40	100
	Major- 11	24FEVC1205	Engineering Drawing -II	03	-	03	60	40	100
	Multi Disciplinary – 1	24CSVI1201	Digital Marketing	03	-	03	60	40	100
	OJT – 2	24FEVC1206	Internship – II	05	-	05	-	100	100
			Total (SC)	**18**	-	-	-	-	-
			Total (GEC+SC) Credits	**30**	-	-	**Total Marks**		**850**

III SEMESTER									
NSQF Level:4.5 /NCrF Level: 5.0			**JOB ROLE: Tractor Operator**						
Category	**NEP-Nomenclature**	**Course Code**	**Title of Course**	**Credits**	**No. of. Contact hours per week**		**Marks Distribution**		
					Theory	**Practical**	**MSE**	**ESE**	**Total**
General Education Components	Major – 12	24FEVC2301	Tractor Engine Systems	04	04	-	40	60	100
	Major – 13	24FEVC2302	Economics of Farm Management	04	04	-	40	60	100
	Major- 14	24FEVC2303	Agriculture and Rural Marketing	04	04	-	40	60	100
			Total (GEC)	**12**	-	-	-	-	-
Skill Components	Major – 15	24FEVC2304	Business Communication	03	-	03	60	40	100
	Major – 16	24FEVC2305	Engineering Survey	03	-	03	60	40	100
	Major – 17	24FEVC2306	Tractor Operation and Safety Measures	04	-	04	60	40	100
	Major – 18	24FEVC2307	Operation and Maintenance of Micro Irrigation System	03	-	03	60	40	100
	OJT – 3	24FEVC2308	Internship – III	05	-	05	-	100	100
			Total (SC)	**18**	-	-	-	-	-
			Total (GEC+SC) Credits	**30**	-	-	**Total Marks**		**800**

IV SEMESTER									
NSQF Level : 4.5 / NCrF Level : 5.0			**JOB ROLE: Tractor Mechanic**						
Category	**NEP-Nomenclature**	**Course Code**	**Title of Course**	**Credits**	**No. of. Contact hours per week**		**Marks Distribution**		
					Theory	**Practical**	**MSE**	**ESE**	**Total**
General Education Components	Major – 19	24FEVC2401	Tractor Transmission and Hydraulic Systems.	04	04	-	40	60	100
	Major – 20	24FEVC2402	Safety Operation of Agricultural Machineries.	04	04	-	40	60	100
	Major- 21	24FEVC2403	Entrepreneurship Development	04	04	-	40	60	100
			Total (GEC)	**12**	-	-	-	-	-
Skill Components	Major -22	24FEVC2404	Repair and Overhauling of Engine and Tractor System	04	-	04	60	40	100
	Major – 23	24FEVC2405	Service and Maintenance of Electrical& Control Board System	03	-	03	60	40	100
	Major – 24	24FEVC2406	Operation and Maintenance of Sowing Machineries of Field Crop	03	-	03	60	40	100
	Major – 25	24FEVC2407	Operation And Maintenance of Paddy Harvesters	03	-	03	60	40	100
	OJT – 4	24FEVC2408	Internship – IV	05	-	05	-	100	100
			Total (SC)	**18**	-	-	-	-	-
			Total (GEC+SC) Credits	**30**	-	-	**Total Marks**		**800**

V SEMESTER									
NSQF Level : 5.0 /NCrF Level: 5.5			**JOB ROLE: Agriculture Machinery Technician**						
Category	**NEP-Nomenclature**	**Course Code**	**Title of Course**	**Credits**	**No. of. Contact hours per week**		**Marks Distribution**		
					Theory	**Practical**	**MSE**	**ESE**	**Total**
General Education Components	Major – 26	24FEVC3501	Post Harvesting Equipments	04	04	-	40	60	100
	Major – 27	24FEVC3502	Renewable Energy Appliances	04	04	-	40	60	100
	Major – 28	24FEVC3503	Basics of Accounting	04	04	-	40	60	100
			Total (GEC)	**12**	-	-	-	-	-
Skill Components	Major – 29	24FEVC3504	Operation and Maintenance of Electric Motor and Pumps	04	-	03	60	40	100
	Major – 30	24FEVC3505	Operation and Maintenance of Field Crop Harvester	04	-	03	60	40	100
	Major – 31	24FEVC3506	Agro Based Entrepreneurship Activities	05	-	04	60	40	100
	OJT – 5	24FEVC3507	Internship – V	05	-	05	-	100	100
			Total (SC)	**18**	-	-	-	-	-
			Total (GEC+SC) Credits	**30**	-	-	**Total Marks**		**800**

VI SEMESTER									
NSQF Level : 5.0 /NCrF Level: 5.5			**JOB ROLE: Agriculture Machinery Entrepreneur**						
Category	**NEP-Nomenclature**	**Course Code**	**Title of Course**	**Credits**	**No. of. Contact hours per week**		**Marks Distribution**		
					Theory	**Practical**	**MSE**	**ESE**	**Total**
General Education Components	Major – 32	24FEVC3601	Agribusiness and Project Management	04	04	-	40	60	100
	Major – 33	24FEVC3602	Financing Sources of Agri Business	04	04	-	40	60	100
	Major – 34	24FEVC3603	Function and Management of Custom Hiring Center	04	04	-	40	60	100
			Total (GEC)	**12**	-	-	-	-	-
Skill Components	Major – 35	24FEVC3604	Function and Management of Agro Service Center	04	-	04	60	40	100
	Major – 36	24FEVC3605	Operation and Maintenance of Combine Harvester for Paddy	04	-	04	60	40	100
	Major – 37	24FEVC3606	Mini Project	05	-	05	-	100	100
	OJT – 6	24FEVC3607	Internship – VI	05	-	05	-	100	100
			Total (SC)	**18**	-	-	-	-	-
			Total (GEC+SC) Credits	**30**	-	-	**Total Marks**		**700**

B. Voc (Hons)

Specialisation- I (Identification of Different Sectors & Activities in Farm Machineries)

Title of Courses: 1. Research Methodology with subject code as (**24FEVC4701) &**
2. Internship – VII with subject code as (**24FEVE4706)** will be same for the three Specialisation*****

VII SEMESTER									
NSQF Level : 5.5 / NCrF Level: 6.0			**JOB ROLE: Farm Machinery Agriculturist**						
Category	**NEP-Nomenclature**	**Course Code**	**Title of Course**	**Credits**	**No. of. Contact hours per week**		**Marks Distribution**		
					Theory	**Practical**	**MSE**	**ESE**	**Total**
General Education Components	Major – 38	24FEVC4701	Research Methodology *****	04	04	-	40	60	100
	Major – 39	24FEVC4702	Applied Instrumentation in Farm Machinery	04	04	-	40	60	100
	Major – 40	24FEVC4703	Fundamentals of Agricultural Extension	04	04	-	40	60	100
			Total (GEC)	**12**	-	-	-	-	-
Skill Components	Major – 41	24FEVC4704	Machinery for Horticulture and Protected Agriculture	06	-	05	60	40	100
	Major – 42	24FEVC4705	Land Grading and Heavy Earth Moving Machinery	06	-	05	60	40	100
	OJT – 7	24FEVC4706	Internship – VII*****	06	-	05	60	40	100
			Total (SC)	**18**	-	-	-	-	-
			Total (GEC+SC) Credits	**30**	-	-	**Total Marks**		**700**

Specialisation- II (Designing and Manufacturing of Agricultural Machineries)

VII SEMESTER									
NSQF Level:5.5 / NCrF Level: 6.0			**JOB ROLE: Operations and Management of Farm Workshop**						
Category	**NEP-Nomenclature**	**Course Code**	**Title of Course**	**Credits**	**No. of. Contact hours per week**		**Marks Distribution**		
					Theory	**Practical**	**MSE**	**ESE**	**Total**
General Education Components	Major – 38	24FEVC4701	Research Methodology *	04	04	-	40	60	100
	Major – 39	24FEVC4707	Advanced Internal Combustion Engines	04	04	-	40	60	100
	Major – 40	24FEVC4708	Machine Design	04	04	-	40	60	100
			Total (GEC)	**12**	-	-	-	-	-
Skill Components	Major – 41	24FEVC4709	Design of Farm Power and Machinery Systems	06	-	05	60	40	100
	Major – 42	24FEVC4710	Testing and Evaluation of Tractor and Farm Equipment	06	-	05	60	40	100
	OJT – 7	24FEVC4706	Internship – VII*	06	-	05	60	40	100
			Total (SC)	**18**	-	-	-	-	-
			Total (GEC+SC) Credits	**30**	-	-	**Total Marks**		**700**

Specialisation- III (Marketing& Financing of Agricultural Machineries)

VII SEMESTER									
NSQF Level:5.5 / NCrF Level: 6.0			**JOB ROLE: Management of Record Maintenance, Review& Audit Process**						
Category	**NEP-Nomenclature**	**Course Code**	**Title of Course**	**Credits**	**No. of. Contact hours per week**		**Marks Distribution**		
					Theory	**Practical**	**MSE**	**ESE**	**Total**
General Education Components	Major – 38	24FEVC4701	Research Methodology *	04	04	-	40	60	100
	Major – 39	24FEVC4711	Agri Logistics and Supply Chain Management	04	04	-	40	60	100
	Major – 40	24FEVC4712	Agricultural Finance & Co-Operation	04	04	-	40	60	100
			Total (GEC)	**12**	-	-	-	-	-
Skill Components	Major – 41	24FEVC4713	Agricultural Input Marketing	06	-	05	60	40	100
	Major – 42	24FEVC4714	Agri Import & Export Management	06	-	05	60	40	100
	OJT – 7	24FEVC4706	Internship – VII *	06	-	05	60	40	100
			Total (SC)	**18**	-	-	-	-	-
			Total (GEC+SC) Credits	**30**	-	-	**Total Marks**		**700**

VIII SEMESTER									
NSQF Level : 6.0 / NCrF Level: 6.5									
Category	**NEP-Nomenclature**	**Course Code**	**Title of Course**	**Credits**	**No. of. Contact hours per week**		**Marks Distribution**		
					Theory	**Practical**	**MSE**	**ESE**	**Total**
Skill Components	Major – 43	24FEVC4801	Major project	15	-	15	-	100	100
	OJT – 8	24FEVC4802	Internship – VIII	10	-	10	-	100	100
	Major – 44	24FEVC4803	Technical Seminar	05	-	05	-	100	100
			Total (SC) Credits	**30**	-	-	**Total Marks**		**300**

Multidisciplinary Courses for Interdepartmental Level									
Semester	**NEP-Nomenclature**	**Course Code**	**Title of Course**	**Credits**	**No. of. Contact hours per week**		**Marks Distribution**		
					Theory	**Practical**	**MSE**	**ESE**	**Total**
I	Multi Disciplinary – 1	24FEVM1101	Engineering Workshop Practices	02	-	02	50	--	50
		24FEVM1102	Selection & Operation of Tillage Implements	02	-	02	50	--	50
		24FEVM1103	Selection & Operation of Sowing & Weeding Machineries.	02	-	02	50	--	50
II	Multi Disciplinary – 2	24FEVM1201	Selection &Operation of Plant Protection Equipments	02	-	02	50	--	50
		24FEVM1202	Selection and Operation of Horticulture Tools & Harvesting Machineries	02	-	02	50	--	50
		24FEVM1203	Power Tiller Operating Skills	02	-	02	50	--	50
III	Multi Disciplinary – 3	24FEVM2301	Micro Irrigation Systems	02	-	02	50	--	50
		24FEVM2302	Tractor Driving Skills	02	-	02	50	--	50
		24FEVM2303	Record Maintenance	02	-	02	50	--	50

SEMESTER - I

NSQF Level	**: 4.0**
NCrF Level	**: 4.5**
Job Role / Qualification Pack	**: Agricultural Machinery Operator**
Award / Exit Option	**: Certificate in Farm Equipments Operation & Maintenance**

24FEVC1101 - PRINCIPLES OF AGRICULTURE (4 credits)

OBJECTIVES:

- To understand different types of soils and climate suitable for raising different agricultural crops.
- To understand different agricultural practices and the recommendations of inputs for raising the crops.

UNIT–1: Introduction to Agriculture**:** Agriculture – art, science and business – branches of agriculture scope of agriculture in India and Tamil Nadu –History of agricultural development – development of scientific agriculture in world. National and International Institutions / Centers on agriculture research – Agronomy - definition and relationship with other disciplines.

UNIT–2: Soil Properties and Management: Physical Properties of Soils; Physical properties of soils-texture-mechanical components and structure. Soil pH – Problem soils their reclamation and management.

UNIT–3: Crop Adaptation and Distribution**:** Agronomic classification of crops–Their economic importance–major crops of India and Tamil Nadu–adaptation and distribution. Factors affecting crop distribution and production. Soils and agriculture seasons of India and Tamil Nadu.

UNIT–4: Farming Systems: Systems of farming – wet, irrigated, dry and rain fed farming. Factors governing choice of crops and varieties. Intensive cropping – crop rotation – advantages. Integrated Farming System (IFS) – organic farming – Natural farming – Eco-friendly agriculture and conservation agriculture –LESIA.

UNIT–5: Basics of Agricultural Operations**:** Tillage, Sowing, Irrigation, Weeding, Plant protection, Fertilizer application, Harvesting, Threshing, Drying and storage – its importance.

REFERENCES:

1. Balasubramaniyan, P and SP. Palaniappan. 2002. Principles and Practices of Agronomy, Agrobios (India), Jodhpur.
2. Dahama.A.K. 1996. Organic farming for sustainable Agriculture. Agro Botanical Publishers (India), Bikaner.
3. Gopal Chandra De. 1997. Fundamentals of Agronomy. Oxford and IBH Publishing Co.Pvt.Ltd., New Delhi.
4. ICAR. 1996. Handbook of agriculture. Indian Council of Agriculture Research, New Delhi.
5. Reddy. S.R. 1999. Principles of Agronomy. Kalyani publishers, New Delhi.
6. Somasundaram, E and A. Arokiaraj. 2002. Text book on Principles of Agronomy. Crystal Printers, Tiruchirappalli, Tamil Nadu.

LEARNING OUTCOME:

- Students learn about different types of soils and climate suitable for raising different agricultural crops.
- Students learn about different agricultural practices and the recommendations of inputs for raising the crops.

24FEVC1102 - WORKSHOP CALCULATION AND SCIENCE – I (3 credits)

OBJECTIVE:

- To understand basic engineering mechanics for understanding agricultural machinery working principles.

UNIT–1: Machine – definition, farm machines – mechanical advantage, efficiency of the machine and velocity ratio – definition and calculation

UNIT–2: Motion - rotary motion; velocity – uniform velocity and variable velocity; acceleration –laws of motion – calculations

UNIT–3: Force **–** definition, types of force, Mass, weight, density, volume, Equilibrium, Pressure, Pressure in hydraulic systems, Hooke's law, and Practical applications.

UNIT–4: Work - energy, power– Definition and calculation of Work, Power and Work done torque, Conservation of energy, Energy equation, Kinetic energy.

UNIT–5: Engine power – terminology – bore, stroke, stroke bore ratio, swept volume, compression ratio; power – friction power, indicated power, brake power, belt power, drawbar power, power take-off power – definition; measurement of engine power by using dynamometer – determination of specific fuel consumption, mechanical efficiency and thermal efficiency.

REFERENCES:

1. O.P. Singhal, 1998. Agricultural Engineering, Aman Publishing House, Merut (UP)
2. Sreevastave, A.C., 1990. Elements of Farm Machinery, Oxford and IBH Publication Co., New Delhi.
3. Senthilkumar, T., R. Kavitha and V.M.Duraisamy 2015. A Text Book of Farm Machinery**,** Thannambikkai Publications, Coimbatore. ISBN: 978-9381102305
4. Jagadishwar Sahay, 2010. Elements of Agricultural Engineering**.** Standard Publishers Distributors, New Delhi. ISBN: 978 – 818040440
5. Workshop Calculation and Science 2015 published by National Instructional Media Institute, Directorate General of Employment & Training, Chennai.

LEARNING OUTCOME:

- Students will learn basic engineering mechanics for understanding agricultural machinery working principles.

24ENUA1101/24ENIA1101/24ENVA1101
ESSENTIAL ENGLISH: BASIC
(3 Credits/3 Hours per week)

Objectives:

This course aims

- to introduce the students to the basics of functional English Grammar for everyday use.
- to provide them opportunities to improve their essential language skills in English through practice in all language skills.
- to facilitate usage of the English language in everyday circumstances.

Unit I: Grammar

- Nouns & Pronouns
- Adjectives & Determiners
- Verbs and Tenses
- Auxiliary Verbs

Unit II: Oral Communication

- Listening Skills
    i. Descriptions
    ii. Story Narrations
    iii. Short Speeches
- Speaking Skills
    i. Descriptions
    ii. Conversation Techniques

Unit III: Reading & Vocabulary

- Reading comprehension passages
- Vocabulary building

Unit IV: Writing Skills

- Paragraph writing
- Note making
- Short Narratives

Unit V: English in Everyday Use Reading Aloud

- Face to Face Conversation
- Telephone Conversation

Textbook:

Textbook/Course Material - Prepared by the School of English & Foreign Languages.

Reference Book:

Sargeant, Howard. Basic English Grammar Book 2. Irvine: Saddleback, 2007. Print.

YOGA &FITNESS (2 credits)

Semester	**I/II/III/IV**	**CourseCode**	**24PEUV0001**
CourseTitle	**YogaandFitness**		
No.ofCredits	**0+2**	**No.ofContacthoursperweek**	**2**
NewCourse/RevisedCourse	**NewCourse**	**PercentageofRevisioneffected**	**--**
Category	**Creditcourse**		
ScopeoftheCourse	**Value-AddedCoursesimpartingtransferableandlifeskills**		
CognitiveLevelsaddressedbytheCourse	**K-1&K-2**		
CourseObjectives	**TheCourseaimsto** gainthepracticalknowledgeaboutHealthandFitnessthroughYogicPracticesandPhysicalactivities.		

