B.Voc
(Farm Equipment Operation and Maintenance)

Syllabus

(with effect from June 2015)

KAUSHAL KENDRA
The Gandhigram Rural Institute – Deemed University
Gandhigram – 624 302 Tamil Nadu

B.Voc (Farm Equipment Operation and Maintenance)

2015 - 2016 Onwards

	Course Code	Category	Title of Course	No. of Credits	Duration of ESE Hours	Marks		
						CFA	ESE	TOTAL
SEMESTER - I	15FEMV0101	GEC	Principles Of Agriculture	3	3	40	60	100
	15ENGV01C1	GEC	English For Communications	2		50		50
	15YOGV0001	GEC	Yoga	1		50		50
	15FEMV0102	GEC	Workshop Calculation & Science I	3	3	40	60	100
	15FEMV0103	GEC	Engineering Drawing-I	3	--	60	40	100
	15FEMV0104	SDC	Farm Power And Machinery	3	3	40	60	100
	15FEMV0105	SDC	Operation And Maintenance of Farm Machinery-I	4	--	60	40	100
	15FEMV0106	SDC	Principle of Electric Motor And Pumps	3	3	40	60	100
	15FEMV0107	SDC	Basic Workshop	2	--	30	20	50
	15FEMV0108	SDC	In plant training I	6		100		100
			Total	30				

	Course Code	Category	Title of Course	No. of Credits	Duration of ESE Hours	Marks		
						CFA	ESE	TOTAL
SEMESTER - II	15CSAU02A1	GEC	Computer Fundamentals and Office Automation	4 (3+1)	3	24+ 24	36+16	100
	15FEMV0209	GEC	Workshop Calculation & Science II	3	3	40	60	100
	15FEMV0210	GEC	Engineering Drawing-II	3	--	60	40	100
	15FEMV0211	GEC	Engineering Survey	2	--	30	20	50
	15FEMV0212	SDC	Farm Engine and Tractor Systems	3	3	40	60	100
	15FEMV0213	SDC	Operation and Maintenance of Farm Machinery-II	4	--	60	40	100
	15FEMV0214	SDC	Principle of Irrigation and Water Management	2	2	20	30	50
	15FEMV0215	SDC	Operation and Maintenance of Micro Irrigation Systems	3	--	60	40	100
	15FEMV0216	SDC	In plant training II	6		100		100
			Total	30				

	Course Code	Category	Title of Course	No. of Credits	Duration of ESE Hours	Marks		
						CFA	ESE	TOTAL
SEMESTER - III	15EVSU0001	GEC	Environmental Studies	4	3	24+40	36+0	100
	15NSSU0001/ 15SHSU0001	GEC	NSS/ Shanti Sena	1	--	50	--	50
	15SPOU001/ 15FATU0001	GEC	Sports and Games/ Fine Arts	1	--	50	--	50
	15FEMV0317	GEC	Workshop Calculation & Science – III	3	3	40	60	100
	15FEMV0318	GEC	Engineering Drawing – III	3	--	60	40	100
	15FEMV0319	SDC	Operation and Maintenance of Tillage Machineries	3	--	60	40	100
	15FEMV0320	SDC	Operation and Maintenance of Soil Forming and Land Shaping Equipments	3	--	60	40	100
	15FEMV0321	SDC	Repair & Overhauling of Tractor Engine	6	--	60	40	100
	15FEMV0322	SDC	In plant training – III	6		100		100
			Total	30				

	Course Code	Category	Title of Course	No. of Credits	Duration of ESE Hours	Marks		
						CFA	ESE	TOTAL
SEMESTER - IV	15CSAU04B1	GEC	Internet and Web Technology	4 (3+1)	3	24+24	36+16	100
	15ENGU00C1	GEC	Communication & Soft skills	2	--	50	--	50
	15FEMV0423	GEC	Workshop Calculation & Science – IV	3	3	40	60	100
	15FEMV0424	GEC	Engineering Drawing-IV	3	--	60	40	100
	15FEMV0425	SDC	Operation and Maintenance of Sowing and Weeding Equipments	3	--	60	40	100
	15FEMV0426	SDC	Operation and Maintenance of Plant Protection Equipments	3	--	60	40	100
	15FEMV0427	SDC	Repair and Overhauling of Tractor Transmission System & Controls	6	--	60	40	100
	15FEMV0428	SDC	In plant training - IV	6		100		100
			Total	30				

	Course Code	Category	Title of Course	No. of Credits	Duration of ESE Hours	Marks		
						CFA	ESE	TOTAL
SEMESTER – V	15ENGU05C2	GEC	Functional English	3	3	40	60	100
	15FEMV0529	GEC	Entrepreneurship Development	3	3	40	60	100
	15FEMV0530	GEC	Food processing	4	--	60	40	100
	15FEMV0531	GEC	Occupational Safety and Health education	2	2	40	60	100
	15FEMV0532	SDC	Operation & Maintenance of Power Tiller	3	--	60	40	100
	15FEMV0533	SDC	Servicing of Auto Electrical & Electronic System	3	--	60	40	100
	15FEMV0534	SDC	Maintenance & Servicing of Hydraulic System in Tractor	3	--	60	40	100
	15FEMV0535	SDC	Maintenance of Batteries and Wheels	3	--	60	40	100
	15FEMV0536	SDC	In plant training – V	6		100		100
			Total	30				

	Course Code	Category	Title of Course	No. of Credits	Duration of ESE Hours	Marks		
						CFA	ESE	TOTAL
SEMESTER - VI	15CSAU0637	GEC	Computer – Tally	3	--	60	40	100
	15FEMV0638	GEC	Agribusiness and Project Management	3	3	40	60	100
	15FEMV0639	GEC	Millet processing and Crop residue management equipments	3	--	60	40	100
	15FEMV0640	GEC	Custom Hiring of Agriculture Machinery	3	3	40	60	100
	15FEMV0641	SDC	Operation and Maintenance of Crop Harvesters	3	--	60	40	100
	15FEMV0642	SDC	Operation &Maintenance of Combine Harvester	3	--	60	40	100
	15FEMV0643	SDC	Operation and Maintenance of Post Harvesting Equipments	6	--	60	40	100
	15FEMV0644	SDC	Project Work	6		100		100
			Total	30				

FIRST SEMESTER

15FEMV0101- PRINCIPLES OF AGRICULTURE (3 credits)

OBJECTIVE:

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

UNIT–I: 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–II: SOIL PROPERTIES AND MANAGEMENT: Physical Properties of Soils; Physical properties of soils-texture-mechanical components and structure. Physical constants-true and apparent specific gravity, pore space, soil colour, soil air, soil temperature - significance of physical properties in relation to plant growth. Chemical properties of soils; Chemical properties of soils- Chemical composition-Soil reaction-Buffering capacity of soils-Soil colloids-Soil pH – Problem soils their reclamation and management.

UNIT–III: CROP ADAPTATION AND DISTRIBUTION **:** Origin of crops, crop distribution and production; origin of crop species, 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–IV: FARMING SYSTEMS **:** Systems of farming – wet, irrigated, dry and rainfed farming. Factors governing choice of crops and varieties. Intensive cropping – crop rotation – advantages. Cropping pattern and cropping systems in India and Tamil Nadu. Concepts and principles of sustainable agriculture – Integrated Farming System (IFS) – organic farming – Natural farming – Eco-friendly agriculture and conservation agriculture –LESIA.

UNIT–V: BASICS OF AGRICULTURAL OPERATIONS**:** Principles and practices of agriculture operations. Tillage and tilth – types of tillage – modern concepts of tillage – tools, implements and machineries for different agricultural operations. Seeds and sowing-factors affecting germination – seed rate – seed treatment – methods of sowing – nursery methods and transplanting – plant population and geometry time and methods of application and INM, harvesting – threshing – drying and storage.

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. Morachan, Y.B. 1980. Crop Production and Management. Oxford and IBH Publishing Co.Pvt.Ltd. New Delhi.

6. Reddy. S.R. 1999. Principles of Agronomy. Kalyani publishers, New Delhi.

7. Sankaran, S. and V.T. Subbiah Mudaliar, 1997. Principles of Agronomy. The Bangalore Printing and publishing Company Ltd., Bangalore.

8. Singh. S.S. 1998. Principles and Practices of Agronomy. Kalyani publishers, New Delhi.

9. Somasundaram, E and A. Arokiaraj. 2002. Text book on Principles of Agronomy. Crystal Printers, Tiruchirappalli, Tamil Nadu.

10. Thakur, C. 1980. Scientific crop production. Vol.I Meteorpolitan Book Co. Pvt, Ltd., New Delhi.

LEARNING OUTCOME

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

15ENGV01C1 - ENGLISH FOR COMMUNICATIONS (2 credits)

OBJECTIVES:

- To improve the English language skills of students with very limited abilities to use the language;
- To focus on the language skills of the learners in a graded manner.

UNIT I – GRAMMAR

- What is grammar?
- The capital letter
- Nouns and pronouns

UNIT II – LISTENING

- Teacher narrations

UNIT III - SPEAKING SKILLS

- Self – introduction
- Descriptions of persons, objects, places

UNIT IV - READING AND VOCABULARY

- Graded reading comprehension passages

UNIT V- WRITING SKILLS

- Sentence construction
- Descriptive Paragraph writing

TEXTBOOK:

1. Course material prepared by the English faculty

REFERENCE BOOK:

1. Seaton, Anne & Y.H. Mew. Basic English Grammar Book 1. Irvine: Saddleback, 2007. Print.

LEARNING OUTCOME

- Students know improve the English language skills with very limited abilities to use the language;
- Students focus on the language skills of the learners in a graded manner.

15YOGV0001- YOGA (ONE CREDIT)

OBJECTIVE:

- To learn Yoga for keeping body and mind in good condition.

UNIT – I : History of Yoga – Definition of the term Yoga – Comprehensive Nature and Scope Yoga – Aims and Objectives of Yoga – Various School of Yoga.

UNIT – II : Pantanjali yoga – Astangayoga – Tantrayoga – Mantrayoga – Hathayoga – Layayoga, Rajayoga – Ganayoga – Bhaktiyoga – Karmayoga.

UNIT–III : Yoga as an ideal system of physical culture – Do's and Don'ts of specific Yogic Techniques – Difference between practice of Asanas and Physical Exercise – Modern Vs. Yogic concept on diet.

UNIT–IV: Preparing Oneself for Yogi practices – Different kinds of Yogic practices – Suryanamaskar – Asanas (Padmasana – Vajrasana – Gomukhasana – Sarvangasana – Halasana – Shalabhasana – Dhanurasana – Paschimottanasana – Yogamudra – Utkatasana – Savasana - Makarasana).

UNIT–V: Parnayamas (Anuloma – Viloma Pranayama, Nadisuddi) – Bandhas (Jalandharabandha – Uddiyananbandha – Mulabandha) – Suddhikriyas (Kapalabhati) – Mudras – Dhyana – Meditation – Gandhiyan way of Meditation.

REFERENCES:

1. Asanas, Swami Kuvalayananda, Kaivalaydhama, Lonavla, 1993.
2. Light on Yoga, B.K.S Iyengar Harpine Collins Publication, New Delhi,2000
3. Sound Health Through Yoga, K.Chandrasekaran, Prem Kalyan Publications, Sedapatti, 1999.
4. Yoga For All, Maharishi Patanjali, Sahni Publications, 2003.
5. Yoga For Health, Institute of Naturopathy and Yogic Sciences, Bangalore, 2003.
6. Yoga For Health, K. Chandra Shekar, Khel Sahitya Kendra, Theni, 2003.
7. Yoga For the Modern Man, M.P. Pandit, Sterling Publishers Private Limited, New Delhi, 1987.
8. Yoga For You, Indira Devi, Jaico Publishing house, Chennai, 2002.