Unit	Content	NoofHours
I	**IntroductionandScopeofYoga:**AstangaYoga-Yogaasanidealsystemofphysicalculture–SchoolsofYoga-DifferencebetweenpracticeofAsanasandPhysicalExercise-LooseningExercisesinyoga–Suryanamaskar.	**5**
II	**Asana&Practice:**MeditativeAsana:Sukhasana–Padmasana–Vajrasana–StandingAsana:Tadasana–Trikonasana–Vrikshasana–SittingAsana:Baddhakonasana–Paschimottanasana–Ustrasana–Vakrasana–Gomukhasana–ProneAsana:–Bhujangasana–Shalabhasana–Dhanurasana-SupineAsana:Pavanamuktasana–Sethubandasana–Navasana	**7**
III	**PracticesofPranayama,Bandhas,MudrasandKriya:**SectionalBreathing-Nadisuddhi–Bhramari–Bhastrika-Kapalabhati–IntroductiontoBandhas–Mudras–Dharana(Trataka)–Dhyana–Mindfulness–IntroductiontoJalaneti–InstantRelaxationTechnique(IRT)	**5**
IV	**ConceptofFitness&Recreation**:Healthrelatedfitness components-BMI-Underweight–Obesity-waist-to-hipratio(WHR)andMinorgames.	**7**
V	**FitnessParameters:**IsometricStrength:Push-up/wallpush-Plank–Wallsit-Medicineballexercises.Shortsprints–4X100metersBriskWalking-RepeatedJumps–Sidewardandbackwardrunfor4X100meters-10metersShuttleRun–4X50metersRopeSkipping-6minuteWalk-3-4Kmsofbriskwalk/3500steps-IntroductiontoYo–Yointermittentrecovery(Level-1)test.	**8**

References	**TextBooks:** 1. IyengarB.K.S.(2000).LightonYoga.HarpineCollinsPublication,NewDelhi. 2. JamesR.Morrow,Jr.,AllenW.Jackson,JamesG.DischandDale.P.Mood.(2000).MeasurementandEvaluationinHumanPerformance,(2ED).ChampaignIllinois:HumanKineticsPublishersInc. 3. LeeE.Brown,VanceFerrigno,JuanCarlosSantana.(2000).Trainingforspeed,AgilityandQuickness.ChampaignIllinois:HumanKineticsPublishersInc. 4. NagarathnamHR.andHRNagendra.(2015).Promotionofpositivehealth.swamivivekanandhayogaprakashana,Banglore. 5. SwamiKuvalayananda.(2000).Pranayama.KaivalyadhamaLonavla,India. 6. SwamiSatyanandaSaraswati.(2008).AsanaPranayamaMudra,Bandha(IVRevisedEdition):BiharSchoolofYoga.Munger,India. 7. ThomasR.Baechle.(1994).EssentialsofStrengthTrainingandConditioning.ChampaignIllinois:HumanKineticsPublishersInc.
	ReferencesBooks: 1. BarryL.Johnson,andJackK.Nelson.(1988).PracticalMeasurementsforEvaluationinPhysicalEducation,(3rdED).Delhi:SurjeetPublications. 2. EdwardL.Fox,RichardW.BowersandMerleL.Foss.(1989).ThePhysiologicalBasisofPhysicalEducationandAthletics,(3rdED).NewYork:W.M.C.BrownPublishers. 3. JayHoffman.(2002).PhysiologicalAspectsofSportsTrainingPerformance.Champaign Illinois:HumanKineticsPublishersInc. 4. ShriKrishna.(1996).EssenceofPranayama.KaivalyadhamaAshram,Lonavla,India. 5. YogaanInstructionBooklet.(2018).VivekandaKendraPrakashanTrust,Chennai. 6. YogaforHealth.(2003).InstituteofNaturopathy&YogicSciences.Bangalore.
	WebResources: 1. http://www.yogamdniy.nic.in/files/pdf/CYP-2023-English.pdf 2. https://youtu.be/SpOJqDZbbbw 3. https://www.mindful.org/mindfulness-how-to-do-it/ 4. https://barbend.com/isometric-exercises/ 5. https://www.medicalnewstoday.com/articles/6-minute-walk-test#scoring 6. https://www.thoracic.org/patients/patient-resources/resources/six-minute-walk-test.pdf
CourseOutcomes	Studentsshouldbeableto 1. Demonstratethesuryanamaskar. 2. Performvariousasanas. 3. Learnthebreathingtechniques,mudrasandbandhas. 4. Selfaggravatedtotakepartinvariousfitnessactivities. 5. Understandthelatestfitnesstools.

Pattern

First CFA	**SecondCFA**		**Total Marks 50**
	25Marks		
25 marks	**Test**	**Assignment**	
	20marks	**5marks**	

24FEVC1103- OPERATIONAL SAFETY & HEALTH EDUCATION IN FARM MACHINERIES (2 credits)

OBJECTIVES:

- To understand safety precautions while handling farm equipments.
- To understand first aid methods and practice it on and off the field.

UNIT–1: General Safety & Health**:** Introduction to Safety Management, Safety Policy under Factories 1948 Act, Dangerous Machineries Act, Safety Committee, Safety Review, Responsibility of Management, Safety Officers Duties & Responsibilities, Safety Targets, Objectives, Standards, Practices and Performances. Motivation & Communication as part of Safety Programme

UNIT–2: Occupational Hazards in operating agriculture machineries: Basics Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, and Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/Disorders & its prevention

UNIT–3: Knowledge on farm Accident & use of safety provisions: Need for Personal Protection Equipment, Selection, Use, Care &Maintenance of Respiratory and Non-respiratory Personal Protective Equipment, Non-respiratory Protective Devices of the operator, Accident Insurance Schemes

UNIT–4: First Aid practices to be followed in farm base accidents**:** Burns, Fractures, Toxic Ingestion, Bleeding, Wounds and Bandaging, Artificial Respiration, Techniques of Resuscitation.

UNIT–5: Exposure to safety health practices in agriculture machineries Safety Health Practices**:** Health– Cleanness, Disposal of Waste, Ventilation and Temperatures, Dust & Fumes, Drinking Water, Lighting, Latrines & urinals. Safety - Fencing of machineries, Work on or near machinery in motion, Hoists and lifts, Pressure plants, Floors, Stairs and means of escape, Protection against fumes & gases, Safety offers. Welfare - Washing facilities in Dry clothing, Storing, Sitting, First Aid Appliances, Canteen, Shelters for rest & lunch, Crèches, Welfare offers, Right & Obligation of workers.

REFERENCES:

1. Preventive and Social Medicine, Published by Benarus Publication, 23rd Edison, Author: Parle & Parle
2. First Aid, Published by Jaypee Publication – 2nd Edison, Author: Ahuja
3. Operational safety and health education2015 published by National Instructional Media Institute, Directorate General of Employment & Training, Chennai.
4. Factory Act- 1947

LEARNING OUTCOME:

- Students able to learn the safety guidelines while handling farm equipments.
- Students able to handle first- aid methods to safeguard the injured person.

24FEVC1104- SELECTION AND OPERATION OF FARM MACHINERIES (3 credits)

OBJECTIVES:

- To understand selection and operation of agricultural machineries under different field conditions.
- To identify and select suitable farm implement to carry out agriculture operation.
- To understand the method of hitching farm implements and its adjustments.

Identify different components, suitability according to the crop and soil conditions and learn the adjustments of depth and width control of the following farm machineries.

UNIT–1: Tillage machineries – Mould board plough, Disc plough, Chisel plough, Reversible disc plough; Disc harrow, Cultivator and Rotavator.

UNIT–2: Sowing Machineries –seed broadcaster - Seed-cum-fertilizer drill, direct paddy seeder and Transplanter.

UNIT–3: Weeding Machineries – Dry land weeder, Cono weeder, and self-propelled power weeder.

UNIT–4: Plant Protection Machineries – Hand operated sprayer – rocker & foot operated sprayer- Power operated sprayer - Hand Operated duster & Power operated duster - Agriculture drone for spraying.

UNIT–5: Harvesting Machineries – types of harvesting machineries – Self-propelled paddy harvesters; Self-propelled fodder harvester.

REFERENCES:

1. Er. Sanjay Kumar, Er. Vishal Kumar and Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8

2. Ojha, T. P and A.M. Michael 2005. Principles of Agricultural Engineering Vol I. Jain Brothers, New Delhi. ISBN: 978-8186321638

LEARNING OUTCOME:

- Students able to select farm machinery according to the soil and crop condition.
- Students able to lean the adjustments needed in the farm machineries according to the soil condition in order to achieve good tilth.
- Students able to operate agriculture machineries under different field conditions.
- Students able to select suitable farm implement according to crop and soil condition.

24FEVC1105- BASIC WORKSHOP (3 credits)

OBJECTIVES:

- To familiarize with the basics of tools and equipments used in fitting, carpentry, sheet metal, welding and smithy.
- To familiarize with the production of simple models in the above trades.

UNIT–1: Lathe -definition– construction – types of lathes – lathe operations. Welding - Tools and equipments - Arc welding of butt joint, tap joint, tee fillet, etc, Demonstration of gas welding.

UNIT–2: Fitting - Tools and equipments - Practice in chipping, filing, drilling, grinding, making vee joints, square and dove tail joints. Tap and dies and hand reamers.

UNIT–3: Carpentry - Tools and equipments - Planning Practice - making halving joint and dove tail joint models, limits, fits, and tolerances with examples used in auto components

UNIT– 4: Plumbing - Tools and equipments - types of joints, treading fitting for different types of pipes-GI, PVC, and HDPE. Study of different type of screws, nuts, studs, bolts and locking devices.

UNIT–5: Foundry – pattern making - Tools and equipments, smithy - Tools and equipments- Demonstration of making simple parts like keys, bolts, etc. sheet metal - operations- shearing, banding, drawing and squeezing.

REFERENCES:

1. S.K. Hajra Choudhury, A.K. Hajra Choudhury and Nirjhar Roy, 15th edition reprinted 2013, Elements of Workshop Technology-Vol.1; Manufacturing processes, Media Promoters and Publishers Pvt, Ltd. Mumbai.

LEARNING OUTCOME:

- Students learn the tools and equipments used in fitting, carpentry, sheet metal, welding and smithy.
- Students able to produce of simple models in the above trades.

24FEVC1106- ENGINEERING DRAWING -I (3 credits)

OBJECTIVE:

- To understand the construction of geometrical figures and projection of 1D, 2D, 3D elements and sectioning of solids and development of surfaces.

UNIT–1: Importance of Engineering Drawing, drawing instruments and materials, BIS and ISO Conventions. Scales - Recommended scales, reduced & enlarged Drawing Sheet sizes: A0, A1, A2, A3, A4, A5, Layout of drawing sheet, sizes of title block and its contents.

UNIT–2: Lettering and Dimensioning - Types of Lettering, Guide Lines for lettering, Recommended sizes of letters and numbers, Single stroke letters, Dimensioning - rules and systems of dimensioning – dimensioning a given drawing.

UNIT–3: Identify the alphabet of lines- Read and Interpret the meaning of various line types with examples- Object Lines, Hidden Lines, Center Lines, Phantom Lines, Dimension Lines, Extension Lines, Leaders, Break Lines -Long-break Line, Round, Solid, Hollow Cross Section, Section Lines – Common Manufacturing Materials, Cutting Plane Lines

UNIT–4: Geometric Construction - Bisecting a line - perpendiculars - parallel line - division of a line; Angles - bisection, trisection, Tangent lines touching circles internally and externally Polygons - Regular polygons - circumscribed and inscribed in circles, conic sections.

UNIT–5: Orthographic Projection - Definition - Planes of Projection–Four quadrants – Reference Line, First angle projection–Third angle projection. Isometric Projection–Definition–Isometric axes, lines and planes, Isometric Scale - Isometric view. Drawing of isometric views of plane figures, drawing of isometric views of prisms and pyramids, drawing of isometric view of cylinders and cones.

REFERENCES:

1. K.V. Natarajan, 2006 A text book of engineering graphics, Dhanalakshmi Publishers, Chennai.
2. M.B. Shah and B.C. Rana, 2005, Engineering drawing, Pearson education.
3. N.D. Bhatt, 2003, Engineering Drawing, Chaotar publishing house 46th edition.
4. K.R. Gopalakrishnan.1998 Engineering Drawing (Vol. I & II) Subhas Publications.
5. Luzadder and Duff, 2001, Fundamentals of Engineering Drawing Prentice Hall of India Pvt Ltd XI edition.
6. K. Venugopal, 2002. Engineering graphics, New Age International (P) Limited.
7. Engineering Drawing Workbook (2014) by National Instructional Media Institute, Directorate General of Employment & Training, Chennai.

LEARNING OUTCOME:

- Student conversant with the construction of geometrical figures and projection of 1D, 2D, 3D elements and sectioning of solids and development of surfaces.

24FEVC1107- OPERATION AND MAINTENANCE OF POWER TILLER (3 credits)

OBJECTIVES:

- To understand different components of power tiller and its functions.
- To understand operation and maintenance of power tiller.

UNIT–1: Familiarizing the tools for maintaining the power tiller–Identifying the different system of power tiller and its functions.

UNIT–2: Dismantling and assembling of the power tiller -Overhauling of steering clutch and brake of the power tiller.

UNIT–3: Adjustment of clutch assembly – Adjustment of transmission system.

UNIT–4: Dismantling, checking, repairing and assembling of rotavator- Replacement of tynes of the tiller

UNIT–5: Periodical maintenance of the power tiller-Preventive maintenance of the power tiller- common troubles and remedies- Field operations of the power tiller with suitable attachments

REFERENCES:

1. Repair, Maintenance & Operation of Power Tiller, March 2011 Sector: Agriculture for Modular Employable Skills, Developed by National Instructional Media Institute, Directorate General of Employment & Training, Ministry of Labour& Employment, Government of India, Chennai.
2. Mechanic Tractor, February 2016 Sector: Automobile, Common for Mechanic Tractor / Mechanic Agriculture Machinery, Trade: Practical, Developed by National Instructional Media Institute, Directorate General of Employment & Training, Ministry of Labour& Employment, Government of India, Chennai.
3. R K Ghosh & S Swain, 1993, Practical Agricultural Engineering, Naya Prakash publications, Kolkata, ISBN: 81-85421-15-3

LEARNING OUTCOME:

- Students learn the components and its functions of power tiller.
- Students learn to operate the power tiller with suitable attachment in field conditions.
- Students learn to know the reasons for common trouble occur and how to rectify in the power tiller.

24FEVC1108- INTERNSHIP – I(4 credits)

OBJECTIVE: To learn skills for specific job role from relevant Industry / Institution.

COVERAGE AREA OF INTERNSHIP: Power Tiller & Tillage Equipments – Manufacturing / Servicing unit.

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The internshipmay be organized continuously for four weeks or more than one spell within a semester as per the convenience of the Industry/Institutes. During their stay in the industry, they have to maintain a diary on daily basis to record the work assigned, outcome of the work and it has to be countersigned by the student's in-charge. In addition, he/she has to submit weekly report to the department. During the in-plant training period, the Industry / Institute partner will evaluate their performance for 60 marks and the concerned course teacher for 40 marks as given below

INDUSTRY/ INSTITUTE

1	Attitude	10 marks
2	Punctuality	
3	Behavior	
4	Involvement	10 marks
5	Performance (completion of assigned work)	20 marks
6	Contribution to the industry	20 marks
	Total	**60 marks**

COURSE TEACHER

1	Diary /Record	10 marks
2	Weekly report	10 marks
3	Viva –voce	20 marks
	Total	**40 marks**

LEARNING OUTCOME:

- Students learn the work culture from the concerned industry
- Students learn to handle special tools used in assembling and dismantling of machinery components.

SEMESTER - II

NSQF Level	**: 4.0**
NCrF Level	**: 4.5**
Job Role / Qualification Pack	**: Agricultural Machinery Mechanic**
Award / Exit Option	**: Diploma in Farm Equipments Operation & Maintenance**

24FEVC1201- WORKSHOP CALCULATION AND SCIENCE – II (3 credits)

OBJECTIVE:

- To understand the principles of lever, moments, friction, heat and temperature, basic electricity and capacitors.

UNIT–1: Levers and moments**:** The principle of moments - the bell crank lever, a practical application of the bell crank lever in vehicle. Slider crank mechanism – Four bar mechanism. Axle loadings, a steering mechanism as a machine

UNIT–2: Friction**:** Definition, Coefficient of friction, Static friction, sliding friction; Making use of friction – Clutch- Torque & power transmitted by a plate clutch and model calculation, Belt drive- Torque & power transmitted by a belt drive and model calculation, speed ratio of belt drive.

UNIT–3: Heat and temperature**:** Definition, units, differences, boiling point, melting point, temperature measuring instruments, specific heat, transmission of heat, expansion of solids, liquids, gaseous, quantity of heat with practical examples - thermal conductivity.

UNIT–4: Basic Electricity**:** Introduction, sources of electricity, uses of electricity, classification, types of electric current, advantages, simple electric circuits, ohms law, insulating materials, electrical conductors, electric power, horse power, work and energy, concept of earthing**.**

UNIT-5: Capacitors - Capacitance, Capacitors in circuits- Contact breaker ignition circuit – Electronic principles- Introduction, Semiconductors- Effect of dopants, Electrons and holes; Light Emitting Diode (LED)- Voltage and current in an LED, Basic operation of transistor, Current gain in transistor, Current flow in transistors; Transistor circuit used in automotive applications- Voltage amplifier, Darlington pair, Heat sink.

REFERENCES:

1. Sanjay Kumar, 2007, A Text Book of Tractor at a Glance, International book distributing company, Lucknow
2. Senthilkumar, T., R. Kavitha and V.M.Duraisamy, 2015. A Text Book of Farm Machinery**,** Thannambikkai Publications, Coimbatore. ISBN: 978-9381102305
3. Jagadish war Sahay, 2010. Elements of Agricultural Engineering**.** Standard Publishers Distributors, New Delhi. ISBN: 978 – 818040440
4. Workshop Calculation & Science, 2015, NIMI Publications, Chennai

LEARNING OUTCOME:

- Students learn the basic principles of lever, moments, friction, heat and temperature, basic electricity and capacitors.
- Students learn to calculate the moment, torque, thermal conductivity, heat loss and heat gain, simple electric circuit, electric power, work and energy.

24ENUA1201/24ENIA1201/24ENVA1201
ESSENTIAL ENGLISH: INTERMEDIATE
(3 Credits/3 Hours per week)

Objectives:
This course aims

- to help the students understand the intricacies of English Grammar for everyday use;
- to help them improve their essential language skills in English;
- to encourage them to use English in their personal and professional spheres

Unit I: Grammar

- Prepositions & Prepositional phrases
- Conjunctions
- Direct & Indirect Speech
- Sentences
- Punctuation

Unit II: Oral Communication

- Listening Skills
    i. Long Narratives, Recorded speeches
    ii. Movie clips
- Speaking Skills
    i. Narrations & Public speaking
    ii. Debating

Unit III: Reading & Vocabulary

- Reading comprehension passages
- Vocabulary building

Unit IV: Writing Skills

- Precis Writing
- Personal Letter Writing
- General Essay Writing

Unit V: English in Everyday Use

- Short speeches
- Debates
- Silent Rapid Reading

Textbook:
Textbook/Course Material - Prepared by the School of English & Foreign Languages.

Reference Book:
Sargeant, Howard. Basic English Grammar Book 2. Irvine: Saddleback, 2007. Print.