LEARNING OUTCOME

- Students know about Yoga for keeping body and mind in good condition.

15FEMV0102 - WORKSHOP CALCULATION AND SCIENCE – I (3 credits)

OBJECTIVE:

- Students will learn to basic engineering mechanics for undertaking skilled agricultural operations efficiently.

UNIT– I: MACHINE **:** Machine – definition, farm machines – six simple machines – lever, wheel and axle, pulley, inclined plane, screw and wedge – their applications and definitions; mechanical advantage efficiency of the machine and velocity ratio – definition and calculation

UNIT–II: MOTION: Motion translator motion, rotary motion; velocity – uniform velocity and variable velocity; acceleration – uniform acceleration and variable acceleration; laws of motion – calculations

UNIT–III: FORCE**:** Force **–** definition of force, types of force Types of force -examples,– Direct forces, Attractive forces, Explosive forces, Describing forces, Graphical representation of a force, Addition of forces, Parallelogram of forces ,Triangle of forces, Resolution of forces, Mass, Equilibrium, Pressure, Pressure in hydraulic systems, Hooke's law, Practical applications.

UNIT–IV: WORK**:** Work energy, power– Definition and calculation of Work, Power and Work done by a torque, Definition and calculation of Energy -Potential energy, Chemical energy, Conservation of energy, Energy equation, Kinetic energy, Energy of a falling body, Kinetic energy of rotation.

UNIT–V: ENGINE POWER: Engine power – terminology used – bore, stroke, stroke bore ratio, swept volume, compression ratio; power – indicated power, brake power, belt power, drawbar power, power takeoff power – definition; measurement of engine power by using dynamometer – dynamometer types – 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

LEARNING OUTCOME

- Students will learn to basic engineering mechanics for undertaking skilled agricultural operations efficiently

15FEMV0103- ENGINEERING DRAWING - I (3 credits)

OBJECTIVE :

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

UNIT–I: 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. Using drawing instruments to draw straight lines, rectangles, squares, circles, polygons.

UNIT–II: 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–III: 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–IV: Geometric Construction - Bisecting a line - perpendiculars - parallel lines - division of a line; Angles - bisection, trisection, Tangent lines touching circles internally and externally Polygons - Regular polygons - circumscribed and inscribed in circles. Conic sections - Definitions of focus, directrix, eccentricity, Construction of Ellipse by Concentric circles method, Construction of parabola by rectangular method.

UNIT–V: 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 Development of Surfaces - Need for preparing development of surface, Concept of true length - Principal methods of development, Development of simple solids like cubes, prisms, cylinders, pyramids, cones.

TEXT BOOKS:

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.

REFERENCE BOOKS:

1. N.D. Bhatt, 2003, Engineering Drawing, Chaotar publishing house 46th edition.
2. K.R. Gopalakrishnan.1998 Engineering Drawing (Vol. I & II) Subhas Publications
3. Luzadder and Duff, 2001, Fundamentals of Engineering Drawing Prentice Hall of India Pvt Ltd XI edition
4. K. Venugopal, 2002. Engineering graphics, New Age International (P) Limited.

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

15FEMV0104 - FARM POWER AND MACHINERY (3 credits)

OBJECTIVE:

- To equip the students with sufficient theoretical knowledge and practical skills about farm power and tractor power, implement resources used in agriculture, their cost of operation and selection.

UNIT–I: FARM POWER AND TRACTORS **:** Farm power in India - sources, IC engines – working principles, two stoke and four stoke engines, IC engine terminology, different systems of IC engine. Tractors – types and utilities.

UNIT–II: TILLAGE AND TILLAGE MACHINERY**:** Tillage – ploughing methods – primary tillage implements – mould board, disc plough and chisel plough – secondary tillage implements – cultivators, harrows and rotovators – wetland equipment – puddlers, tramplers and cage wheels.

UNIT–III: SOWING, PLANTING AND INTERCULTURAL EQUIPMENT**:** Sowing methods – seed drills, seed cum fertilizer drills – Paddy transplanters – nursery requirements – implements for intercultural operations – wet land, dry land and garden land intercultural tools.

UNIT–IV: PLANT PROTECTION GADGETS, HARVESTING MACHINERY AND HORTICULTURE TOOLS**:** Plant protection equipment – harvesting tools and equipments – reapers and combine – harvesting machinery for groundnut, tuber crops and sugarcane – tools for horticultural crops

UNIT–V: EQUIPMENT FOR LAND DEVELOPMENT AND FARM MACHINERY SELECTION**:** Equipment for land development and soil conservation – Cost of operation of farm machinery – Tractor and implement selection

TEXT BOOKS

1. Senthilkumar, T., R. Kavitha and V.M.Duraisamy 2015. **A TEXT BOOK OF FARM MACHINERY,** Thannambikkai Publications, Coimbatore. ISBN: 978-9381102305
2. Jagadishwar Sahay, 2010. **ELEMENTS OF AGRICULTURAL ENGINEERING.** Standard Publishers Distributors, New Delhi. ISBN: 978 – 818040440

REFERENCE BOOKS

1. Ojha, T.P and A.M.Michael 2005. **PRINCIPLES OF AGRICUTURAL ENGINEERING VOL I.** Jain Brothers, New Delhi. ISBN: 978-8186321638
2. Nakra C.P 1970. **FARM MACHINERY AND EQUIPMENT:** Dhanpat Rai Publishing Company Ltd, New Delhi ISBN : 978-8187433231
3. Sricastava, A.C., 1991. **ELEMENTS OF FARM MACHINERY.** Oxford & IBH Publishing Co Pvt Ltd, New Delhi. ISBN: 978-8120405134

WEB RESOURCES:

www.agricoop.nic.in/dacdivision/Machinery/directory.htm
www.farmmachineryshow.org

LEARNING OUTCOME

- Students equip with sufficient theoretical knowledge and practical skills about farm power and tractor power, implement resources used in agriculture, their cost of operation and selection.