24FEVC1202- ENVIRONMENTAL STUDIES (4 credits)

OBJECTIVES:

- To understand the importance in conservation of environment and natural resources.
- To understand causes, effects and control measures of environmental pollution.
- To understand the concepts of disaster management and preparedness to overcome

UNIT–1: Natural Resources: (1) Types of Natural Resources, Natural Resource Conservation, Role of an Individual in Conservation of Natural Resources, Equitable Use of Resources for Sustainable Lifestyles. (2) Land Resources: Land as a Resource, Land Degradation, Man-induced Landslides, Soil Erosion and Desertification. (3) Forest Resources: Use and Overexploitation, Deforestation, Case Studies, Timber Extraction, Mining, Dams, and their Effects on Forests and Tribal People. (4) Water Resources: Use and Overutilization of Surface and Ground Water, Floods, Drought, Conflicts over Water, Dams – Benefits and Problems. (5) Mineral Resources: Use and Exploitation, Environmental Effects of Extracting and Using Mineral Resources, Case Studies. (6) Food Resources: World Food Problems, Changes Caused by Agriculture and Overgrazing, Effects of Modern Agriculture, Fertilizer-Pesticide Problems, Water logging, Salinity, Case Studies. (7) Energy Resources: Growing Energy Needs, Renewable and Non-renewable Energy Sources, Use of Alternate Energy Sources, Case Studies.

UNIT–2: Ecosystems: Concept of an Ecosystem, Types of Ecosystems, Structure and Function of an Ecosystem, Producers, Consumers and Decomposers, Energy Flow in the Ecosystem, Food Chains, Food Web sand Ecological Pyramids, Ecological Succession, Introduction, Types, Characteristic Features, Structure and Function of Forest Ecosystem, Grassland Ecosystem and Desert Ecosystem, Aquatic Ecosystems (Ponds, Streams, Lakes, Rivers and Ocean Estuaries).

UNIT–3: Environmental Pollution: Definition, Causes, Effects and Control Measures of: (a) Air Pollution, (b) Water Pollution, (c) Soil Pollution, (d) Marine Pollution, (e) Noise Pollution, (f) Thermal Pollution, (g) Nuclear Hazards, Solid Waste Management: Causes, Effects and Control Measures of Urban and Industrial Wastes, Role of an Individual in Prevention of Pollution, Pollution – Case Studies, Disaster Management: Floods, Earthquakes, Cyclones and Landslides – Industrial Pollution by Agricultural Manufacturing unit.

UNIT–4: Social Issues and the Environment: Environment from Unsustainable to Sustainable Development, Urban Problems Related to Energy Water Conservation, Rainwater Harvesting, Watershed Management, Resettlement and Rehabilitation of People: Its Problems and Concerns, Case Studies, Environmental Ethics: Issues and Possible Solutions, Climate Change, Global Warming, Acid Rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust, Case Studies, Wasteland Reclamation, Consumerism and Waste Products. Environment (Protection) Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife (Protection) Act, Forest (Conservation) Act, Issues Involved in Enforcement of Environmental Legislation, Public Awareness.

UNIT–5: Biodiversity: Introduction – Definition: Genetic, Species and Ecosystem Diversity, Bio-geographical Classification of India, Value of Biodiversity: Consumptive Use, Productive Use, Social Use, Ethical Use, Aesthetic Use and Option Values, Biodiversity at Global, National and Local Levels, India as a Mega-diversity Nation, Hotspots of Biodiversity, Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts, Endangered and Endemic Species of India, Conservation of Biodiversity: In-situ and Ex-situ Conservation of Biodiversity, Biological Diversity Act, 2002.

REFERENCES:

1. Asthana, D.K., Meera Asthana, 2006, A text book of Environmental Studies, S. Chand andCompany Ltd., New Delhi.
2. Benny Joseph, Tata McGraw, 2005, Environmental Studies, Hill Publishing Company, New Delhi
3. Erach Bharueha, 2005, A text book of Environmental Studies, UGC, University Press, New Delhi.
4. Palanithurai, G, 2009, Panchayats in Disaster: Preparedness and Management, ConceptsPublishing company.
5. Thangamani and Shyamala, 2003, A text book of Environmental Studies, Pranav Syndicate,Publication Division, Sivakasi.

LEARNING OUTCOME:

- Students able to learn about the importance of conservation of bio-diversity
- Students able to learn the control measures of environmental pollution

24GTPUV1001/24GTPIV1001 – LET US KNOW GANDHI

Credits:2

Marks
CFA:20
ESE:30
Total:50

Objectives

- To enable students to understand and appreciate the principles and practices of Mahatma Gandhi and their relevance in the contemporary times.
- To develop a Pro-active character and positive attitude to follow Gandhian values and responsibilities in their personal and social life.

Specific Objectives of Learning:

This will make the students:

- To understand the life and work of Gandhi.
- To identify the Gandhi in each of us.
- To know the relevance of Gandhi.
- To apply the knowledge of Gandhi in a multi-dimensional context.
- The know the Gandhian innovations and its relevance today.

Unit1 Gandhiji's Life in Brief: Early Life of Gandhi – London Learning Phase-South African Phase: Racial Discrimination, Transformation and Satyagraha - Indian Phase: Social reformation and Indian Independence- Martyrdom.

Unit2 Understanding Gandhian Principles: Eleven Ashram Vows-Truth and Nonviolence, Ends and Means, Right and Duties, Simple Living and High Thinking.

Unit3 Applications of Gandhian Principles: Sarvodaya - Welfare of all, Satyagraha - Peace and Justice, and Training for Nonviolent Action: Shanti Sena as an alternative Defence.

Unit4 Societal Reformation: Influence of Seven Social Sins - Communal Harmony: Pluralism - Religions and Inter-faith Relations, Removal of Untouchability, Prohibition and Gender Equality- Governance : Decentralization of Power and Panchayati Raj - Economics: Trusteeship, Bread Labour and Self Reliance (Swadesi)

Unit5 Gandhian Alternative to Education: BasicEducation(NaiTalim),-Multi-lingualism-AdultEducation,-Education on Health, Sanitation and Hygiene: VillageSanitation, Balanced and Healthy Diet, Nature Cure.

REFERENCES:

- Arunachalam: (1985),Gandhi: The Peace Maker, Gandhi Samarak, Nidhi,Madurai.
- LouisFischer,(2002),The Essential Gandhi: An Anthology of His Writing son His Life, Work and Ideas, Vintage, New York.
- NandaB.R., (1958), Mahatma Gandhi: A Biography, Oxford University Press, NewDelhi.
- M.K. Gandhi: (1983), An Autograph or the Story of My Experiments with Truth, Navajivan Publishing House, Ahmadabad.
- M.K.Gandhi:(1951), Satyagraha in South Africa: Navajivan Publishing House, Ahmadabad.
- M.K.Gandhi:(1983), Constructive Programme – Its Meaning and Place. Navajivan Publishing House, Ahmadabad.
- M.K.Gandhi:(1948) Key to Health, Navajivan Publishing House, Ahmadabad.
- M.K.Gandhi:(1949), Diet and Diet Reforms, Navajivan Publishing House, Ahmadabad.
- M.K.Gandhi: Basic Education, Navajivan Publishing House, Ahmadabad.
- M.K.Gandhi:(2004), Village Industries, Navajivan Publishing House, Ahmadabad.
- M.K.Gandhi:(1962), Hind Swaraj or The Indian Home Rule, Navajivan Publishing House, Ahmadabad.
- M.K.Gandhi:(2004), Trusteeship, Navajivan Publishing House, Ahmadabad.
- M.K.Gandhi:(2001), India of my Dreams, Navajivan Publishing House, Ahmadabad.
- M.K.Gandhi: Self Restraint Vs. Self Indulgence, Navajivan Publishing House, Ahmadabad.
- R.R.Prabhu & UR Rao. The Mind of Mahatma Gandhi, Navajivan Publishing House.

24FEVC1203- PERSONALITY DEVELOPMENT (3 credits)

OBJECTIVES:

- To know the facts of its application in management.
- To be aware of the ethical values.
- To familiarize with the applications of the concepts in management.

UNIT–1: Introduction: Definition of Personality - Personality, Development - Stability of Personality - Personality Change – role of soft kills.

UNIT–2: Theories of Personality**:** Psychoanalytical Theory of Personality - Humanistic Theory of Personality - Trait Theory of Personality - Social Cognitive Theories - Behaviourism and Learning Approaches to Personality - Eastern Theory: Thriguna Theory (SRT)

UNIT–3: Determinants of Personality: Cognitive Determinants - Intellectual Development and Capacities - Deviant Intelligence - Major areas of adjustment affected by Intelligence - Socio-cultural Determinants - Family and Educational Determinants - Social Determinants - Emotional Determinants

UNIT–4: Enrichment: Motivation and its Process - Life Skills for Personality Development – role of – physiologic in personality development.

UNIT–5: Techniques in Personality Development: Self-confidence - Goal setting - Time Management and effective planning - Stress Management - Meditation and concentration techniques - Self hypnotism - Self acceptance and self-growth.

REFERENCES:

1. Cervone Daniel, Pervin. L.A, (2008), Personality Theory &Research, (10th Edition.), John Willey & Sons, Inc., United States of America.
2. Haslam Nick, (2007), Introduction to Personality and Intelligence, Sage Publications, New Delhi.
3. Hurlock, B. Elizabeth, (2007). Personality Development, Tata McGraw-Hill Publishing Company Limited, New Delhi.
4. Rajiv K. Mishra. Rupa & Co. (2006) Personality Development
5. Rao K. Ramakrishna et al., (2008), Hand Book of Indian Psychology, Cambridge University Press India Pvt. Ltd., New Delhi.
6. Robert J. Gregory (2006). Psychological Testing, Pearsons Education.

LEARNING OUTCOME:

- Known the facets and its application in management.
- Aware of the ethical values in management.

- Able to understand the philosophy in Management.
- Adapt with the applications of the concepts in management.

24FEVC1204- SERVICING AND MAINTENANCE OF FARM MACHINERIES
(4 credits)

OBJECTIVES:

- To understand field adjustments for achieving proper ploughing, sowing, weeding, plant protection and harvesting machineries.
- To understand replacement of worn-out parts, care and maintenance of machineries.
- To understand safety precautions before and after the usage of machineries.

UNIT–1: Tillage machineries – dismantling and assembling- adjustments, method of hitching, identify the common causes and remedies, guidelines for safety precautions, care and maintenance before and after the usage of implements.

UNIT–2: Broadcaster - Seed-cum-fertilizer drill, Direct paddy seeder and Transplanter- dismantling and assembling- adjustments, method of hitching, identify the common causes and remedies, guidelines for safety precautions, care and maintenance before and after the usage of machineries.

UNIT-3: Weeding Machineries – Dry land weeder, Cono weeder, and self-propelled power weeder- dismantling and assembling- adjustments identify the common causes and remedies, guidelines for safety precautions, care and maintenance before and after the usage of machineries.

UNIT–4: Plant Protection Machineries – Hand operated sprayer, Power operated sprayer and Hand Operated duster- Power Operated duster dismantling and assembling- adjustments, method of hitching, identify the common causes and remedies, guidelines for safety precautions, care and maintenance before and after the usage of machineries - drones techniques used in spraying.

UNIT–5: Harvesting machineries - paddy reaper and self-propelled fodder harvester- dismantling and assembling- adjustments, identify the common causes and remedies, guidelines for safety precautions, care and maintenance before and after the usage of machineries.

REFERENCES:

1. Er. Sanjay Kumar, Er. Vishal Kumar and Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8
2. Ojha, T.P and A.M. Michael 2005. Principles of Agricultural Engineering Vol I. Jain Brothers, New Delhi. ISBN: 978-8186321638

LEARNING OUTCOME:

- Student will acquire skill for adjusting the controls available in the plough, harrows, seed drill, weeder, sprayers and harvesters to reach the maximum output

- Students will learn to replacement of worn-out parts repair and maintenance of agriculture machineries

24FEVC1205- ENGINEERING DRAWING -II (3 credits)

OBJECTIVES:

- To read and interpret drawings, identify different drawing projections, drawing of machine and tractor engine systems.

UNIT–1: Drawing of I.C. engine – Diesel engine and their parts. Sketching of Diesel cycle, valves, and valve timing diagram. Drawing of piston assembly, drawing of piston gudgeon pins rings and connecting rod.

UNIT–2: Drawing of crank shaft and cam shaft showing all parts. Drawing of cylinder block and cylinder head, cylinder liners.

UNIT–3: Drawing of different cooling system-showing all necessary parts such as water pump, thermostatic valve, Radiator etc. Drawing of lubrication system, showing all necessary parts such as filters, oil pump, pressure release valve etc.

UNIT–4: Drawing of power take off (PTO) system. Drawing of steering system. Drawing of charging system and solenoid switch circuit.

UNIT–5: Drawing of tillage machineries and seed planters and their components; Drawing of weeders, bund former, ridger and their components.

REFERENCES:

1. Sanjay Kumar, 2007, A Text Book of Tractor at A Glance, International book distributing company, Lucknow
2. K.V. Natarajan, 2006 A text book of engineering graphics, Dhanalakshmi Publishers, Chennai.
3. M.B. Shah and B.C. Rana, 2005, Engineering drawing, Pearson education.
4. K.V. Natarajan, 2006 A text book of engineering graphics, Dhanalakshmi Publishers, Chennai.
5. N.D. Bhatt, 2003, Engineering Drawing, Chaotar publishing house 46th edition.
6. K.R. Gopalakrishnan.1998 Engineering Drawing (Vol. I & II) Subhas Publications
7. Luzadder and Duff, 2001, Fundamentals of Engineering Drawing Prentice Hall of India Pvt Ltd XI edition
8. K. Venugopal, 2002. Engineering graphics, New Age International (p) Limited.

LEARNING OUTCOME:

- Students can read and interpret drawings, identify different drawing projections, free hand sketching of machine and tractor engine systems
- The student will be able to understand the shape and size of the components of the tractor, power tiller, tillage implements, rotavator, harrows, cultivator, seed drills, weeders, bund former and ridger

Course Code & Title	**24CSVI1201** **DIGITAL MARKETING LAB** **Credits: 0+3**		
Degree Level:	**B.Voc**	**Semester**	**II**
Programme:	**B.Voc (FEOM)**		
Course Objectives	**The Course aims to:** • Familiarize students with the concept of digital marketing and its current and future evaluations. • Identify impact of digital space and digital marketing in reaching out to customers. • Learn the importance of search engine optimization and marketing. • Acquire the skill of making efficient use of the digital assertions on social media platforms. • Discover effective methods for gathering, arranging, and handling social media data.		
Cognitive Level	**K1-K3**		

Lab Exercises

1. Creating Face Book page uploading contacts for invitation
2. Exercise on fan page: wall posting to increase fans on fan page
3. Marketing on fan page(with examples)
4. Creating Promotional Banner through Canva
5. Face Book promotion using Banners
6. Creating the poll in Face Book fan Page.
7. Face Book Advertising
8. Best practices for Face Book advertising
9. Payment module – CPC vs CPM vs CPA
10. LinkedIn Marketing
11. Understanding LinkedIn company profile
12. Understanding LinkedIn Individual profiles
13. Understanding LinkedIn groups
14. LinkedIn publishing
15. Twitter Marketing
16. Twitter Advertising
17. Uploading videos on video marketing with thumbnails
18. YouTube for business
19. Sending bulk E-Mail.

24FEVC1206- INTERNSHIP –II (5 credits)

OBJECTIVE: To learn skills for specific job role from relevant Industry / Institution.

COVERAGE AREA OF INTERNSHIP: Sowing, Weeding & Spraying Equipments – Manufacturing / Servicing unit.

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The internship may be organized continuously for four weeks or more than one spell within a semester as per the convenience of the Industry/Institutes. During their stay in the industry, they have to maintain a diary on daily basis to record the work assigned, outcome of the work and it has to be countersigned by the student's in-charge. In addition, he/she has to submit weekly report to the department. During the in-plant training period, the Industry / Institute partner will evaluate their performance for 60 marks and the concerned course teacher for 40 marks as given below

INDUSTRY/ INSTITUTE

1	Attitude	10 marks
2	Punctuality	
3	Behavior	
4	Involvement	10 marks
5	Performance (completion of assigned work)	20 marks
6	Contribution to the industry	20 marks
	Total	**60 marks**

COURSE TEACHER

1	Diary /Record	10 marks
2	Weekly report	10 marks
3	Viva –voce	20 marks
	Total	**40 marks**

LEARNING OUTCOME:

- Students learn the work culture from the concerned industry.

- Students learn to handle special tools used in assembling and dismantling of machinery components.

SEMESTER - III

NSQF Level	**: 4.5**
NCrF Level	**: 5.0**
Job Role / Qualification Pack	**: Tractor Operator**

Award / Exit Option	**: NA**

24FEVC2301 - TRACTOR ENGINE SYSTEMS (4 credits)

OBJECTIVES:

- To understand different systems of the tractor engine for effective functioning and maintenance.
- To understand components in each system of a tractor engine.

UNIT–1: Engine Components – working principle & construction of cylinder heads, types of combustion chambers. Function of Engine Valves. Description & function of connecting rod, Description & function of piston – small end & big end bearings. Description of crankshaft & Camshafts. Firing order of the engine. Description and function of the fly wheel and vibration damper, Timing mark.

UNIT–2: Fuel system– different parts of the system – working of the system, care of fuel system; air cleaner – types, working principles – governing system – functions, principles of operation and methods of governing system.

UNIT–3: Cooling systems: - Purpose, types, Cooling system components, water pump, function of thermostat, pressure cap, Recovery system & Thermo-switch. Function & types of Radiators.

UNIT–4: Lubrication system: - purposes & characteristics of oil, Type of lubricants, grade as per SAE, & their application, oil additives, type of lubrication system. Lubrication system components- different type of Oil pump, Oil filters & oil cooler. Probable reasons for low / high oil pressure, high oil consumption and their remedies.

UNIT–5: Ignition system – function, classification – CI system and SI system – different components of the system; Electrical system – different components of the system – battery, generator and starter motor; starting troubles and their remedies, battery maintenance

REFERENCES:

1. Sanjay Kumar, 2007, A text book of tractor at a glance, international book distributing company, Lucknow
2. Senthilkumar, T., R. Kavitha and V.M. Duraisamy 2015. A text book of farm machinery**,** Thannambikkai Publications, Coimbatore. ISBN: 978-9381102305
3. Jagadishwar Sahay, 2010. Elements of Agricultural Engineering**.** Standard Publishers Distributors, New Delhi. ISBN: 978 – 818040440
4. Sanjay Kumar, 2007, A Text Book of Tractor at a Glance, International book distributing company, Lucknow.
5. Ojha, T. P and A.M. Michael 2005. Principles of Agricultural Engineering, Vol I**.** Jain Brothers, New Delhi. ISBN: 978-8186321638
6. Nakra C.P 1970. Farm Machinery and Equipment**:** Dhanpat Rai Publishing Company Ltd, New Delhi ISBN: 978-8187433231.
7. Sricastava, A.C., 1991. Elements of Farm Machinery**.** Oxford & IBH Publishing Co Pvt Ltd, New Delhi. ISBN: 978-8120405134

LEARNING OUTCOME:

- Students know about different systems of the tractor for effective functioning and maintenance.
- Students able to identify the components in each system of a tractor.

24FEVC2302 - ECONOMICS OF FARM MANAGEMENT (4 credits)

OBJECTIVES:

- To understand the basic principles & economics of farm management.

UNIT–1: Nature, scope, characteristics and role of farm business management; farm management decisions; farm management problems.

UNIT–2: Principles of farm management decisions – principle of variable proportion, cost principle, principle of factor substitution, law of equi-marginal returns, opportunity cost principle, etc.

UNIT–3: Tools of farm management and farm business analysis - farm planning and budgeting; Farm records and accounts, types and problems in farm records and accounts, net worth statement, farm efficiency measures.

UNIT–4: Management of farm resources – Land, Labour – types of labour, Farm machinery – energy resources available in the farm. Farm building – needs and importance etc.,

UNIT–5: Risk and uncertainty in farming -sources of uncertainty in farming, management strategy to counteract uncertainty and decision-making process in farm business management under risks and uncertainty.

REFERENCES:

1. Heady EO & Jensen H. 1960. Farm Management Economics. Prentice Hall.
2. Johl SS & Kapoor TR. 1973. Fundamentals of Farm Business Management. Kalyani
3. Kahlon AS & Singh K. 1992. Economics of Farm Management in India.Allied Publ.
4. Panda SC. 2007. Farm Management & Agricultural Marketing. Kalyani Publications.

LEARNING OUTCOME:

The student should have gained knowledge about

- Basic economics in farm management
- Liquidity and wealth management
- Maintain of farm records and decision making based on records

24FEVC2303 - AGRICULTURE AND RURAL MARKETING (4 credits)

OBJECTIVES:

- Inculcate critical thinking to carry out strategies for agriculture and rural development.
- Equip the student with skills to analyze problems, formulate a hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.

UNIT–1: Introduction to Agriculture and Rural Marketing: Definition, nature and scope, Classification of rural markets, rural v/s urban markets. Marketing environment, infrastructure facilities, rural credit institutions, rural retail outlets.

UNIT–2: Rural Consumer behaviour: Consumer buying behaviour, Factors affecting Consumer Behaviour, Social factors, Technological Factors, Economic Factors, Political Factors, Characteristics of Rural consumer- Age and Stages of the Life Cycle, Occupation and Income, Economic circumstances, Lifestyle, Personality and Brand Belief, Information Search and prepurchase Evaluation, Rise of Consumerism, Consumer Buying Process, Opinion Leadership Process, Diffusion of Innovation, Brand Loyalty, Researching Rural Market: Sensitizing rural market.

UNIT–3: Marketing of agricultural inputs and outputs: Different agricultural inputs-a brief overview, Challenges for, factors suggesting better future prospects, marketing strategies for inputs. Profiling of Indian agricultural produces marketing, challenges in marketing of agricultural produce and inputs, Strategies to promote marketing of agricultural produce. Problems and Prospects of agriculture and rural marketing, strategies for rural marketing, Need for marketing finance, Source of marketing finance, Farmers Service Societies (FSS), Regulated Market and Acts.

UNIT–4: Standardization and Grading, processing and packaging: Inspection of quality control, Inspection of AGMARK, Indian Standers and Grade Specifications, Food Products order (FPO) 1955 Consumer Protection Act 1986. The National Council for State Marketing Boards(NCOSAMB), State Trading Corporation (STC),Public Distribution System (PDS), Different aspects of processing and packaging.

UNIT–5: Institutional Support to Agriculture and Rural Marketing, Commission on Agriculture Costs and Prices, (CACP), National Agriculture Cooperative marketing Federation (NAFED), Agriculture and schemes under Processed Food Exports Development Authority(APEDA), the National Co-operative Development Corporation (NCDC), Food Corporation of India (FCI), Panchayat, StateAgriculture Marketing Boards.

REFERENCES:

1. Badi R V Badi N.V: Rural Marketing
2. Acharya S S Agarwal: Agriculture Marketing in India
3. Economy of Assam: P.K. Dhar
4. Rural Marketing: CSG Krishnamacharyulu
5. Agricultural Economics: R. K. Lekhi

LEARNING OUTCOME:

- The Programme has been framed to provide an understanding andexperience of different aspects of agriculture and rural marketingof agricultural products
- It is to provide a holistic perspective of schemes/programmesofcentral govt. in general and state govt. in particular.
- It is to develop expertise in planning and management ofagricultural products and rural marketing
- Students can join in Rural Development Organizations /Institutions as Social Worker, Community Mobilizer.
- Students can set up Small Scale Industry in rural areas supportedby State govt. institutions.

24FEVC2304 - BUSINESS COMMUNICATION (3 credits)

OBJECTIVE:

- To gain knowledge about communication in business and day to day life

Unit-1: Structure of Business Letters: Layout of business letter – Types of business letter – Enquiry, Offers, Quotations and Orders.

Unit-2: Trade references and status enquires – Confirmation and execution of orders – Refusal and cancellation of orders – Acknowledging receipts of goods and making payments.

Unit-3: Complaints and settlements – Collection letters – Circular letters.

Unit-4: Agency letters – Banking letters – Insurance letters. Drafting of Agenda and Minutes: Meaning – Types – Methods.

Unit-5: Reports: Types and preparation – Speech drafting – Occasions – Application for a situation.

REFERENCES:

1. Bhal and Nagamiah, Modern Business Correspondence
2. Majumdar, Commercial Correspondence
3. Reddy & Appannaiah, Essentials of Business Communication
4. Rajendra Paul, Business Correspondence.

LEARNING OUTCOME:

- Students should have the competency to draft letters for various needs of business

24FEVC2305 - ENGINEERING SURVEY (3 credits)

OBJECTIVES:

- To measure the regular and irregular areas of an agricultural field by using chain survey.
- To prepare contour map and level difference of a given field by using levelling.

UNIT–1: Surveying--definition and purpose; classification of surveying; units of measurement of length and area; scales; measurement of horizontal distance-chains, types of chains, tapes; Ranging rod, arrows, plump bob-its functions and usage.

UNIT–2: Chaining–method of chaining on level ground and on sloping ground; direct method and indirect method of stepping; errors and corrections in chaining; laying out right angles and offsets.

UNIT–3: Cross staff survey; Obstacles in chaining; triangulation method of chain survey; ordinate method –average ordinate, mid ordinate, trapezoidal, and Simpson method to determine areas of regular and irregular fields.

UNIT–4: Levelling, definition, types of levelling, terminology, levelling equipments, dumpy level, levelling of dumpy level, levelling staff, methods of calculation of reduced level, the collimation system and the rise and fall system.

UNIT–5: Types of levelling simple levelling, and differential levelling, contouring, uses of contours, and method of contouring, grid system, and plotting of contours.

REFERENCES:

1. Zamir Alvi, 2004. A Textbook of Surveying, Vikas Publishing House Pvt, Ltd, New Delhi.
2. Singhal, O.P. 1998. Agricultural Engineering, Aman Publishing house, Meerut.
3. Dr. Bimal Chandra Mil. 1995. Introduction to soil and water conservation engineering, Kalyani Publishers, Calcutta.
4. Saini, G.S. 1996. A textbook of soil and water conservation, Amman Publishing house, Meerut.
5. Murthy, V.V.N Zoos.2009 Land and water Management, Kalyani Publishing, New Delhi

LEARNING OUTCOME:

- Students to know about measuring the regular and irregular areas of a agricultural field by using chain survey.
- Students able to prepare contour map and level difference of a given field by using levelling.

24FEVC2306 - TRACTOR OPERATION AND SAFETY MEASURES (4 credits)

OBJECTIVES:

- To understand the tractor operation in field conditions
- To understand safety precaution measures observed before starting, operating and stopping the tractor.

UNIT–1: Tractor accessories - Familiarizing and functions of different components involved in engine, clutch, transmission, wheels, font axle, steering system, electrical system, hydraulic system and power take off shaft - mini tractor & electrical tractor - its attachments.

UNIT–2: Method of starting and stopping procedure – precautions observed while starting, operating and stopping a tractor – Periodical maintenance of tractors daily, weekly, monthly& annual- as recommended by tractor manufacturer.

UNIT–3: General precautions observed in tractor systems – cooling, lubrication, air filter, fuel, transmission, hydraulic system, electrical system, and braking system.

UNIT–4: Ploughing of land – Methods of ploughing – Gathering and casting – Continuous ploughing method round and round ploughing – one way ploughing, ploughing with cage wheel and rotavator attachment.

UNIT–5: Safety in tractor operation; physical environment and protective wears – Thermal environment, Vibration, Noise, Dust, Exhaust Emission, Chemicals and Lighting.

REFERENCES:

1. Sanjay Kumar, 2007, A Text Book of Tractor at a Glance, International book distributing company, Lucknow
2. Er. Sanjay Kumar, Er. Vishal Kumar, Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8
3. Dr. Jagdishwar Sahay, 2013, A Text Book of Elements of Agricultural Engineering, Standard Publishers Distributors, 1705-B, Naisarak, PB No:1066, Delhi-110 006, ISBN: 978-81-8014-204-8

LEARNING OUTCOMES:

- Students should have the skills to operate the tractor with implement in field conditions
- Students should have the skills in safety operation &measures while operating the tractor in different field conditions.

24FEVC2307 - OPERATION AND MAINTENANCE OF MICRO IRRIGATION SYSTEM (3 credits)

OBJECTIVE:

- To teach skills of designing, installation and maintenance of micro irrigation systems.

UNIT–1: Micro Irrigation system – types - Importance of micro irrigation systems; relations between agronomy and micro irrigation, types of crops, types of soils, types of roots, identification of cropping pattern, water requirement of different crops, and suitable fertiliser for micro irrigation.

UNIT–2: Design and layout plan of micro irrigation systems, survey of field, measurement of field, availability of water resources, shape and slope of field, designing fundamentals, spacing according to crops, and listing of crops to be produced.

UNIT–3: Components of micro irrigation system description and function of fertigation tank, water pumps, control valves, filters, head-unit, laterals, emitters, back flow preventers, pressure regulator, flush valve, pipe/drip tape, connectors, micro sprinklers.

UNIT–4: Installation of micro irrigation system, installation of head unit, filters, valves, main and sub main line, trenching, adjusting length of drip line and testing of micro irrigation system.

UNIT–5: Maintenance of micro irrigation system cleaning of filters, pressure gauge readings, air valve and safety, valve cleaning, draining of drip lines, flushing of main line and sub main, changing emitters, removing and reinstallation of micro irrigation systemand standard procedures of assembling and dismantling of micro irrigation system.

REFERENCES:

1. Sharma, S.K. 1984. Principles and practices of irrigation Engg. S. Chand and Company Ltd., New Delhi.
2. Michael, A.M. and T.P.Ojha. 1987. Principles of Agricultural Engineering. Vol.2. Jain Brothers, New Delhi.
3. Michael, A.M. 1983. Irrigation Theory & Practice, Vikas Publishing house, New Delhi.
4. Sivanappan, R.K. and Karaigowder. 1997. Irrigation and Drainage, Popular Book Depot, Chennai.
5. Basak, N.N. 1999. Irrigation Engineering. TATA McGraw Hill, New Delhi.

LEARNING OUTCOME:

- Students learn skills of designing, installation and maintenance of micro irrigation systems.

24FEVC2308 - INTERNSHIP - III (5 credits)

OBJECTIVE: To learn skills for specific job role from relevant Industry / Institution.

COVERAGE AREA OF INTERNSHIP: Tractor – Manufacturing / Servicing unit.

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The internship may be organized continuously for four weeks or more than one spell within a semester as per the convenience of the Industry/Institutes. During their stay in the industry, they have to maintain a diary on daily basis to record the work assigned, outcome of the work and it has to be countersigned by the student's in-charge. In addition, he/she has to submit weekly report to the department. During the in-plant training period, the Industry / Institute partner will evaluate their performance for 60 marks and the concerned course teacher for 40 marks as given below

INDUSTRY/ INSTITUTE

1	Attitude	10 marks
2	Punctuality	
3	Behavior	
4	Involvement	10 marks
5	Performance (completion of assigned work)	20 marks
6	Contribution to the industry	20 marks
	Total	**60 marks**

COURSE TEACHER

1	Diary /Record	10 marks
2	Weekly report	10 marks
3	Viva –voce	20 marks
	Total	**40 marks**

LEARNING OUTCOME:

- Students learn the work culture from the concerned industry
- Students learn to handle special tools used in assembling and dismantling of machinery components.

SEMESTER - IV

NSQF Level	**: 4.5**
NCrF Level	**: 5.0**
Job Role / Qualification Pack	**: Tractor Mechanic**
Award / Exit Option	**: Advanced Diploma in Farm Equipments Operation & Maintenance**

24FEVC2401- TRACTOR TRANSMISSION AND HYDRAULIC SYSTEMS
(4 credits)

OBJECTIVES:

- To understand construction of tractor transmission systems.
- To understand the common defects in transmission system and its remedies
- To understand construction of hydraulic control system

UNIT–1: Power transmission system of tractor - Functions; clutch and fluid coupling system - necessity of a clutch in a tractor; essential features of a good clutch; types of clutches -Friction of clutch - single plate, multiple plate clutch; dog clutch and fluid coupling system.

UNIT–2: Transmission gears and torque converter gear – selective sliding type and constant mesh type gear; components of drive train; torque converter.

UNIT–3: Differential unit and final drive - components of differential unit - Functions of crown wheel- differential lock, final drive and power take off shaft.

UNIT–4: Steering system and brake steering system – power steering; brake – principle of operation, classification of brake – mechanical brake and hydraulic brake; types of mechanical brake – internal expanding type, external contracting shoe type and disc type.

UNIT–5: Hydraulic control system – Working principle; Basic components of hydraulic system - Position control system, draft control system, mixed control; Repairs and maintenance of hydraulic system.

REFERENCES:

1. Dr. Jagdishwar Sahay, 2013, A Text Book of Elements of Agricultural Engineering, Standard Publishers Distributors, 1705-B, Naisarak, PB No:1066, Delhi-110 006, ISBN: 978-81-8014-204-8
2. Basic of Transmission, Suspension, Steering System & Brakes, January 2014, Sector: Automobile for Centres of Excellence, Developed by National Instructional Media Institute, Directorate General of Employment & Training, Ministry of Labour& Employment, Government of India, Chennai.
3. A Text Book of Farm Machinery, April 2015, Dr. T. Senthilkumar, Dr. R. Kavitha Dr.V.M. Duraisamy, Published by Thannambikkai publication, Coimbatore, ISBN: 978-93-81102-30-5.
4. A Text Book of Tractor at a glance (A unique book of farm power), 2007, Er. Sanjay Kumar, Published by International Book Distributing Co., Lucknow 226 001 UP, ISBN: 81-8185-185-6

LEARNING OUTCOMES:

- Student learn components and function of tractor transmission system
- Students able to identify the defects in the tractor transmission system and also its remedies.
- Students learn hydraulics control system and its working principles

24FEVC2402- SAFETY OPERATION OF AGRICULTURAL MACHINERIES
(4 credits)

OBJECTIVES:

- Students will be aware on safety aspects of testing of Agricultural Machinery
- Students will be trained on test procedures for ascertaining the performance of the machinery

UNIT–1: Introduction – types of farm accidents – status of accidents.

UNIT–2: Technical requirements for ensuring machinery safety, safety guards, safe distance, safety devices, safety signs and operational case; testing of agricultural machinery for safety; maximum actuating force required to operate control as per ISO recommendation.

UNIT–3: Tools and devices for safety testing, Guards for moving parts, Guards for PTO shafts, safety devices, breaking device, operator's work place, operating controls and roll over protective structures (ROPs); definition of terms.

UNIT–4: Test procedure; criterion for acceptance of ROPS. And Safety precautions - General, Tractor starting, stopping &operations, Towing, using agricultural implements and machinery.

UNIT–5: Farm machinery Safety – Prevention - Causes of Accidents - Safety Provisions – Importance -Problems - Occupational Hazards - Diseases – Psychological problems - Counselling – Statutory Provisions.

REFERENCES:

1. Mehta, M.L., S.R.Verma, S.K.Misra and V.K.Sharma, 1995, "Testing and Evaluation of Agricultural Machinery", Published by Dhaya Publishing House, New Delhi,
2. Sanjay Kumar, 2007, A Text Book of Tractor at a Glance, International book distributing company, Lucknow

LEARNING OUTCOMES:

- Students learn the safety aspects of testing of Agricultural Machinery
- Students learn the precautions to prevent the accidents occurring during handling of agricultural machineries.

24FEVC2403- ENTREPRENEURSHIP DEVELOPMENT (4 credits)

OBJECTIVES:

- To develop and strengthen entrepreneurial quality and motivation among students.
- To impart basic entrepreneurial skills and understandings to run a business efficiently and effectively.

UNIT–1: Entrepreneurial Competence: Entrepreneurship concept – Entrepreneurship as a Career – Entrepreneurial Personality–Characteristics of Successful, Entrepreneur–Knowledge and Skills of Entrepreneur – Scope of the course in creating entrepreneurial opportunities and employment opportunities in public and private sectors – Scopes in competitive examinations.

UNIT–2: Entrepreneurial Environment: Business Environment – Role of Family and Society – Entrepreneurship Development Training and Other Support Organizational Services - Central and State Government Industrial Policies and Regulations - International Business.

UNIT–3: Business Plan Preparation: Sources of Product for Business - Prefeasibility Study - Criteria for Selection of Product - Ownership - Capital - Budgeting Project Profile Preparation - Matching Entrepreneur with the Project - Feasibility Report Preparation and Evaluation Criteria.

UNIT–4: Launching of Small Business: Finance and Human Resource Mobilization Operations Planning - Market and Channel Selection - Growth Strategies - Product Launching – Incubation, Venture capital, IT start-ups.

UNIT–5: Management of Small Business: Monitoring and Evaluation of Business - Preventing Sickness and Rehabilitation of Business Units – Effective Management of small Business.