15FEMV0105 - OPERATION AND MAINTENANCE OF FARM MACHINERY–I
(4 credits)

OBJECTIVE:

- Students will be equipped with sufficient practical skills on farm power sources, handling of tractors, power tillers and various implements used in land preparation, sowing, inter cultivation and plant protection

UNIT– I: TRACTOR AND POWER TILLERS**:** Tractors – different types – makes – powertillers – working principle components – Uses –Major systems – Functioning of each system

UNIT–II: TILLAGE IMPLEMENTS**:** Tractor drawn implements – Primary Tillage – Secondary tillage implements – Proper hitching of Implements – Power tiller attachments – Operational Adjustments – Safety aspects

UNIT–III: SOWING IMPLEMENTS**:** Sowing implements – Types – Working Principle – Calibration of seed drill – Adjustments – safety aspects

UNIT–IV: SPECIAL PLANTERS**:** Paddy transplanters – Pneumatic planters – Planters for Sugarcane and vegetables

UNIT–V: PLANT PROTECTION EQUIPMENTS**:** Plant protection Equipments – types – Working principle of different types of sprayers

TEXT BOOK

1. Jain, S.C. and C.R.Rai, 1999. Farm tractors(Maintenance and Repair). Standard Publishers Distributers, New Delhi.

REFERENCE BOOKS

1. Barger, E.L., J.B. Lilijedahl and E.C. McKibben, 1997. Tractors and their power units. Wiley Easterb Pvt Ltd, New Delhi.
2. Jagadishwar Sahay, 1992. Elements of Agricultural Engineering. Agro book agency, Patna – 20.
3. Ralph Alcock, 1986, Tractor implement system. AVI Pub, co., Inc. West poert, connectient.
4. Sreevastave, A.C., 1990. Elements of Farm Machinery, Oxford and IBH Publication Co., New Delhi.

JOURNALS

International journal of automotive technology, ISSN 1229-9138
Review of automotive engineering published by the japanesh society of automotive engineers.

E- REFERENCES

1. www.idavette.net
2. www.autorepair.about.com

LEARNING OUTCOME

- Students can be equipped with sufficient practical skills on farm power sources, handling of tractors, power tillers and various implements used in land preparation, sowing, inter cultivation and plant protection

15FEMV0106 - PRINCIPLES OF ELECTRIC MOTOR AND PUMPS (3 credits)

OBJECTIVE

- To learn the working principle, Installation, maintenance and operation of an electric motor/diesel engine and irrigation pumps.

UNIT–I: FARM ELECTRICITY**:** Farm electricity – use of electricity; origin of electricity; electrical terms; generation of electricity; Generator, Motor and Alternator; Selection, Installation and Maintenance of Electric Motor; Transformer; Transmission and Distribution of Electric Power.

UNIT–II: ELECTRIC MOTOR**:** Electric motor – DC motor and AC motor – DC Motor – Components – Types – Working Principles – DC motor starter – types; AC motors – Single phase – Components – Types – Working principle – Three phase – Components – types – working principle; Overload protection devices; Motor starters – types.

UNIT–III: CENTRIFUGAL PUMP**:** Principle of centrifugal pump; Construction installation and operation of centrifugal pump in series and parallel; Finding out defects and method to recondition centrifugal pump; submersible pump – construction, installation, operation and selection of appropriate type. Procedure to recondition, install and test of submersible pumps. Causers of failures and remedial measures.

UNIT–IV: SOLAR PV PUMP**:** Solar Photo Voltaic pump –Description and principle of working of solar cell – conversation efficiency – commercial solar cells - photo voltaic water pumping system – components, installation and maintenance.

UNIT–V: DIESEL ENGINE PUMPS: Pumps operated by diesel engine - Principle of Compression-ignition engine, Diesel cycle. Different type of starting and stopping method of Diesel Engine. Technical terms used in engine, Engine specification Procedure to clean fuel tank & check leak in the fuel line. Lubrication system – types, description and advantages of each over others. Filters and oil coolers – their description functions and method to overhaul for efficient functioning.

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 to know the working principle, Installation, maintenance and operation of an electric motor/diesel engine and irrigation pumps.

15FEMV0107- BASIC WORKSHOP (2 CREDITS)

OBJECTIVE:

- 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–I: WELDING **:** Tools and equipments - Arc welding of butt joint, tap joint, tee fillet, etc, Demonstration of gas welding. Heat treatment process-annealing, normalizing, hardening and tempering,

UNIT–II: 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–III: 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– IV: PLUMBING**:** Tools and equipments - types of joints, treading fitting for different types of pipes-GI, PVC, HDPE . study of different type of screws, nuts, studs, bolts and locking devices.

UNIT–V: SMITHY **:** Tools and equipments-Demonstration of making simple parts like keys, bolts, etc. sheet metal operations-shearing, banding, drawing and sqeezing

REFERENCES:

- S.K. Hajra Choudhury, A.K. Hajra Choudhury and Nirjhar Roy, 2001, Elements of Workshop Technology-Vol. 1 Manufacturing processess, Media Promoters and Publishers Pvt, Ltd. Mumbai.

LEARNING OUTCOME

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

15FEMV0108 – IN-PLANT TRAINING – I (6 credits)

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

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The in-plant training 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**

SECOND SEMESTER

15CSAU02A1- COMPUTER FUNDAMENTALS AND OFFICE AUTOMATION
(4 credits)

OBJECTIVES

- To understand the basic concepts of computers
- To develop applications using MS word, MS excel and MS PowerPoint.

UNIT–I : Definition of a computer – computer terminologies – anatomy of a computer – generations of computers- types of computers – types of operating system- types of programming languages – assembler- translator – compiler – cross complier

UNIT–II : Input devices – output devices – storage devices – source data entry devices.

UNIT–III: MS – Word: Introduction – features – document creation – document editing: cursor movements – selecting text – copying text – moving text – finding and replacing text – spelling and Grammar – page setup – mail merge – table creation.

UNIT–IV: MS – Excel: Introduction – advantages and application – organization of workbook – editing a worksheet – range – formatting worksheet – chart: creation – changing type – print options – built-in functions.

UNIT–V: Power point: introduction – features – creating presentation – viewing – saving and close presentation – changing layout – changing designs – slide transition – adding animation effects – inserting table, charts, pictures, clipart in presentation.

REFERENCES:

1. Fundaments of Information Technology, S.K.Bansal, A.P.H. Publishing company, New Delhi, 2002.

2. 2007 Microsoft Office System step by step, Joyce Cox, Joan Preppernau, Steve Lambert and Curtis Fyre, 2007.

LEARNING OUTCOME

- Students understand the basic concepts of computers
- Students using MS word, MS excel and MS PowerPoint.

15CSAU02N1	COMPUTER FUNDAMENTALS AND OFFICE AUTOMATION

Objective(s):

- To understand the basic concepts of computers
- To develop applications using MS Word, MS Excel and MS PowerPoint.
- To acquire knowledge on hardware devices.

UNIT	CONTENTS
I	*Computer concepts*
	• Definition of a computer –Origin of Computer- Characteristics
	• Computer terminologies
	• Anatomy of a computer - generations of computers
	• Types of computers- types of operating system
	• Types of programming languages
	• Assembler - translator
	• Compiler – cross compiler
	• Discussion on recent trends and technology
II	*Hardware devices*
	• Input devices –Keyboard-mouse-pointing devices
	• Output devices - printers- plotters- monitors
	• Storage devices - Floppy – Compact disk – external Hard disk – Pen drives – Flash Drive
	• Source data entry devices – Digital camera – Scanners – Voice Recognition System – fax machine - microphone
	• Surprise test/ slip test
III	*MS-Word*
	• MS-Word: Introduction - features
	• Document creation - Document editing: cursor movements
	• Selecting text - copying text - moving text
	• Finding and replacing text - Spelling and Grammar
	• Page setup - Table creation.
	• Mail Merge
	• Test on MS word shortcut keys
IV	*MS-Excel*
	• MS-Excel : Introduction - Advantages & applications -
	• Organization of workbook - Editing a worksheet -
	• Range - Formatting worksheet -
	• Chart: creation - changing type - Print options
	• Built-in functions.
	• Test on Excel Functions
V	*MS-Power Point*
	• MS-Power Point: Introduction - features –
	• Creating presentation - viewing - saving and close presentation
	• Changing Layout - Changing Designs - Slide transition
	• Adding animation effects
	• Inserting table, charts, pictures, clipart in presentation.
	• Checking the creativity of Students

15FEMV0209 - WORKSHOP CALCULATION AND SCIENCE-II (Credits 3)

OBJECTIVE:

- To calculate area, volume, weight, temperature, pressure, horse power and calorific value of fuels which are involved in farm equipment operations.

UNIT I : Formulae for Perimeter and Area of Plane figure - Rectangle, Square, Parallelogram, Triangle, Hexagon, any regular polygon, Trapezium, Circle, sector, Fillet, Ellipse, segment of a circle; Formulae for Volume and surface area of solids- Rectangular solid, Prism, cylinder, pyramids and cones, Frustum of pyramid and cones, sphere, Hollow sphere, segment of sphere, circular ring, spherical sector, Calculation of volume and weight of simple solid bodies such as cubes, square and hexagonal prism-shop problem.

UNIT II : Heat and temperature –Temperature-Thermodynamic temperature scale (Kelvin), Cooling system temperature; Standard temperature and pressure (STP); Thermal expansion with calculation; Heat- Sensible heat, Latent heat, Specific latent heat, Specific heat capacity, Quantity of heat with calculation; Heat transfer – Conduction, Convection, Radiation ;

UNIT III: Heating, expansion and compression of gases - Absolute pressure, Absolute temperature; Laws relating to the compression and expansion of gases -Heating a gas at constant volume, Heating a gas at constant pressure, Charles' law. Expansion or compression at constant temperature – isothermal

UNIT IV: Internal combustion engines- Engine power-Brake power, Horsepower, Mean effective pressure, Calculation of indicated power, Cylinder pressure vs. crank angle, Mechanical efficiency of an engine, Volumetric efficiency, Torque vs. engine speed, Specific fuel consumption vs. engine speed, Brake power, torque and sfc(Specific fuel consumption) compared, Brake mean effective pressure, Thermal efficiency, Indicated thermal efficiency, Brake thermal efficiency petrol vs. Diesel.

UNIT V: Fuels and combustion- Calorific value, Combustion-Products of combustion, Relevant combustion equations. Air–fuel ratio-Petrol engine combustion, Detonation, Preignition, Octane rating, Diesel fuel, Flash point , Pour point, Cloud point, Biofuels, Liquefied petroleum gas (LPG) ,Hydrogen, Zero emissions vehicles (ZEVs)

TEXT BOOKS

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

REFERENCE BOOKS

1. Ojha, T.P and A.M.Michael 2005. **PRINCIPLES OF AGRICUTURAL ENGINEERING VOL I.** Jain Brothers, New Delhi. ISBN: 978-8186321638
2. Nakra C.P 1970. **FARM MACHINERY AND EQUIPMENT:** Dhanpat Rai Publishing Company Ltd, New Delhi ISBN : 978-8187433231
3. Sricastava, A.C., 1991. **ELEMENTS OF FARM MACHINERY.** Oxford & IBH Publishing Co Pvt Ltd, New Delhi. ISBN: 978-8120405134

LEARNING OUTCOME

- Students learn calculate area, volume, weight, temperature, pressure, horse power and calorific value of fuels which are involved in farm equipment operations

15FEMV0210 - ENGINEERING DRAWING II (3 credits)

OBJECTIVE:

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

UNIT – I : Read and interpret drawings- Determine information from the title block, Read and interpret industrial prints, Read and interpret detailed and assembly drawings, Identify casting drawings and machining drawings, Read and interpret diagrams, Distinguish between a mono detail and a multi detail drawing.