REFERENCES

1. Hisrich, Entrepreneurship, Tata McGraw Hill, New Delhi, 2001.
2. S.S.Khanka, Entrepreneurial Development, S.Chand and Company Limited, New Delhi, 2001.
3. Mathew Manimala, Entrepreneurship Theory at the Crossroads, Paradigms & Praxis, Biztrantra, 2nd Edition ,2005
4. Prasanna Chandra, Projects – Planning, Analysis, Selection, Implementation and Reviews, Tata McGraw-Hill, 1996.
5. P.Saravanavel, Entrepreneurial Development, Ess Pee kay Publishing House, Chennai - 1997.
6. Donald F Kuratko, T.V Rao. Entrepreneurship: A South Asian perspective. Cengage Learning. 2012

LEARNING OUTCOMES:

- Students will gain knowledge and skills needed to run a business.

24FEVC2404- REPAIR AND OVERHAULING OF ENGINE AND TRACTOR SYSTEM (4 credits)

OBJECTIVES:

- To understand the procedure involved in servicing and overhauling of tractor engine / transmission / hydraulic / electrical and control board system / tyre and front axle.
- To understand common troubles, reasons and its remedies found in different tractor systems.
- To understand care and maintenance of tractor and its components.

Identify, use, maintain and store tools required for overhauling, adjustments, troubles, care and maintenance of the engine and tractor system

UNIT–1: Tractor engine: dismantling & assembling the engine from the tractor, overhauling of cylinder assembly, overhauling of piston & connecting rod assembly.

UNIT–2: Fuel system: identify the different parts of fuel system, servicing fuel feed systems – overhauling and testing of electronic fuel injectors – practice on fault finding and remedies care & maintenance of fuel system.

UNIT–3: Cooling system: checking cooling system for overheating, overhauling of water pumps, check the thermostat valve, pressure cap & fan belt tension. Lubrication system – identify the parts of lubrication oil flow circuit, overhauling of oil pump & oil pressure relief valve.

UNIT–4: Transmission system: dismantling & assembling of clutch, overhauling of gearbox, overhauling of differential and final drive, servicing of the P.T.O shaft, tyre – dismantle the wheels for checking rims, tyres & tubes – overhauling rear axle drive shaft assembly.

UNIT–5: Steering – check & repair a mechanical steering system, overhauling steering gear box. brake system – overhauling the rear hydraulic brake, overhauling the master cylinder assembly, Hydraulic– lubrication of single- and three-point hitching, Electrical system – overhauling of alternator and starting motor assembly.

REFERENCES:

1. Mechanic Tractor, January 2021Sector: Automobile, Common for Mechanic Tractor / Mechanic Agriculture Machinery, Trade: Practical, Developed by National Instructional Media Institute, Directorate General of Employment & Training, Ministry of Labour& Employment, Government of India, Chennai.

LEARNING OUTCOMES:

- Students learn servicing and overhauling of engine and tractor systems
- Student able to identify the faults and its remedies in engine and tractor systems

24FEVC2405 - SERVICE AND MAINTENANCE OF ELECTRICAL & CONTROL BOARD SYSTEM (3 credits)

OBJECTIVES:

- To understand electrical and electronic systems used in tractor.
- To understand how to service the electrical system in tractor

Identify, use, maintain and store tools required for overhauling of different components of the tractor electrical system

UNIT–1: Locating electrical parts, system and controls of the tractor- Making different joints on simple strapped conductors- Sieving, insulating the conductors- Measuring the gauge of the conductors- Soldering the wire joints; Making serious and parallel connections and circuits- Connecting the voltmeter and ammeter- Checking the fuse box, wires short circuited and identification of starting system wiring and marking on terminal joints- Study of circuit breakers, relays and construction of simple circuit using relay

UNIT–2: Testing of alternator output voltage, circuit voltage drops and trouble shooting in charging system- Dismantling and assembling of alternator and troubleshooting of alternator; Dismantling and assembling of starter motor- Replacement of brushes and commutator – Checking up of spark plug, head light, ignition coil and condenser

UNIT–3: Identify and measure voltage of Dry cells/ Battery; Identify the parts of a battery charger and test for its operation; Charge a Secondary Battery; Maintain service and trouble shoot a battery charger; Form a DC source 12V/ 500mA using 2 V cells; Maintenance of Lead- Acid Batteries; Battery Servicing and Testing.

UNIT–4: Various meters and components available in control board of a tractor – its functions and recommended specifications for indicators / gauges for good maintenance of a tractor.

UNIT–5: Identification of faults using the indicators of the control board and its rectifications.

REFERENCES

1. Repair & Overhauling of Auto Electrical & Electronic System, March 2010, Published by National Instructional Media Institute, Chennai.
2. Mechanical Technology in Agriculture, 2005, Donald M. Johnson, Joe Harper, David E. Lawver, Philip, Buriak, Published by International Book Distributing Co., Lucknow 226 001 UP, ISBN: 81-8189-081-7
3. Mechanic Tractor, February 2016, Published by National Instructional Media Institute, , Chennai.
4. Repair & Overhauling of Hydraulic System, October 2011, Published by National Instructional Media Institute, Chennai.

LEARNING OUTCOMES:

- The students learn to identify the repairs in electrical and electronics system used in the tractor
- Students learn servicing and testing of battery
- Students learn to service the alternator and starting motor of tractor
- Students learn to identify repair and maintenance meters available in control board.

24FEVC2406 - OPERATION AND MAINTENANCE OF SOWING MACHINERIES IN FIELD CROPS (3 credits)

OBJECTIVES:

- To study about the function, working principle of different sowing machineries.
- Understand and accomplish to adjust number of seedlings, Plant to plant spacing, seedling depth, row spacing and travelling speed.

UNIT-1: Introduction to seeding or sowing, common seeding crops- broadcasting, dibbling, drilling, seed dropping behind the plough, transplanting, hill dropping, check row planter, seed metering mechanism.

UNIT-2: Manual operated sowing machineries – broadcaster, gorru, seed drill, components, manual operated seed drill- single row, double row seed drill or planter.

UNIT-3: Power operated sowing machineries – automated portray sowing machine, power operated seed drill – tractor drawn seed cum fertilizer drill, tractor drawn pulse seeder.

UNIT-4: Sowing machineries for paddy - direct paddy seeder, daincha paddy seeder. Paddy Transplanter - Transplanter process, objectives, techniques, description, mechanism, function, importance, Nursery raising and field preparation techniques, manual and power operated- functions, specifications, power required, general information, salient features

UNIT-5: Driving theory and practice, procedure of use of various controls, checking picking mechanism, spacing adjustment, care and maintenance of sowing machineries in field crops.

REFERENCE BOOKS

1. Er. Sanjay Kumar, Er. Vishal Kumar and Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8
2. Ojha, T.P and A.M.Michael 2005. Principles of Agricultural Engineering Vol I. Jain Brothers, New Delhi. ISBN: 978-8186321638

LEARNING OUTCOMES

- Plan and execute to grow nursery and prepare field for mechanical Transplanting.
- Perform operation and maintenance of rice transplanter efficiently and economically.

24FEVC2407 - OPERATION AND MAINTENANCE OF PADDY HARVESTERS
(3 Credits)

OBJECTIVES:

- To give driving practice of operating paddy harvesters
- To identify the faults and remedies of paddy harvesters

UNIT–1: Self propelled vertical conveyor reaper - Function, suitability of crop, power requirement, labour requirement, components, capacity, adjustments, causes and remedies.

UNIT–2: Reaper binder - Function, suitability of crop, power requirement, labour requirement, components, capacity, adjustments, causes and remedies.

UNIT–3: Mini combine harvester - Function, suitability of crop, power requirement, labour requirement, components, capacity, adjustments, causes and remedies.

UNIT–4: Combine harvester - Function, suitability of crop, power requirement, labour requirement, components, capacity, adjustments, causes and remedies.

UNIT–5: Practice on the operation, adjustments care and maintenance of paddy harvesters.

REFERENCES

1. Repair, Maintenance & Field Operation of Combine Harvester, March 2011, Published by NIMI Chennai.
2. R K Ghosh & S Swain, 1993, Practical Agricultural Engineering, Naya Prokash Publications, Kolkata, ISBN: 81-85421-15-3
3. Er. Sanjay Kumar, Er. Vishal Kumar, Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8

LEARNING OUTCOME

- Student learn to operate and maintain the VCR in the field condition
- Student learn to operate and maintain the reaper binder in the field condition

24FEVC2408 –INTERNSHIP – IV (3 Credits)

OBJECTIVE: To learn skills for specific job role from relevant Industry / Institution.

COVERAGE AREA OF INTERNSHIP: Tractor – Manufacturing / servicing unit

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The internship may be organized continuously for four weeks or more than one spell within a semester as per the convenience of the Industry/Institutes. During their stay in the industry, they have to maintain a diary on daily basis to record the work assigned, outcome of the work and it has to be countersigned by the student's in-charge. In addition, he/she has to submit weekly report to the department. During the in-plant training period, the Industry / Institute partner will evaluate their performance for 60 marks and the concerned course teacher for 40 marks as given below

INDUSTRY/ INSTITUTE

1	Attitude	10 marks
2	Punctuality	
3	Behavior	
4	Involvement	10 marks
5	Performance (completion of assigned work)	20 marks
6	Contribution to the industry	20 marks
	Total	**60 marks**

COURSE TEACHER

1	Diary /Record	10 marks
2	Weekly report	10 marks
3	Viva –voce	20 marks
	Total	**40 marks**

LEARNING OUTCOME

- Students learn the work culture from the concerned industry
- Students learn to handle special tools used in assembling and dismantling of machinery components.

SEMESTER - V

NSQF Level	**: 5.0**
NCrF Level	**: 5.5**
Job Role / Qualification Pack	**: Agriculture Machinery Technician**
Award / Exit Option	**: NA**

24FEVC3501 - POST HARVESTING EQUIPMENTS (4 Credits)

OBJECTIVES:

- To understand the operation and maintenance of selected post harvesting equipments
- To understand the adjustments needed for effective functioning of the equipments

UNIT–1: Paddy Machineries - Function, suitability of crop, power requirement, labour requirement, components, capacity, & adjustments.

UNIT–2: Groundnut &Pulse threshers -Function, suitability of crop, power requirement, labour requirement, components capacity& adjustments.

UNIT–3: Dehusker & sheller- Function, suitability of crop, power requirement, labour requirement, components, capacity& adjustments.

UNIT–4: Grader -Function, suitability of crop, power requirement, labour requirement, components, capacity, & adjustments of Seed cleaner cum grader, Groundnut grader, Potato grader and paddy winnower.

UNIT–5: Drier - Function, suitability of crop, power requirement, labour requirement, components and capacity of rectangular metal bin drier, Solar Tunnel Drier, Solar cabinet drier, Agricultural waste fired furnace drier

REFERENCES:

1. Repair, Maintenance & Operation of Post harvesting Equipments, March 2011, Sector: Agriculture for Modular Employable Skills, Developed by National Instructional Media Institute, Directorate General of Employment & Training, Ministry of Labour& Employment, Government of India, Chennai.

2. Directory of Rural Technologies, Vol.1, Farm & Post-harvest Equipment, 1986, Published by Council for Advancement of Rural Technology, New Delhi

3. Principles of Agricultural Processing, 1994, P.H. Pandey, Published by Kalyani Publishers, New Delhi

4. Bankable Post Harvest Equipment developed in India, 1986, R P Kachru, P K Srivastava, B S Bisht & T P Ojha, Published by CIAE, ICAR-Bhopal

LEARNING OUTCOME:

- Student will able to learn the operation and maintenance of selected post harvesting machineries.
- To learn the adjustments needed for effective functioning of the machineries

24FEVC3502 - RENEWABLE ENERGY APPLIANCES (4 Credits)

OBJECTIVES:

- To understand the various sources of renewable energy and their applications
- To attend minor repair & maintenance of solar gadgets and biogas plant

UNIT–1: Renewable energy – definition; comparison between conventional and renewable energy; solar energy, wind energy and biomass energy – merits and demerits.

UNIT–2: Solar applications – Solar cooker, solar water heater, solar dryer, solar distillation, solar lantern and solar water pumps – components and working principles; Repair & Maintenance of solar gadgets.

UNIT–3: Bio gas plants – Fixed dome type and Floating gas holder type – Construction details, operational parameters of a biogas plant; Repair and Maintenance of bio gas plants.

UNIT–4: Wind mill applications – pumping water, grinding grain and generation of electricity – classification of wind mill - horizontal axis rotor and vertical axis rotor.

UNIT–5: Gasifier –Classification of gasifier – up-draft, down-draft, cross – draft and fluidized bed gasifier; Components and functions; cooling and cleaning of producer gas; Recommended fuel size for different types of gasifiers.

REFERENCES:

1. Repair, Maintenance and operation of energy sources equipments, 2011, NIMI Publications, Chennai.
2. Er. Sanjay Kumar, Er. Vishal Kumar, Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8.
3. G.D.Rai, 1988.Non-conventional Energy Sources, Published by KhannaPublishers, Chennai, ISBN- 13:978-8174090737, ISBN - 19788174090737.

LEARNING OUTCOME:

- Students learn the various sources of renewable energy and their application and limitations
- Students learn to handle the renewable energy gadgets

24FEVC3503 –BASICS OF ACCOUNTING (4 Credits)

OBJECTIVES:

- To understand basic concepts of Accounting for Business
- To understand the accounting practices and its techniques with special reference to Sole-Proprietorship, Trading and Non-Trading Concerns.

UNIT–1: Fundamentals of Accountancy, Meaning, Scope and Utility of Accounts, Methods of keeping Books of Accounts, Users of Accounts, Fundamental Accounting Equation, Types of Accounts, Rules of Debit and Credit, Types of Transactions, Types of Assets and Liabilities

UNIT–2: An introduction - Book keeping Vs. Accounting - Relationship among Book-keeping, Accounting and Accountancy - Accounting Principles - Accounting Standards in India - Source documents - Double entry system - Transaction – Account - Approaches of recording transactions - Accounting rules - Journal entries

UNIT–3: Format of ledger account - Distinction between journal and ledger - Procedure for posting - Balancing of ledger accounts - Need for preparing trial balance - Definition of trial balance - Features of trial balance - Objectives of preparing trial balance - Limitations of trial balance - cash book and its types

UNIT–4: introduction to computers – use of computer in accounting, data storage, retrieval, taxation using computer and soft wares.

UNIT–5: Tally – fundamentals, Features, Start-up, Screen Components, Mouse/ Keyboard functions, Screen Areas, Company Data, Creation / Altering Company in Tally.

REFERENCES:

1. Accounting for Managers – J. Made Gowda – Himalaya Publishing House, 2015
2. Financial Management, I.M.Pandey,
3. Financial Management, Texts and cases, 2014.
4. Financial Accounting by Dr. Malleswari, 7th Edition, 2016. Himalaya Publishing House.

LEARNING OUTCOME:

- The student will gain knowledge about the basics of book keeping,
- The students able to prepare balance sheets and analysis of financial statements

24FEVC3504 - OPERATION AND MAINTENANCE OF ELECTRIC MOTOR AND PUMPS (3 Credits)

OBJECTIVES:

- To understand Operation and Maintenance of motors &pumps used for irrigation.
- To understand the troubles, occur in different motors & pumps and its remedies.

UNIT–1: Introduction of electric motors – types of electric motors used in pump sets, tube wells, etc., selection of electric motors - care, maintenance of installation of electric motors - Accessories for electric motor pump set - Electric motor trouble shooting, periodic servicing and off-season storage.

UNIT–2: Introduction of pump;Types of pumps – Centrifugal pump, Vertical turbine pump, Submersible pump, Propeller pump, Jet pump and Reciprocating pump; Comparative study of different pumps.

UNIT–2: Centrifugal pump – working principle, components and accessories; Installation operation and maintenance; trouble shooting in Centrifugal pump.

UNIT–3: Air compressor for lifting water from bore-wells– Important components; Working arrangement; Troubleshooting in air compressor.

UNIT–4: Submersible pump –working principle, Components and accessories; Installation, Operation and Maintenance; Troubleshooting in Submersible pump.

UNIT–5: Important terms and pump calculation; cost calculation of pumping. Safety, precautions in handling electrical appliances & motors.

REFERENCES:

1. Fundamentals of Agricultural Engineering, 2016, by Er. Sanjay Kumar, Er. Vishal Kumar, Ram Kumar Sahu, Kalyani Publications, New Delhi – 110 002.

2. Elementa of Agricultural Engineering, 2013, By Dr. Jagdishwar Sahay, Standard Publishers Distributers, Delhi – 110 006.

LEARNING OUTCOME:

- Student will able to learn the operation and maintenance of different pumps used for irrigation.
- Student will able to learn to rectify the troubles occur in different pumps

24FEVC3505 - OPERATION AND MAINTENANCE OF FIELD CROP HARVESTER (3 Credits)

OBJECTIVES:

- To learn the operation and maintenance of different crop harvesting machineries

UNIT–1: Maize harvester- Identification for components, functions, suitability, power requirement, labour requirement and capacity.

UNIT–2: Groundnut Digger- Identification for components, functions, suitability, power requirement, labour requirement and capacity.

UNIT–3: Sugarcane Harvester - Identification for components, functions, suitability, power requirement, labour requirement and capacity.

UNIT–4: Potato and Turmeric Digger - Identification for components, functions, suitability, power requirement, labour requirement and capacity.

UNIT–5: Fruit harvesting tools and machinery - Identification for components, functions, suitability, power requirement, labour requirement and capacity.

REFERENCES

1. Repair, Maintenance & Field Operation of Root Harvesting Equipments, March 2011, Sector: Agriculture for Modular Employable Skills, Developed by National Instructional Media Institute, Directorate General of Employment & Training, Ministry of Labour& Employment, Government of India, Chennai.
2. Farm Machinery and Equipment, Smith, Wilkes, Tata McGraw Hill.
3. Er. Sanjay Kumar, Er. Vishal Kumar, Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8
4. Performance Evaluation of Sugarcane Harvesters, 2002, Technical Report No. CIAE/AMD/NATP/2002/272, CIAE, ICAR-Bhopal

LEARNING OUTCOMES:

- Students able to operate and maintain the different types of crops harvesting machineries

24FEVC3506 - AGRO BASED ENTREPRENEURSHIP ACTIVITIES
(4 Credits)

OBJECTIVE:

- Students will be trained under different agro based entrepreneurship activities.

Introduction of different agro based entrepreneurship activities; conduct market survey and analyse market demand based on market trend, existing competition, current requirement, market status, etc. Identify possible source of finance / loan; Identify potential farmers; identify suitable location for case of conducting business.

Field study and report preparation on

- Study on vermi compost unit.
- Study on value addition of milk and milk products.
- Study on poly house cultivation.
- Study on value addition of fruits and vegetables.
- Study on cold storage unit.