UNIT–II: Identify different drawing projections - Interpret pictorial and multi-view drawings. Interpret auxiliary and section views, Determine views in a drawing and the significance of the view being shown. Identify missing lines and missing views.

UNIT–III: Free hand sketching of key and screw threads. Read and interpret three Types of screw thread representation: pictorial, schematic and simplified presentation. Terms used in describing a threaded Part, Designation of Thread Specifications, Left-Hand Thread Notations, read and interpret the different type of Finish Symbols, Fillets and Rounds and Machine Slots.

UNIT–IV: Drawing of I .C engine – Diesel and their parts. Sketching of Diesel cycle, valves and valve timing diagram. Free hand sketch of piston assembly, Free hand sketching of piston gudgeon pins rings and connecting rod. Free hand sketching of crank shaft and cam shaft showing all parts. Free hand sketching of cylinder block and cylinder head, cylinder liners .

UNIT–V: Free hand sketching of different cooling system -showing all necessary parts such as water pump, thermostatic valve, Radiator etc. Free hand sketching of lubrication system, showing all necessary parts such as filters, oil pump, pressure release valve etc. Free hand sketching of power take off (PTO) system. Freehand sketching of steering system. Free hand sketching of charging system and solenoid switch circuit.

TEXT BOOKS:

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.

REFERENCE BOOKS:

1. N.D. Bhatt, 2003, Engineering Drawing, Chaotar publishing house 46th edition.
2. K.R. Gopalakrishnan.1998 Engineering Drawing (Vol. I & II) Subhas Publications
3. Luzadder and Duff, 2001, Fundamentals of Engineering Drawing Prentice Hall of India Pvt Ltd XI edition
4. 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

15FEMV0211- ENGINEERING SURVEY (2 CREDIT)

OBJECTIVE:

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

UNIT–I: 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–II: 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–III: Cross staff survey; Obstacles in chaining; triangulation method of chain survey; ordinate method –average ordinate, mid ordinate, traphezoidal, and simpson method to determine areas of regular and irregular fields.

UNIT–IV: Leveling, definition, terminology, leveling equipments, dumpy level, leveling of dumpy level, leveling staff, methods of calculation of reduced level, the collimation system and the rise and fall system

UNIT–V: Types of leveling simple leveling, and differential leveling, 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 measure the regular and irregular areas of a agricultural field by using chain survey. To prepare contour map and level difference of a given field by using levelling.

15FEMV0212 - FARM ENGINE AND TRACTOR SYSTEMS (3 CREDITS)

OBJECTIVE:

- To learn different systems of the tractor for effective functioning and maintenance.

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

UNIT–II: 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–III: Cooling systems:- Purpose, types, Cooling system components, water pump, function of thermostat, pressure cap, Recovery system & Thermo-switch. Function & types of Radiator; 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–IV: 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

UNIT–V: Transmission system – clutch assembly – types; gears – functions; tractor differential, differential lock, final drive, torque converter – its functions and components; hydraulic system, components, controls and advantages; hitching of the implements – different types and its operation

TEXT BOOKS

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

REFERENCE BOOKS

1. Ojha, T.P and A.M.Michael 2005. **PRINCIPLES OF AGRICUTURAL ENGINEERING VOL I.** Jain Brothers, New Delhi. ISBN: 978-8186321638
2. Nakra C.P 1970. **FARM MACHINERY AND EQUIPMENT:** Dhanpat Rai Publishing Company Ltd, New Delhi ISBN : 978-8187433231
3. 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.

15FEMV0213 - OPERATION AND MAINTENANCE OF FARM MACHINERY – II
(4 credits)

OBJECTIVE:

- To learn functions, components and working principle of intercultural operation machineries, rice transplanting and harvesting machinery, multicrop thresher.

UNIT–I: Machinery for Intercultural operations – cultivators, sweep, junior hoe, manual weeders, power weeders for wetland and garden land -- functions, components, working principle; estimating the cost of operation in the field condition.

UNIT–II: Rice Transplanting machinery - functions, components, working principle; estimating the cost of operation in the field condition.

UNIT–III: Harvesting machinery for paddy – self propelled vertical conveyor reaper and tractor rear/front mounted vertical conveyor reaper - functions, components, working principle; estimating the cost of operation in the field condition.

UNIT–IV: Harvesting machinery for groundnut, tuber crops and sugarcane - functions, components, working principle; estimating the cost of operation in the field condition.

UNIT–V: Multi crop thresher – functions, components, working principle; estimating the cost of operation in the field condition.

REFERENCES:

1. Ojha, T.P and A.M.Michael 2005. **PRINCIPLES OF AGRICULTURAL ENGINEERING VOL I.** Jain Brothers, New Delhi. ISBN: 978-8186321638

2. Nakra C.P 1970. **FARM MACHINERY AND EQUIPMENT:** Dhanpat Rai Publishing Company Ltd, New Delhi ISBN : 978-8187433231

3. Sricastava, A.C., 1991. **ELEMENTS OF FARM MACHINERY.** Oxford & IBH Publishing Co Pvt Ltd, New Delhi. ISBN: 978-8120405134

LEARNING OUTCOME

- Students able to learn functions, components and working principle of intercultural operation machineries, rice transplanting and harvesting machinery, multicrop thresher.