REFERENCES

1. Er. Sanjoy Kumar, Er. Vishal Kumar, Ram Kumar, 2012, "Fundamentals of Agricultural Engineering", Kalyani Publishers, Ludhiana

LEARNING OUTCOME

- Students learn to identify suitable agro based entrepreneurship activity based on location, market demand, possible source of finance and opportunity for scaling up the business.

24FEVC3507 - INTERNSHIP - V (5 Credits)

OBJECTIVE: To learn skills for specific job role from relevant Industry / Institution.

COVERAGE AREA OF INTERNSHIP: Pumps & post harvesting (Manufacturing / servicing unit)

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The internship may be organized continuously for four weeks or more than one spell within a semester as per the convenience of the Industry/Institutes. During their stay in the industry, they have to maintain a diary on daily basis to record the work assigned, outcome of the work and it has to be countersigned by the student's in-charge. In addition, he/she has to submit weekly report to the department. During the in-plant training period, the Industry / Institute partner will evaluate their performance for 60 marks and the concerned course teacher for 40 marks as given below

INDUSTRY/ INSTITUTE

1	Attitude	10 marks
2	Punctuality	
3	Behavior	
4	Involvement	10 marks
5	Performance (completion of assigned work)	20 marks
6	Contribution to the industry	20 marks
	Total	**60 marks**

COURSE TEACHER

1	Diary /Record	10 marks
2	Weekly report	10 marks
3	Viva –voce	20 marks
	Total	**40 marks**

LEARNING OUTCOMES:

- Students learn the work culture from the concerned industry
- Students learn to handle special tools used in assembling and dismantling of machinery components.

SEMESTER - VI

NSQF Level	**: 5.0**
NCrF Level	**: 5.5**
Job Role / Qualification Pack	**: Agriculture Machinery Entrepreneur**
Award / Exit Option	**: B. Voc in Farm Equipments Operation & Maintenance**

24FEVC3601- AGRIBUSINESS AND PROJECT MANAGEMENT (4 Credits)

OBJECTIVE:

- To understand special features of agri business and its importance of agri business.

UNIT–1: Agribusiness: Agribusiness – Definition – Structure of Agribusiness (input, farm and product sectors), Agribusiness Management - Special features of Agribusiness - Importance of Agribusiness in Indian Economy.

UNIT–2: Introduction to Principles of Management: Management functions — planning, organizing — departmentation, forms of agri business organization - staffing, directing, supervision and motivation, controlling — types, performance, evaluation and control techniques.

UNIT–3: Production and Personal Management: Functional areas of agri business—production and operations management—functions, planning, physical facilities and managing quality. Inventory management—raw material procurement, inventory types, costs, personnel management.

UNIT–4: Marketing Management: Marketing management — marketing environment, marketing mix pricing and marketing polices. Visit to AVIF – TNAU.

UNIT–5: Input Marketing, Distribution: Input marketing firms-types and distribution channels. Processing firms-types, size and managerial problems. Management Information System (MIS) - concept and applications. Business standards business - Intellectual property rights and patenting – Government policies for agri business.

REFERENCES:

1. Prasad, L.M, 2005, 'Principles and Practices of Management', Sultan Chand and Sons Educational Publishers, New Delhi.
2. Richard, B Chase, Nicholas J., Acquilano and F.Robert Jacobs, 2007, `Production and Operations Management - Manufacturing and service, Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Aswathappa, K, Human Resource Management: Text and Cases, Tata McGraw-Hill Pub. Co. Ltd. New Delhi, 5th Edition, 2008.
4. Chandra Prasanna. 2000. Financial Management - Theory and Practice. Tata Mc Graw Hill Publishing Company Ltd., New Delhi.

LEARNING OUTCOME:

- The students able to start suitable agri business enterprises**.**

24FEVC3602- FINANCING SOURCES OF AGRI BUSINESS (4 Credits)

OBJECTIVES:

- The course aims to make students proficient in concepts and techniques of financial management in agri business.
- Focus will be on developing understanding of the application of Financial and investment decisions.

Unit-1: Financial policy, sources of finance: external, internal, owned, debt, foreign financial participation; raising finance-some important issues: effect of legal form of organization, provisions of the Companies Act, control of capital issues; need for financing agri business in India, assessment of the capacity of the borrowers to borrow and repay

Unit-2: Financial markets: money and capital markets; regional and all India financial institutions: commercial banks, regional rural banks, NABARD, cooperatives' (NCDC and other institutions) Agro Industries Corporation, IDBI, IFCI, ICICI, SFCs, SIDCs; LIC, Non-banking financial companies

Unit-3: Agri business financing system in India: aims and objectives of financing of agri-business, framework of financial decision making, changing role of finance manager, long term finance and short term financing for agri business- methods of appraising working capital requirements

Unit-4: Precautions and procedural formalities of financing: pre, progress and post financing requirements, RBI guidelines. Visit to Lead bank, Cooperative banks & NVFCS

Unit-5: Role of external finance for agricultural production, marketing and processing-demand assessment, repayment method, steps for NPA reduction; problems, prospects and challenges in financing of agri business in India.

REFERENCES:

1. Chandra P. 2000. Financial Management. Tata McGraw Hill. Khan MY & Jain PK. 2004.
2. Financial Management: Text, Problems and Cases. Tata McGraw Hill. Pandey IM. 1997.
3. Financial Management. Vikas Publ. Ramachandran N & Kakani RK. 2005. Financial

LEARNING OUTCOMES:

- The students should have gained the knowledge about the basics of financial institution, schemes & interest rates.
- The students should able to make decision of financial inputs and financial forecasting.

24FEVC3603- FUNCTION AND MANAGEMENT OF CUSTOM HIRING CENTER
(4 Credits)

OBJECTIVE:

- Students will be trained in Custom Hiring Centre and make them to understand the functions and management of the centre

Students will undergo one month training in any established custom hiring centre and prepare a case study report which will cover the following items.

UNIT–1: Introduction - Farm Mechanization- status and its needs, advantages, Govt. schemes, CHC - objectives, custom hiring centres in India, TamilNadu, fixing of hiring charges, advantages, dis- advantages.

UNIT–2: To evaluate and identify machineries for hire based on farmer demand competition and availability and to fix a suitable hiring price for the machinery based on procurement cost, competitor cost and profitability.

UNIT- 3: Cost of operation of farm machinery- problem solving. Fixed cost – depreciation cost, interest on investment, taxes, insurance and housing. Variable cost – repair and maintenance cost, fuel cost, lubrication oil cost and operator cost.

UNIT–4: To identify sources of procurement for machinery and mode of purchase and to prepare application form for obtaining financial loan

UNIT–5: To conduct local survey to understand the current trend and needs of machineries in the area.

REFERENCES

1. Terry Kastens 1997. Farm Machinery Operating Cost Calculations. Kansas State University Agricultural Experiment Station and Cooperative Extension Service.
2. Guide for estimating cost of farm machinery operation, 1979. Public.Resource.Org. IS: 9164.

LEARNING OUTCOMES:

- To impart knowledge about the calculations of description wear and tear.
- To occur knowledge about the cost of operation and maintenance methods in using of agriculture machineries

24FEVC3604- FUNCTION AND MANAGEMENT OF AGRO SERVICE CENTER

(4 Credits)

OBJECTIVE:

- Students will be trained in Agro Service Centre and make them to understand the functions and management of the centre
- Students will undergo one month training in any established tractor / any agricultural machinery/ Irrigation machinery dealer and prepare a case study report which will cover the following items.

UNIT–1: Application & analysis of practical knowledge on selection of right machinery based on needs – land types – financial sources – availability of technology.

UNIT–2: Identification of vendors – demographic – locality – provision of service maintenance- durability of machine and technology.

UNIT–3: Role & need of skilled operators – knowledge on basics maintenance – periodical maintenance & handling of minor repairs

UNIT–4: Stores management – LIFO – FIFO – costing on service & maintenance – comparison on competitive service providers and manufactures

UNIT–5: Preparation of report on early maintenance – cost effect ratio – return on investment & replacement of the machineries.

EVALUATION METHOD:

Dealer / Service Centre

1	Attitude	10 marks
2	Punctuality	
3	Behaviour	
4	Involvement	10 marks
5	Performance (completion of assigned work)	20 marks
6	Contribution to the industry	20 marks
	Total	**60 marks**

Course Teacher

1	Diary /Record	10 marks
2	Weekly report	10 marks
3	Viva –voce	20 marks
	Total	**40 marks**

LEARNING OUTCOME

- Students learn to develop a sustainable model of Agro Service Centre

24FEVC3605- OPERATION AND MAINTENANCE OF COMBINE HARVESTER FOR PADDY (4 Credits)

OBJECTIVES:

- To teach the different components of combine harvester.
- To practice on driving combine harvester.
- To learn repairs and maintenance of combine harvester.

UNIT–1: Combine harvester – introduction – prime operational functions in combine; different parts, components and controls of combine harvester

UNIT–2: Practice on field operative of combine harvester under different field conditions and learn safe machine operating procedure.

UNIT–3: Perform daily maintenance of combine harvester

UNIT–4: Calculation of grain losses and other parameters – collectable and non-collectable losses due to combine–Estimate the cost of operation of combine, power requirement and field capacity

UNIT–5: First-aid **–** Definition; purpose; key aims of first aid – preserve life, prevent further harm and promote recovery; golden hours in first aid; First-aid box; important guidelines for first aiders. Safety precautions while starting, operating and stopping of combine harvester.

REFERENCES

1. Repair, Maintenance & Field Operation of Combine Harvester, March 2011, Published by NIMI Chennai.
2. Jagadishwar Sahay, 2010. Elements of Agricultural Engineering**.** Standard Publishers Distributors, New Delhi. ISBN: 978 – 818040440

LEARNING OUTCOMES:

- Students learn to identify tools for maintenance of combine harvester.
- Students learn to adjust cutter bar, feeder, thresher, straw walker blower and augers depend on field conditions.
- Students learn to drive combine harvester.
- Students learn to calculate post-harvest losses and cost of operation

24FEVC3606- MINI PROJECT (5 Credits)

The mini project work will be in one of the following themes:

i. A new innovation or critical study related to the technology or development dimensions envisaged by the course

ii. Preparation of an innovative enterprise for one's future career

iii. Carrying out a regional development/employment development project planning exercise within the spirit of the course

iv. Finding out an innovative project with analysis suitable for the specific area.

Project work will be carried out by a group of students, minimum 2 and maximum 5 out of 100 marks, the evaluation of 60 marks will be awarded by project guide based on students' performance during project period and 40 marks will be awarded jointly by project guide and course coordinator based on final viva and students project presentation.

24FEVE3607–INTERNSHIP-VI (5 Credits)

OBJECTIVE: To learn skills for specific job role from relevant Industry / Institution.

COVERAGE AREA OF INTERNSHIP: Dealers & Franchisee Units & Other Financial Institution.

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The internship may be organized continuously for four weeks or more than one spell within a semester as per the convenience of the Industry/Institutes. During their stay in the industry, they have to maintain a diary on daily basis to record the work assigned, outcome of the work and it has to be countersigned by the student's in-charge. In addition, he/she has to submit weekly report to the department. During the in-plant training period, the Industry / Institute partner will evaluate their performance for 60 marks and the concerned course teacher for 40 marks as given below

INDUSTRY/ INSTITUTE

1	Attitude	10 marks
2	Punctuality	
3	Behavior	
4	Involvement	10 marks
5	Performance (completion of assigned work)	20 marks
6	Contribution to the industry	20 marks
	Total	**60 marks**

COURSE TEACHER

1	Diary /Record	10 marks
2	Weekly report	10 marks
3	Viva –voce	20 marks
	Total	**40 marks**

LEARNING OUTCOMES:

- Students learn the work culture from the concerned industry
- Students learn to handle special tools used in assembling and dismantling of machinery components.

SEMESTER - VII

B.Voc (Hons) – Farm Equipments Operation & Maintenance

1. **Specialization- I** (Identification of Different Sectors & Activities in Farm Machineries)
2. **Specialization- II** (Designing and Manufacturing of Agricultural Machineries)
3. **Specialization-III** (Marketing& Financing of Agricultural Machineries)

NSQF Level	**: 5.5**
NCrF Level	**: 6.0**
Job Role / Qualification Pack	**1. Farm Machinery Agriculturist** **2. Operations and Management of Farm Workshop** **3. Management of Record Maintenance, Review& Audit Process**
Award / Exit Option	**: NA**

B.Voc (Hons)

Title of Courses: 1. Research Methodology with subject code as (**24FEVC4701) &**
2. Internship – VII with subject code as (**24FEVE4706)** will be same for the three Specialisation*****

24FEVC4701–RESEARCH METHODOLOGY (4 Credits)

OBJECTIVES:

- To make the students understand about Research Processing.
- To enable the students to gain knowledge on to conduct research, article writing, presentation and concluding of research

UNIT–1: Meaning of Research: Objectives of research, Types of Research, Research Process, Problem Statement, Research Design,

UNIT–2: Problem Formulations: Conducting Literature Review, Information's Sources (Books, monographs, reviews, blogs, etc.,) Information Retrieval, Role of libraries in Information Retrieval, Research Gap,

UNIT–3: Research Design: Experimental / Theoretical/Empirical Research, Cause effect Relationship, Field Experiment, Data/variable types and classifications, Data collection- Methods and Tools

UNIT–4: Data Analysis and Interpretations: Sampling, Sampling Error, Statistical Methods/Tools – Measures of Central Tendency, Test of Hypothesis - Correlations and regression analysis.

UNIT–5: Writing Research Articles and Thesis: Guidelines for writing the abstracts, introductions, methodology, results and discussion, Conclusion, section of manuscript, Plagiarism and Ethical Considerations in Research.

REFERENCES:

1. Research and Methodology by C.R Kothari, Gaurav Garg.
2. Research and Methodology by Ranjit Kumar
3. Research Design by R. Panneerselvam
4. Case Study Research Design and Methods by Robert K. Yin
5. The Action Research Dissertation (A Guide FOR Students and Faculty) by Kthryn Herr, Gary L. Anderson
6. Research Design by Jhon W. Creswell

LEARNING OUTCOME:

- After learning this paper, the students will gain knowledge in, Research Process, Conducting Literature Review, Information's Sources, Data collection, Sampling, Citation and listing system of documents**.**

24FEVC4706–INTERNSHIP-VII (6 Credits)

OBJECTIVE: To learn skills for specific job role from relevant Industry / Institution.

COVERAGE AREA OF INTERNSHIP: Dealers & Franchisee Units & Other Financial Institution.

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The internship may be organized continuously for four weeks or more than one spell within a semester as per the convenience of the Industry/Institutes. During their stay in the industry, they have to maintain a diary on daily basis to record the work assigned, outcome of the work and it has to be countersigned by the student's in-charge. In addition, he/she has to submit weekly report to the department. During the in-plant training period, the Industry / Institute partner will evaluate their performance for 60 marks and the concerned course teacher for 40 marks as given below

INDUSTRY/ INSTITUTE

1	Attitude	10 marks
2	Punctuality	
3	Behavior	
4	Involvement	10 marks
5	Performance (completion of assigned work)	20 marks
6	Contribution to the industry	20 marks
	Total	**60 marks**

COURSE TEACHER

1	Diary /Record	10 marks
2	Weekly report	10 marks
3	Viva –voce	20 marks
	Total	**40 marks**

LEARNING OUTCOMES:

- Students learn the work culture from the concerned industry
- Students learn to handle special tools used in assembling and dismantling of machinery components.

Specialisation- I (Identification of Different Sectors & Activities in Farm Machineries)

24FEVC4702–APPLIED INSTRUMENTATION IN FARM MACHINERY (4 Credits)

OBJECTIVE:

- To understand the operation of instruments that is used in design and evaluation of farm machinery and their application.

UNIT-1: Strain gauges, types and applications in two- and three-dimensional force measurement in farm machinery. Various methods of determining strain/stresses experimentally. Design, selection and analysis of strain gauges.

UNIT-2: Introduction to transducers (sensors). Active and passive transducers, analog and digital modes, null and deflection methods. Performance characteristics of instruments including static and dynamic characteristics.

UNIT-3: Load cells, torque meters, flow meters types and principles of working. Devices for measurement of temperature, relative humidity, pressure, sound, vibration, displacement (LVDT) etc.**:** Recording devices and their types. Measuring instruments for calorific value of solid, liquid, and gaseous fuels.

UNIT-4: Instruments used to measure the internal combustion engine. Tacho meter, feeler gauge- flat, wire type, thickness gauge, telescoping gauge, vernier caliper, dial indicators.

UNIT-5: Basic signal conditioning devices, data acquisition system. Microcomputers for measurement and data acquisition. Data storage and their application including wireless communication. Application of sensors in farm machinery and power: Tractor and selected farm machinery.

REFERENCES:

1. Ambrosius EE. 1966. Mechanical Measurement and Instruments. The Ronald Press Company.
2. Doeblin EO. 2004. Measurement System- Application and Design. Tata McGrawHill
3. Nakra BC and Choudhary KK. 1985. Instrumentation, Measurement and Analysis.2nd Edition Tata McGraw Hill.
4. Nachtigal CL (Editor). 1990. Instrumentation and Control. Fundamentals and• Application. Wiley Series in Mechanical Engineering.
5. Oliver FJ. 1971. Practical Instrumentation Transducers. Hayden book company Inc.Course.

LEARNING OUTCOME:

- The student will be able to select and implement suitable systems for measurement of different parameters like force, torque, speed and pressure etc, that are used in design and evaluation of Farm machinery.

24FEVC4703– FUNDAMENTALS OF AGRICULTURAL EXTENSION (4 Credits)

OBJECTIVE:

- To understand the basic fundamentals of Agriculture extension.

UNIT 1: Understanding the fundamentals of extension education, extension systems in India

UNIT 2: Insight in to programme planning and rural development efforts, extension administration.

UNIT 3: Knowledge on different extension methods and approaches used for transfer of agricultural technology.

UNIT4: Provide an opportunity to visit different organizations involved in extension activities and rural development work.

UNIT 5: Acquaintance on practical skills in preparation of different extension teaching methods Knowledge on the concepts of adoption, diffusion and innovation and understanding the principles involved in agricultural journalism

REFERENCES

1. De, D. and Jirli, B. (2010). A Handbook of Extension Education. Agrobios (India), Jodhpur.
2. Mondal, S. (2019). Fundamentals of Agricultural Extension Education. Kalyani publishers, New Delhi.

LEARNING OUTCOMES

Students gain knowledge in various extension activities.

24FEVC4704–MACHINERY FOR HORTICULTURE AND PROTECTED AGRICULTURE (6 Credits)

OBJECTIVE:

- To learn about the different machinery used in cultivation of vegetable crops, orchard crops and also in protected agriculture.