15FEMV0214 - PRINCIPLES OF IRRIGATION AND WATER MANAGEMENT (2 Credits)

OBJECTIVE:

- To understand functioning of different irrigation practices, soil, plant and water relationship and methods adopted to improve irrigation efficiencies.

UNIT–I: Sources of irrigation water, measurement of irrigation of water volumetric method, velocity area methods, direct discharge methods, weirs and orifices; water conveyance systems , open channel, underground pipe lines

UNIT–II: Irrigation methods, surface irrigation, and sub surface irrigation, surface irrigation border, check basin, furrow, surge irrigation, conditional favorable to adapt the irrigation methods, its advantages and limitations

UNIT–III: Over Head irrigation methods or micro irrigation systems, Drip irrigation and sprinkler irrigation, description, components, advantages, limitations, suitability and hydraulics of flow for irrigation systems.

UNIT–IV: Soil-water - plant relationship, Soil-water relationship, Soil-crop relationship, Crop-water relationship, factors affecting water requirements of crops, determination of water requirements of crop, soil-water-plant-relationship, Duty of water, relation between delta, duty and base period.

UNIT–V: Irrigation efficiencies Water conveyance, water distribution, water application, water storage, water use efficiency, methods used to improve irrigation efficiency, calculations of irrigation efficiencies

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 can understand functioning of different irrigation practices, soil, plant and water relationship and methods adopted to improve irrigation efficiencies.

15FEMV0215- OPERATION & MAINTENANCE OF MICRO IRRIGATION SYSTEMS
(**3 Credits)**

OBJECTIVE:

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

UNIT–I: Importance of micro irrigation systems; relations between agronomy and micro irrigation, types of crops, types of soils, types of roots, identification of crop pattern, water requirement of different crops, and type of fertilizers.

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

UNIT–IV: 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–V: 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 and 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

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

15FEMV0216- INPLANT TRAINING – II (6 credits)

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

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The inplant training 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 incharge. In addition, he/she has to submit weekly report to the department. During the inplant 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**

THIRD SEMESTER

15EVSU0001- ENVIRONMENTAL STUDIES (4 Credits)

OBJECTIVES:

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

UNIT– I : Natural Resources : Introduction to Environment and natural resources (Definition, scope and important) – Forest Resources: Use and over-exploitation of forest resources and its impact on forest and tribal people – Water Resources: Use and over-exploitation of water and impact – Land Resources: Land degradation and soil – erosion, desertification – Food Resources: Effects of modern agriculture, fertilizer-pesticide problems – Energy Resources: Growing energy needs renewable and non-renewable energy source-use of alternative energy sources.

UNIT– II: Ecosystem and Biodiversity: Concept of an ecosystem – Structure and function of an ecosystem – Energy flow in the ecosystem - Food chains, food webs and ecological pyramids – Types of ecosystem – Biodiversity: genetic, species and ecosystem diversity, India as a mega – diversity nation – Treats to biodiversity : habit loss, poaching of wild life, man-wildlife conflicts; Endangered and endemic species of India – Conservation of Biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT– III: Environmental Pollution : Causes, effects and control measure of: Air pollution, Water pollution, Soil pollution, Noise pollution and Nuclear hazards, Solid waste management, Global environmental problems.

UNIT– IV: Social Issues and the Environment : Sustainable development, Rural Urban problems related to environment, Water management and rain water harvesting – Environment ethics: Issues and possible solutions, Environmental Protection Policy, Acts and Legislation, Population and the Environment – Environmental and Population concern: Environment and human health, Environment education at various levels – HIV/AIDS, Women and child welfare, gender issues, gender equity, institutions for gender studies / research.

UNIT– V: Disaster Management: Disaster : Meaning and concepts, types, causes and management – Effects of disaster on community, economy, environment – Disaster management cycle : early response, rehabilitation, reconstruction and preparedness – Vulnerability Analysis and role of community in Disaster Mitigation – The Disaster Management Act 2005 – Disaster Management Authority : National, State and District level – Ill effects of fireworks.

REFERENCES

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

LEARNINNG OUTCOME

- Students able to learn in-situ and ex-situ conservation of bio-diversity
- Students able to learn the control measures of environmental pollution

15NSSU0001 – NSS (0+1 Credit)

OBJECTIVES:

- To know the history, philosophy, principles of NSS and working with people
- To know the role and responsibility of volunteers

UNIT – I: NSS – History, Philosophy, Principles and Objectives

UNIT – II: Working with people – Methods and Techniques

UNIT – III : NSS – Regular Programme : Objectives, activities – role and responsibilities of volunteers

UNIT – IV : NSS Special Camping Programme: Objectives, activities - role and responsibilities of volunteers

UNIT – V : Evaluation of the NSS activities – Tools and Techniques

REFERENCES

1. National Service Scheme Manual, 1997. Department of Youth Affairs and Sports, Ministry of Human Resource Development, Government of India.