UNIT-1: Vegetable cultivation, nursery machinery, tray seeders, grafting machines, vegetable transplanters. Machinery for planting crops on raised beds, mulch laying and planting machines. Harvesting of vegetable crops: Harvesting platforms and pickers.

UNIT-2: Machinery for orchard crops: Pit diggers, inter-cultivators and basin forming equipment for orchards. Machinery for transplanting of trees. Harvesters for fruit crops: Shaker harvesters, types and principle of operation. Elevated platforms for orchard management and harvesting. Pruning machines.

UNIT-3: Machinery for orchards, vineyard machinery spraying machines, inter-cultivation machines. High clearance machines and special purpose machinery for crops on trellis. Machinery for special crops: Tea leaf harvesters, pruners and secateurs.

UNIT-4: Machinery for lawn and garden: Grass cutters, special machinery for turf maintenance. Turf aerators and lime applicators.

UNIT-5: Protected agriculture: Principles, mechanical systems of greenhouse, ventilation systems, shading system, water logging system, irrigation system, sensors, electrical and electronic system. Intelligent Control system for greenhouses. Machinery for processing of growth media, tray filling machines-tray sowing machines, transplanting machines. Robotic grafting machines. Weeding and thinning equipment. Crop protection and harvest under protected agriculture.

REFERENCES:

1. Bell B and Cousins S. 1997. Machinery for Horticulture. Old Pond Publishing Ltd ISBN10: 0852363699,ISBN-13: 978-0852363690
2. Good Agricultural Practices for Greenhouse Vegetable Production in the South East European countries FAO Rome 2017.
3. Ponce P, Molina A, Cepeda P, Lugo E and Mac Cleery B. 2014. Greenhouse Design andControl. CRC Press, ISBN 9781138026292 - CAT K23481, 1st Edition.

LEARNING OUTCOME:

- Knowledge about different principles of mechanizing cultivation of horticultural crops and in protected agriculture.

24FEVC4705 – LAND GRADING AND HEAVY EARTH MOVING MACHINERY
(6 Credits)

OBJECTIVE:

- To understand the different types of earth moving systems and them applications.

UNIT-1: Engineering fundamentals related to earth moving machinery, swell, shrinkage and compaction measurements, use of tractors and crawlers and effect of altitude and temperature on their performance.

UNIT-2: Grading of sloppy lands. Principles of mechanisms used in crawler mounted tractors. Dump trucks and their mechanisms. Load hoisting equipment.

UNIT-3: Land cleaning and reclamation equipment, power shovels, drag lines and cam shells, rubber tyre for earth moving machinery.

UNIT-4: Earth diggers and ditchers. Bull dozers, Backhoe excavators (JCB) and scrapers, Elevating and self powered graders, Trenching machineries and wagons.

UNIT-5: Automation of earth moving and grading machines. Boring machines, different methods of boring, Economic analysis of land development machinery.

REFERENCES:

1. Dutta S K. 1987. Soil conservation and land management, International Distributors,Dehradun.
2. Sigma and Jagmohan. 1976. Earth moving machinery, Oxford and IBH.
3. Wood and Stuart. 1977. Earth moving machinery, Prentice Hall.
4. Nicolas H L, Day D H. 1998. Moving the earth, The work book of excavation, McGraw Hill.

LEARNING OUTCOME:

- To clarify basic concepts associated with earth-moving machinery
- To understand the properties of soil and ground in earth-moving.

Specialisation- II (Designing and Manufacturing of Agricultural Machineries)

24FEVC4708–ADVANCED INTERNAL COMBUSTION ENGINES (4 Credits)

OBJECTIVES:

- To gain insight on the working principle of spark ignition engines and compression ignition engines.
- To study the pollutant formation and its control in IC engines
- To study the recent technologies adopted in IC engine applications.

UNIT–1: Spark ignition Engine mixture requirements – Fuel – Injection systems – Monopoint, Multipoint injection, Direct injection – Stages of combustion – Normal and abnormal combustion – factors affecting knock – Combustion chambers.

UNIT–2: States of combustion in C.I. Engine – Direct and indirect injection systems – Combustion chambers – Fuel spray behaviour – spray structure, spray penetration and evaporation – air motion – Introduction to Turbo charging.

UNIT–3: Pollutant – Sources – Formation of carbon monoxide, Unburnt hydrocarbon, NOx, Smoke and Particulate matter – Methods of controlling Emissions – Catalytic converters and Particulate Traps – Methods of measurements and Introduction to emission norms and Driving cycles.

UNIT–4: Alcohol, Hydrogen, Natural Gas and Liquefied Petroleum Gas- Properties, Suitability, Merits and Demerits as fuels, Engine Modifications.

UNIT–5: Lean Burn Engines – Stratified charge Engines – homogeneous charge compression ignition engines – Plasma Ignition – Measurement techniques – laser Doppler, Anemometry. Use of nano technology in IC Engines.

REFERENCES

1. Duffy Smith, Auto fuel Systems, The Good Heart Willox Company, Inc., 1989.
2. Heywood, J.B., Internal Combustion Engine Fundamentals, McGraw-Hill, 1988.
3. K.K. Ramalingam, Internal Combustion Engine fundamentals, Scitech Publications, 2002.
4. Kirpal Singh, Automobile Engineering Vol - I, Standard Publishers, Delhi 2013.
5. R.B. Mathur and R.P.Sharma, Internal Combustion Engines, Dhanapat Rai Publications,1993.
6. V. Ganesan, Internal Combustion Engines, II Edition, Tata McGraw-Hill Education, 2002.

LEARNING OUTCOME:

- On successful completion of this course the student will be able to understand the working principle of IC engines, source of pollution formation and its control and recent trends in IC engines.

24FEVC4709– MACHINE DESIGN (4 Credits)

OBJECTIVE:

- To acquaint and equip the students with the latest design procedures of machine and its systems.

UNIT 1: Drawing in machine drawing- Machine components, detailed assembly and manufacturing drawing- Forms of screw threads, B.S.W., square, metric, representations of threads, bolts, studs, screws, nuts, hexagonal and square headed.

UNIT 2: Different types of keys, Sunk taper key, hollow saddle key, Flat saddle key, key with gib, head, round key, Feather key, wood ruff key. Cotter joints, Gib and cotter joint, Socket and spigot joints, sleeve joints, Knuckle joints.

UNIT 3: Shaft couplings, muff, flanged/flexible. Shaft bearings, Journal bearing, bushed hearing Plummer block. Pulleys, Fast and loose pulleys, stepped pulleys.

UNIT 4: Meaning of design, Phases of design, design considerations. Common engineering materials and their mechanical properties. Types of loads and stresses, theories of failure, factor of safety, selection of allowable stress. Stress concentration. Elementary fatigue and creep aspects. Cotter joints, knuckle joint. Design of threaded fasteners subjected to direct static loads, bolted joints loaded in shear.

UNIT 5: Design of shafts under torsion and combined bending and torsion. Design of keys. Design of muff, sleeve, and rigid flange couplings. Design of helical and leaf springs. Design of flat belt and V-belt drives. Design of gears. Design of levers, thin cylindrical shells. Design and selection of anti-friction bearings. Crane hooks, circular rings, universal coupling etc.

TEXT BOOKS:

1. Bhat, N.D. (1986). Machine Drawing. Charotar Publishing Home, Anand.
2. Chakravarti, A. (1978). Design data Hand Book .
3. Khurmi, R.S. and Gupta, J.K. (1984). Machine Design. Eurasia Publishing House, New Delhi.
4. Maleev and Hartman. (1978). Mechanical Design of Machines. CBS Publications, New Delhi.
5. Norton.R.L. Machine Design. Pearson Education, New Delhi.

REFERENCE BOOKS:

1. Pandya, N.C. and Shah,C.S. (1981). Machine Design.Charotar Book Stall, Anand.
2. PSG, Coimbatore. (1984). Design data Hand Book.
3. Sharma, P.C. and Aggrawal, D.K. (1985). Machine Design.DhanpatRai& Sons, NewDelhi.
4. Shingley J.E and C.R Mischke. Mechanical Engineering Design. Tata McGraw Hill

24FEVC4710–DESIGN OF FARM POWER AND MACHINERY SYSTEMS
(6 Credits)

OBJECTIVE:

- To acquaint and equipment with the latest design procedures of agriculture machinery.

UNIT–1: Modern trends in application of different farm power sources, Modern trends in design of farm machinery systems, general design principles and procedures, fundamentals and economic considerations for design and development of farm machinery systems. Design considerations, procedure and their applications in agricultural tractors & typical machines.

UNIT–2: Design of selected machines: tillage & seeding machines, definition and importance of reliability criteria in design and its application. Analytical design considerations of linkages/ components in farm machinery and its application. Design of selected farm equipments: – tillage, seeding, planting, interculture equipments.

UNIT–3: Design of selected machines: manual intercultural, plant protection and self-propelled harvesting machines.

UNIT–4: Design of power threshers, design of rotary, vibrating and oscillating machines design and selection of matching power unit for different operations.

UNIT–5: Safety devices for tractors & farm implements.

REFERENCES:

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. Bernacki C, Haman J &Kanafajski CZ.1972. Agricultural Machines.Oxford& IBH. Bindra OS & Singh Harcharan 1971.Pesticides Application Equipments. Oxford & IBH.
4. Bosoi ES, Verniaev OV & Sultan-Shakh EG. 1990. Theory,Construction and Calculations of Agricultural Machinery.Vol. I. Oxonian Press.
5. Klenin NI, Popov IF &Sakoon VA. 1987. Agricultural Machines. Theory of Operations, Computing and Controlling Parameters and the Condition of Operation. Amrind Publ.
6. Lal R & Dutta PC. 1979. Agricultural Engineering (through solved examples). Saroj Parkashan.

LEARNING OUTCOME:

- The student will be able to appreciate the principles behind the design of tillage tools and planting machinery.
- The student will know the principles behind the design of crop spraying equipments and harvesting and threshing machinery.

24FEVC4711–TESTING AND EVALUATION OF TRACTOR AND FARM EQUIPMENT (6 Credits)

OBJECTIVE:

- To acquaint and equip with the procedure of testing & performance evaluation of farm power & machinery as per test standards and interpretation of results.

UNIT–1: Importance and significance of testing and types of testing. Test equipment, usage and limitations. Test procedures and various test codes: National and International.

UNIT–2: Test equipment; usage and limitations. Dynamometers, load cell, tachometer, etc., fuel consumption measurements, slippage, skid. Power losses in dynamometers and hydraulic test equipment.

UNIT–3: Prototype feasibility testing and field evaluation. Laboratory and field testing of selected farm equipment. Non-destructive testing techniques.

UNIT–4: Tractor performance testing, evaluation and interpretation of results.

UNIT–5: Review and interpretation of test reports. Case studies – Farm machinery training & testing institute in India.

REFERENCES:

1. Barger E L, Liljedahl J B David W. Smith, and Makato Hoki, 2004. Tractors and their Power Units. Eastern Wiley 4th Edition.
2. Indian Standard Codes for Agricultural Implements. Published by BIS, New Delhi.
3. Inns F M. 1986. Selection, Testing and Evaluation of Agricultural Machines and Equipment. FAO Service Bull. No.115.
4. Mehta M L, Verma S R, Rajan P and Singh S K 2019. Testing and Evaluation of Agricultural Machinery. Daya Publishing House, Delhi.
5. S.C Jain, and C.R. Rai. 1984. Farm Tractor Maintenance and Repairs, Published by Standard Publishers Distributors. ISBN 13 : 9788180140600, ISBN 10: 8180140601.
6. Smith D W, Sims B G and O'Neill D H 2001. Testing and Evaluation of Agricultural Machinery and Equipment -Principle and Practice. FAO Agricultural Services Bull.

LEARNING OUTCOME:

- The student will be able to test farm machinery, prepare performance reports and analyze the performance reports to find the suitability of a machinery for a given farm operation.

Specialisation- III (Marketing& Financing of Agricultural Machineries)

24FEVC4712–AGRI LOGISTICS AND SUPPLY CHAIN MANAGEMENT (4 Credits)

OBJECTIVE:

- The course introduces students to the concepts and processes of agricultural supply chain management, framework for structuring supply chain drivers; network designs, demand forecasting, inventory planning, sourcing decisions and IT enablement of supply chain.

UNIT–1: Overview of logistics: introduction, nature, concepts, evolution, importance, components and functions of logistics management; Introduction to supply chain management, value chain, supply chain effectiveness and Indian infrastructure, outsourcing and 3PLs and fourth party logistics

UNIT–2: Elements of logistics and supply chain management: demand forecasting, functions of inventory, warehousing and distribution centers, transportation, protective packaging, order processing, material handling with special reference to agri products

UNIT–3: Performance measurement of logistics and supply chain management-dimensions, basic tools, and impediments to improved performance; Logistic and supply chain management in Indian agri industry like edible oil industry, sugar industry, bakery and confectionary industry, cereal and pulses industry

UNIT–4: Issues in marketing and customer service with special reference to agri business: changing environment and the importance of CRM, Gap analysis for customer service management, efficient customer response planning for uncertainty, product costing for uncertainty

UNIT–5: Logistics & supply chain management and Information technology in agri business- from vertical integration to virtual integration, transiting from made- to-stock to build-to- order, integrated IT solutions for L&SCM, emerging technologies in L&SCM

REFERENCES:

1. Acharya, S. S., and Agarwal, N. L., 2011, Agricultural marketing in India. Oxford and IBH.
2. Altekar, R. V., 2006, Supply Chain Management: Concepts and Cases.PHI
3. Chopra, S., Meindl, P. and Kalra, D. V., 2016, Supply chain management: Strategy, Planning, and Operation, Pearson Education India
4. Mohanty R.P.2010. Indian Case studies in Supply Chain Management & other Learning Resources. OXFORD

LEARNING OUTCOME:

- Understand the fundamentals and cross functional perspectives Agri Logistics Supply Chain Management.
- Best practices of Agri Logistics Supply Chain Management.
- Assessing the dynamics and cross-functional perspective of Agri Logistics Supply Chain Management.
- Explain the suitability of various Agri Logistics Supply Chain Models.

24FEVC4713 – AGRICULTURAL FINANCE AND CO-OPERATION (4 Credits)

OBJECTIVES:

- To impart knowledge and expertise in the field of agricultural finance.
- To enables the student to understand the business planning and financial management of an agri-business.

UNIT–1: Agricultural Finance- meaning, scope and significance, Credit, needs and its role in Indian, agriculture, Credit Analysis Agricultural credit: meaning, definition, need, classification, 3 R's, 5C's and 7 P's of credit, repayment plan

UNIT–2: Sources of agricultural finance, Institutional and non- institutional sources, Commercial Banks, social, control and nationalization of commercial banks Micro financing including KCC, Lead bank scheme, RRBs, Scale of finance and unit cost an introduction to higher financing institutions RBI, NABARD ADB, IMF, world bank, Insurance and Credit Guarantee, Corporation of India, cost of Credit

UNIT–3: Recent development in agricultural credit recent development in agricultural credit. Basic guidelines for preparation of project reports Bank norms, SWOT analysis, Time value of money.

UNIT–4: Agricultural Cooperation Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture, Agricultural Cooperation, in India credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing.

UNIT–5: Crop insurance scope, significance, and limitations and the potential of the newly launched 'PradhanMantriFasalBimaYojana' (Prime Minister's Crop Insurance) Role of ICA, NCUI, NCDC, NAFED.

REFERENCE BOOKS

1. Agricultural Finance and Management by S. Subba Reddy and P. Raghu Ram, Oxford & IBHPublishing Co. Pvt. Ltd, New Delhi
2. Agricultural economics by S. Subba Reddy, P. Raghu Ram, T.V. Neelakanta Sastry and I.Bhavani Devi, Second Edition, Oxford & IBH Publishing Co. Pvt. Ltd, New Delhi
3. An introduction to Agricultural Finance by U. K. Pandey, Kalyani Publishers, New Delhi

LEARNING OUTCOME:

- The student should have absorbed the knowledge about time value of money, document related to agricultural credit & the repayment methods.
- The student should have the gained the knowledge about the financial institute, shemes available & application of SWOT among the schemes.
- The students should have exposure to the insurance schemes and ware housing facilities available under union & state government.

24FEVC4714–AGRICULTURAL INPUT MARKETING (6 Credits)

OBJECTIVES:

- To enable the students to know the structure of agriculture input marketing.
- To gain knowledge related to agricultural mechanization.

UNIT–1: Agri input marketing - Meaning and importance - distinctive features of Agri. Input marketing - Distribution channels of agri. Inputs - Private, Government, Co-operative and Joint sector. Agri inputs promotional programme - concepts and techniques.

UNIT–2: Issues in seed marketing - determinants of seed demand - private sector contribution - public sector support to private sector - Distinctive features of Seed Marketing - other Input Marketing - strengths and weaknesses on Indian seed industry.

UNIT–3: Fertilizer industry scenario - public, private, co-operative and joint sector role - fertilizer production consumption, and imports - fertilizer marketing characteristics. Bio fertilizers - its role and scope - major constraints involved - production level - market level – field level- Marketing network/ channels.

UNIT–4: Pesticide industry - an overview - nature of industry growth - consumption crop wise, area wise - demand and supply - market segmentation. -IPM concept development - bio pesticides - its role and scope.

UNIT–5: Agricultural mechanization - benefits and importance and future priorities -scenario of farm implements and machinery sector - economic advantage of mechanization – contribution of agricultural mechanization - Need for the development of agricultural machinery and implements to suit the local resource endowments.

REFERENCES:

1. Acharya SS & Agarwal NL 2004, Agricultural Marketing in India - Oxford & IBH.
2. Sharma Premjit 2008, Marketing of Seeds - gene Tech Books, New Delhi.
3. Marketing of the Agri. Inputs - IIMA publications.
4. State of the Indian Farmer - Input Management, Ministry of Agriculture, GOI, Academic Foundation, New Delhi-2004.

LEARNING OUTCOME:

After the completion of the course the students are expected to

- Examine two different channels of agricultural inputs.
- Identify the problems involved in Fertilizers and Pesticides industries.
- Assess the benefits approved due to agricultural mechanization.

24FEVC4715–AGRI IMPORT AND EXPORT MANAGEMENT (6 Credits)

OBJECTIVE:

- The objective of the course is to familiarize the students on different contemporary issues, procedural formalities and need of import and export trade in a country especially for agricultural products.

UNIT–1: Introduction to agriculture, forms of agriculture, production, need for import and export, analysis of marketable surplus and marketed surplus, analysis of import and export statistics of agricultural products in India, macroeconomic forces.

UNIT–2: Overview of world agricultural trade, issues impacting international agricultural trade, agricultural policy, technology advancement on agricultural products.

UNIT–3: Import requirements-causes, identifying agri products for import, import substitution, regulation of imports, quality standards, scanning the countries for importing the required agri products, import planning, documents required.

UNIT–4: Identifying foreign markets for agri export, marketing plan for exports, export documents and procedure, terms of payment and export finance, legal dimensions.

UNIT–5: Institutional infrastructure for export promotion in India, export assistance, State trading in imports and exports, working of the State trading organizations in India.

REFERENCES:

1. Varsheny, R.L. and Bhattacharyya, B.International Marketing Management, Sultan Chand and Sons, New Delhi.
2. Abidi, Suhayl, Export Opportunities in Agriculture Products, Ahmadabad Management Association
3. Johnson, Thomas E.& Bade Donna L.,Export Import Procedures and Documentation,Amacom Publisher
4. Reed,Michael, International Trade in Agricultural Products,Create Space Independent Publishing Platform.
5. Seyoum,Belay,Export-Import Theory,Practices and procedures,Rutledge Taylor& Francis Group,New York.

LEARNING OUTCOME:

- The students should have exposure to basic import & export procedures.
- They should have sufficient knowledge about the documentation needed for export & import of agricultural machineries and should have the basis knowledge about the transfer of technology.

SEMESTER- VIII

NSQF Level	**: 6.0**
NCrF Level	**: 6.5**
Award / Exit Option	**: B. Voc (Hons) in Farm Equipments Operation & Maintenance**

24FEVC4801–MAJOR PROJECT (15 Credits)

The major project work will be in one of the following themes:

i. A new innovation or critical study related to the technology or development dimensions envisaged by the course

ii. Preparation of an innovative enterprise model for one's future career

iii. Carrying out a regional development/employment development project planning exercise within the spirit of the course

iv. Finding out an innovative project with analysis suitable for the specific area.

Project work will be carried out by a group of students, minimum 3 and maximum 5 out of 100 marks, the evaluation of 60 marks will be awarded by project guide based on students performance during project period and 40 marks will be awarded jointly by project guide and course coordinator based on final viva and students project presentation.

24FEVE4802–INTERNSHIP – VIII (10 Credits)

OBJECTIVE: To learn skills for specific job role from relevant Industry / Institution.

Student report on Rural Agricultural Work Experience (RAWE) and participation in training programmes conducted by State Government and Union Government institution (KVIC, AMMA, AGMARK & TNAE department). Village attachment / Unit attachment in Univ./ College/ KVK/ Res. Stn. (8 Weeks).Project Report Preparation, Presentation and Evaluation (1 Week).Students has to submit weekly report to the department. During the in-plant training period, the Industry / Institute partner will evaluate their performance for 60 marks and the concerned course teacher for 40 marks as given below

INDUSTRY/ INSTITUTE

1	Attitude	10 marks
2	Punctuality	
3	Behavior	
4	Involvement	10 marks
5	Performance (completion of assigned work)	20 marks
6	Contribution to the industry	20 marks
	Total	**60 marks**

COURSE TEACHER

1	Diary /Record	10 marks
2	Weekly report	10 marks
3	Viva –voce	20 marks
	Total	**40 marks**

LEARNING OUTCOME:

- Students learn the work culture from the concerned industry
- Students learn to handle special tools used in assembling and dismantling of machinery components.

24FEVS4803 – TECHNICAL SEMINAR (05 Credits)

OBJECTIVES:

- To enhance the ability required for identification of his/her field of interest.
- To develop skills regarding professional communication and technical report writing.
- To establish the fact that student is not a mere recipient of ideas, but a participant in discovery and inquiry.
- To learn how to prepare and publish technical papers.

GUIDELINES:

- The student is expected to present a seminar in one of the current topics in the field of agricultural machinery related issues / technology.
- The seminar shall be of 30 minutes duration and give presentation to the Seminar Assessment Committee (SAC).
- The committee shall evaluate the seminar based on the style of presentation, technical context, and coverage of the topic, adequacy of references, depth of knowledge and the overall quality.
- A guide will be allotted and he / she will guide and monitor the progress of the student and maintain attendance also.
- Each student has to submit a seminar report in the prescribed format given by the Institution.
- With two periods per week, 2 students are expected to present the Seminar.
- Students are encouraged to use various teaching aids such as power point presentation, demonstration models and latest software like SOLID WORKS, ANSYS, SPSS and R
- It is recommended that the report for Technical Seminar - II may be in the form of a technical paper which is suitable for publishing in Conferences / Journals as a review paper.

LEARNING OUTCOME:

- At the end of the course, the student will be able to
- Develop the capacity to observe intelligently and propose and defend opinions and ideas with tact and conviction.
- Develop skills regarding professional communication and technical report writing.
- Learn the methodology of publishing technical papers.

MULTIDISCIPLINARY COURSES FOR INTERDEPARTMENT LEVEL

24FEVM1109 –ENGINEERING WORKSHOP PRACTICES (02 Credits)

OBJECTIVE:

- Workshop Technology is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops.

UNIT-1: Introduction to various shops /sections and workshop layouts. Safety norms to be followed in a workshop should be conveyed to students

UNIT-2: Metal Joining - Introduction of Tools- Types of Welding Joint-Arc Welding - Soldering.

UNIT-3: Carpentry - Introduction of tools and operations-types of carpentry hardware and their uses-carpentry joints-carpentry operations.

UNIT-4: Plumbing and Electrical - Introduction to tools and types of plumbing joints-measure voltage-current -frequency-phase difference- power-power factor for single and three phase supply-wire fan-tube light- Two-way control - wire-MCB-ELCB for a given load circuit.

UNIT-5: Define engine- working principle of two stroke and four stroke engine- Dismantling and assembling of internal combustion engine.

REFERENCES:

1. Mechanical Workshop Practice by K.C JOHN, PHI learning.
2. S.K. Hajra Choudhury, A.K. Hajra Choudhury and Nirjhar Roy, 15th edition reprinted 2013, Elements of Workshop Technology-Vol.1; Manufacturing processes, Media Promoters and Publishers Pvt, Ltd. Mumbai.

LEARNING OUTCOME:

- On successful completion of this course the student will be able to have hands on experience in Various Operation and maintenance of engines.

24FEVM1110–SELECTION & OPERATION OF TILLAGE IMPLEMENTS
(02 Credits)

OBJECTIVES:

- To understand basic of tillage operation in Agriculture according to crop and soil conditions.
- To equip the students with sufficient practical skills about primary and secondary tillage implements.
- To understand the method of hitching tillage implement and adjustments required during operations.

UNIT–1: Primary tillage machineries – Mould board plough, Disc plough, Chisel plough, - Identify different components, function and suitability according to the crop and soil conditions, hitching and operating of implements with tractor.

UNIT–2: Secondary tillage machineries – Reversible disc plough, Disc harrow, Cultivator and Rotavator- Identify different components, function and suitability according to the crop and soil conditions, hitching and operating of implement with tractor.

UNIT–3: Other tillage machineries – Bund former, Ridger and Leveller- Identify different components, function and suitability according to the crop and soil conditions, hitching and operating of implement with tractor.

UNIT–4: Ploughing of land – methods of ploughing- gathering, casting.

UNIT–5: Safety measures of primary and secondary tillage machineries- care and maintenance.

REFERENCES:

1. Er. Sanjay Kumar, Er. Vishal Kumar and Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8
2. Ojha, T.P and A.M.Michael 2005. Principles of Agricultural Engineering Vol I. Jain Brothers, New Delhi. ISBN: 978-8186321638

LEARNING OUTCOME:

- Students able to select suitable tillage implements according to the soil and crop condition
- Students able to operate tillage implements under different field conditions.

24FEVM1111–SELECTION & OPERATION OF SOWING & WEEDING MACHINERIES (02 Credits)

OBJECTIVES:

- To understand basic of sowing and weeding machine according to crop and soil conditions.
- To knowledge the method of hitching tillage implements and adjustments required during operations.

UNIT–1: Sowing Machineries (manual) – Two row crop seeder, multi crop seeder, Direct paddy seeder - Identify different components, function and suitability according to the crop and soil conditions, operating of manual operated sowing machineries.

UNIT- 2: Sowing Machineries (power) – Seed-cum-fertilizer drill, paddy transplanter - Identify different components, function and suitability according to the crop and soil conditions, operating of power operated sowing machineries.

UNIT-3: Weeding Machineries (manual) –Dry land weeder, wet land weeder- Identify different components, function and suitability according to the crop and soil conditions, operating of manual operated sowing machineries.

UNIT-4: Weeding Machineries (power) – Baby weeder (two row), power weeder, self-propelled power weeder, brush cutter- Identify different components, function and suitability according to the crop and soil conditions, operating of power operated sowing machineries.

UNIT-5: Safety measures of sowing and weeding machineries- care and maintenance.

REFERENCES:

1. Er. Sanjay Kumar, Er. Vishal Kumar and Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8

2. Ojha, T.P and A.M.Michael 2005. Principles of Agricultural Engineering Vol I. Jain Brothers, New Delhi. ISBN: 978-8186321638

LEARNING OUTCOME:

- Students able to select suitable sowing and weeding machineries according to the soil and crop condition
- Students able to operate sowing and weeding machineries under different field conditions.

24FEVM1207–SELECTION & OPERATION OF PLANT PROTECTION EQUIPMENTS (02 Credits)

OBJECTIVES:

- To understand basic of plant protection according to crop and soil conditions.
- To equip the students with sufficient practical skills about sprayers.

UNIT–1: Spraying equipments (manual) – Hand compression, lever operated knapsack, ASPEE sprayers - Identify different components, function and suitability according to the crop and soil conditions, operating of manual operated spraying equipments.

UNIT–2: Spraying equipments (manual) – Rocker, pedal or foot operated sprayers - Identify different components, function and suitability according to the crop and soil conditions, operating of manual operated spraying equipments.

UNIT- 3: Spraying equipments (power) – Battery, mist blower sprayer- Identify different components, function and suitability according to the crop and soil conditions, operating of power operated spraying equipments.

UNIT- 4: Spraying equipments (power) –2 stroke portable, knapsack power sprayer- Identify different components, function and suitability according to the crop and soil conditions, operating of power operated spraying equipments.

UNIT-5: Safety measures of plant protection equipments - care and maintenance.

REFERENCES:

1. Er. Sanjay Kumar, Er. Vishal Kumar and Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8

2. Ojha, T.P and A.M.Michael 2005. Principles of Agricultural Engineering Vol I. Jain Brothers, New Delhi. ISBN: 978-8186321638

LEARNING OUTCOME:

- Students able to select suitable sprayers according to the soil and crop conditions.
- Students able to operate different sprayers.

24FEVM1208–SELECTION & OPERATION OF HORTICULTURE TOOLS & HARVESTING EQUIPMENTS (02 Credits)

OBJECTIVES:

- To understand basic of horticultural tools and harvesting machineries.
- To equip the students with sufficient practical skills about horticultural tools and harvesting machineries.

UNIT–1: Horticultural tools – study and use of common tools and equipment used in horticultural operations- budding, grafting, pruning knives, spades, gardening scissors.

UNIT–2: Harvesting machine- self-propelled vertical conveyor reaper, identify different components, operating, function and suitability according to the crop and soil conditions.

UNIT- 3: Harvesting machine- self-propelled fodder harvester, identify different components, operating, function and specifications.

UNIT- 4: Care and Maintenance -Safety measures in operating and handling of horticultural tools.

UNIT-5: care and maintenance - Safety measures in operating and handling of harvesting machineries.

REFERENCES:

1. Er. Sanjay Kumar, Er. Vishal Kumar and Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8

2. Ojha, T.P and A.M.Michael 2005. Principles of Agricultural Engineering Vol I. Jain Brothers, New Delhi. ISBN: 978-8186321638

LEARNING OUTCOME:

- Students able to select suitable horticultural tools and harvesting machineries according to the soil and crop conditions.
- Students able to use and operate different horticultural tools and harvesting machineries, respectively.

24FEVM1209–POWER TILLER OPERATING SKILLS (02 Credits)

OBJECTIVES:

- To understand different components of power tiller and its functions.
- To understand operation and maintenance of power tiller.

UNIT-1: History and evolution of power tiller- Definition- Uses of power tillers- Types of power tillers- key components and functions-Safety precautions and Personal Protective Equipment (PPE)

UNIT-2: Pre-start inspection procedures- checking fuel and oil levels- Tire and wheel inspection- cleaning and maintenance

UNIT-3: Basic driving skills- starting and stopping- steering and maneuvering-forward and reverse driving-setting the tilling depth

UNIT-4: Types of attachments (plough, harrow, seeders, etc.,)- attaching and detaching implements- operating attachments- field operation techniques

UNIT-5: Identifying and fixing common problems- Basic repair skills-legal requirements and safety regulations- sustainable practices and environmental considerations

REFERENCES:

1. Repair, Maintenance & Operation of Power Tiller, March 2011 Sector: Agriculture for Modular Employable Skills, Developed by National Instructional Media Institute, Directorate General of Employment & Training, Ministry of Labour& Employment, Government of India, Chennai.
2. Mechanic Tractor, February 2016 Sector: Automobile, Common for Mechanic Tractor / Mechanic Agriculture Machinery, Trade: Practical, Developed by National Instructional Media Institute, Directorate General of Employment & Training, Ministry of Labour& Employment, Government of India, Chennai.

LEARNING OUTCOME:

- Students learn the components and its functions of power tiller.
- Students learn to operate the power tiller with suitable attachment in field conditions.
- Students learn to know the reasons for common trouble occur and how to rectify in the power tiller.

24FEVM2309–MICRO IRRIGATION SYSTEMS (02 Credits)

OBJECTIVES:

- To understand the basic of micro irrigation systems.
- To equip the students with sufficient practical skills about the installation of drip and sprinkler irrigation system.

UNIT–1: Micro irrigation system – drip irrigation - Identify different components, function and suitability according to the crop, spacing, field and soil conditions.

UNIT–2: Micro irrigation system – sprinkler irrigation - Identify different components, function and suitability according to the crop, spacing, field and soil conditions.

UNIT–3: Installation of micro irrigation system - drip and sprinkler irrigation system.

UNIT–4: Maintenance of micro irrigation system - cleaning of filters, pressure gauge readings, air valve and safety, valve cleaning, draining of drip lines, flushing of main line and sub main, changing emitters, removing and reinstallation of micro irrigation system.

UNIT-5: Causes and remedies, safety measures of drip and sprinkler irrigation systems.

REFERENCES:

1. Sharma, S.K. 1984. Principles and practices of irrigation Engg., S.Chand and Company Ltd., New Delhi.
2. Michael, A.M. and T.P.Ojha. 1987. Principles of Agricultural Engineering. Vol.2. Jain Brothers, New Delhi.
3. Michael, A.M. 1983. Irrigation Theory & Practice, Vikas Publishing house, New Delhi.
4. Sivanappan, R.K. and Karaigowder. 1997. Irrigation and Drainage, Popular Book Depot, Chennai.
5. Basak, N.N. 1999. Irrigation Engineering. TATA McGraw Hill, New Delhi.

LEARNING OUTCOME:

- Students learn skills of installation and maintenance of micro irrigation systems.

24FEVM2310–TRACTOR DRIVING SKILLS (02 Credits)

OBJECTIVES:

- To understand the tractor operation in field conditions
- To understand safety precaution measures observed before starting, operating and stopping the tractor.

UNIT-1: History and evolution of tractors - Types of tractors and their uses- Basic Tractor Components- Engine and transmission - Hydraulic Systems-Steering and braking systems-Electrical systems- Safety precautions and PPE (Personal protective equipment)

UNIT-2: Pre-start inspection procedures- Checking fluid levels and tire condition- Basic maintenance tasks -lubrication and greasing points-battery maintenance- cleaning air filters-inspecting tires and wheels-checking lights and signals.

UNIT-3: Proper starting procedures-Smooth acceleration and deceleration- Safe stopping techniques-Basic Maneuvering-Steering, turning, and maneuvering-Forward and reverse driving-Parking and securing the tractor-Field Operations- Ploughing - Harrowing - Sowing and planting

UNIT-4: Types of attachments (ploughs, harrows, seeders, mowers, etc.) -Attaching and detaching implements-Operating attachments- Handling Different Terrains-Driving on slopes-Navigating through mud and water- Load Handling- Safe loading and unloading practices-Understanding load limits-Transporting loads safely

UNIT-5: Common Tractor Problems-Engine Issues-Hydraulic system failures-Electrical Problems-Diagnosing issues and fixing- Legal Requirements-Licensing and certification-Understanding local regulations-record keeping and documentation-Environmental Considerations-Fuel efficiency and emissions- Sustainable practices.

REFERENCES:

1. Er. Sanjay Kumar, Er. Vishal Kumar, Dr. Ram Kumar Sahu, 2012, Fundamentals of Agricultural Engineering, Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8
2. Dr. Jagdishwar Sahay, 2013, A Text Book of Elements of Agricultural Engineering, Standard Publishers Distributors, 1705-B, Naisarak, PB No:1066, Delhi-110 006, ISBN: 978-81-8014-204-8

LEARNING OUTCOME:

- Students should have the skills to operate the tractor with implement in field conditions
- Students should have the skills in safety operation &measures while operating the tractor in different field conditions.

24FEVM2311–RECORD MAINTENACE (02 Credits)

OBJECTIVES:

- To describe the basic concepts of records and document management.
- To analyze the role and function of records and records management in an organization.

UNIT-1: Classification of records - Nature and characteristics of a good record - Forms of records (Paper based, Micro forms)- Records life cycle -Stages of records management (Current/Active, Semi-active, Inactive) - Importance of records management – Environmental dangers to records - Ways of improving active records.

UNIT-2: Meaning of filing - Types of files (Open and confidential files) - Opening and closing a file - Designing a file cover - File description - Features of a good file - Filing methods - Filing procedure - The filing systems – Filing equipment s- Factors that influence filing of records - Advantages of a good filing system - File census - Controlling file movement (file request form, file transit sheet).

UNIT-3: Categories of Appraisal - Principles of retention schedules - Developing records schedule and form -Importance of appraisal and retention scheduling.

UNIT-4: Types of Indices- Importance of Indexing - Rules of Indexing – Differences between Indexing and Abstracting Service.

UNIT-5: Ethics–Definition of ethics - Code of conduct - Work Ethics - Importance of ethics in Records Management.

REFERENCES:

1. Patricia, E., Ann, J. and Schubert, D. (2012). Records Management, Integrated Information Systems. 3rd edition; Prentice Hall, Pearson Education Company.
2. Real, J and Ginn, M 2007, Records management, 18th edition, Thamson: SouthWestern
3. Roper, M. (Ed) (2009), Organizing Current Records. London, International Records Management Trust

LEARNING OUTCOME:

- Classify records and archives for easier identification of information.
- File information and control its movements.