2. Supe, S.V. 1995, Extension Education, Sterling Publications, Madras

3. Advi Reddy, 1996, Extension Education Babatal Publications, Hyderabad

4. Narayanasamy, N, M.P.Boraian and R. Ramesh, 1997, Participatory Rural Appraisal, GRU, Gandhigram.

LEARNING OUTCOME

- Student able to know To know the history, philosophy, principles of NSS and working with people, role and responsibility of volunteers

15SHSU0001- FOUNDATION COURSE IN SHANTI SENA (1 Credits)

OBJECTIVES:

- To introduce the Concept of Shanti Sena (Peace Brigades) to the students.
- To give exposure and training to students in the skills needed for Shanti Sena

UNIT – I : Shanti Sena- Meaning and conceptual frame work – historical development

UNIT– II : Shanti Sena in India and abroad- Contributions of Mahatma Gandhiji, Khan Abdul Ghaffar Khan, Vinoba Bhave and Jeyaprakash Narayan

UNIT– III : Organisation and functions of Shanti Sena- Shanti Kendras, All India Shanti Sena Mandal; Peaceful resolution of conflicts, Peace Making, Alternative to Defense and Violence

UNIT –IV : Experiments in Modern times- World Peace Brigade, Peace Brigade International, U.N. Peace Keeping Force, Truth and Reconciliation Commission and Experiments of Gandhigram Rural Institute

UNIT – V : Skills and Training for Shanti Sena- Skills of First Aid and Skills for disaster management, Peace Making Skills(Conflict Resolution and Counseling) and Transforming oneself into a Shanti Saink

REFERENCES

1. K.Arunachalam (1985), Gandhi - The Peace Maker, Gandhi Smarak Nidhi, Madurai.
2. Dr.N.Radhakrishnan, (1997), Gandhian Nonviolence: A Trainer's Manual, Gandhi Smiriti and Darshan Samiti, New Delhi.

LEARNING OUTCOME

- Student will learn concept of Santhi Sena and acquire skill on santhi sena

15SPOU0001 - SPORTS AND GAMES (0+1 Credit)

OBJECTIVES

- To acquire basic knowledge of Physical Education
- To know the rules and regulations of sports and games
- To acquire knowledge about recreation
- To spread the message of positive health as taught in Yoga to people in a systematic and scientific manner
- To provide a proper perspective and insight into various aspects of Yoga education to the trainees

UNIT – I : Concept and meaning of Physical Education- Definition of Physical Education- Aims and Objectives of Physical Education- Scope of Physical Education

UNIT-II : Origin of games(basket ball, ball badminton, circket, foot ball, hockey, kabaddi, kho-kho, Tennikoit, Volley ball)- Basic skills of anyone of the major games (basket ball, Volley ball, kabaddi and foot ball etc.,) and two events Track and Field events- Intramural and Extramural tournaments- Recreational activities

UNIT- III : Common athletic injuries and their treatment- personal hygiene- safety education with special reference to play field- modern trends in Physical Education- Counseling against doping, drug addiction, smoking, alcoholism- nutrition and sports diet

UNIT- IV : Meaning of Yoga- Definition of Yoga- Aims and Objectives of Yoga- Scope of yoga- Need and Importance of Yoga in the modern era

UNIT- V : The wheel of Yoga-Eight limbs of yoga – Gandhiji's contribution of Yoga – Meaning and Objectives of Meditation – various types of meditation – Difference between yoga and Physical Exercises – Threaputical aspects of yoga and its applications.

REFERENCES

1. Essential of Physical Education by Dr. Ajmeer Singh, Xpress Grafics, Delhi-28, 2003.
2. The Official Rules book of Basketball, Football, Hockey, Volleyball, Kabaddi Federation of India, 2015.
3. Competition Rules Book by Amateur Athletics Federation of India, New Delhi, 2003.
4. Officiating Techniques in Track and Field by Brar T.S. Gwalior, 2002.

LEARNING OUTCOME

- Students able acquire basic knowledge of Physical Education, know the rules and regulations of sports and games, acquire knowledge about recreation, spread the message of positive health as taught in Yoga to people in a systematic and scientific manner, provide a proper perspective and insight into various aspects of Yoga education to the trainees

15FATU0001- FINE ARTS (1 Credits)

OBJECTIVES:

- A general survey course to introduce the students to Indian Art.
- To understand the basics of Art History, Aesthetics and Art Appreciation.
- Theoretical, social and cultural dimensions of the production of art and architecture

UNIT- I: Art History and Aesthetics **:** What is art and what is art History? What constitutes art and how do we define it? The Classical Concept of art. Theory of Art as Expression. Aesthetic theories of Art.

UNIT- II: Indian Art **:** Do art and architecture perform functions and have a role to play in society? The role and importance of the museum as a site for cataloguing and preserving art, and projecting certain defined notions that have a bearing on the study of art and architecture will also be focused upon

UNIT- III: Indian Architecture : Prescriptive texts and the making of early Indian art and architecture. Was the 'science' of art and architecture developed as a concomitant of the artistic and architectural developments in early India?

UNIT- IV: Types of Architecture**:** Domestic (dwellings), public institutional (step-wells, rest-houses, hospitals) and religious institutional (temples, *stūpas*/ *caityavihāra*, *maṭhas*) will be focused upon. The focus will be on the material sources at particular monument sites such as Sanchi, Amaravati, Ajanta, Ellora, Khajuraho, Tanjavur, Mahabalipuram, Sravana Belagola, Bhubaneshwar and Mount Abu. (There may be other sites added or dropped from this list depending on the newer literature available.)

UNIT- V: Trends and Developments**:** How do we understand the different structures that emerge over a long period of time within a monument or when a monument no longer has a living significance for the people in its vicinity? Are symbols remnants of the primitive mentality or do they also evolve over time? How do we understand ornamentation? Finally, is there an Indian art and architecture?

REFERENCES

1. Brancaccio, Pia (2011) The Buddhist Caves at Aurangabad: Transformations in Art and Religion. Leiden & Boston: Brill.
2. Brockman, Norbert C. (2011) Encyclopedia of Sacred Places. Vol. 1: A-M. Second Edition, California: ABC-CLIO, LLC.
3. Burton-Page, John (2008) *Indian Islamic Architecture. Forms and Typologies, Sites and Monuments*. Ed. George Michell. Leiden & Boston: Brill.
4. Elgood, Heather (2000) *Hinduism and the Religious Arts*. London & New York: Cassell.
5. Tillotson, GHR, *Paradigms of Indian Architecture: Space and Time in Representation and Design*, Curzon, 1997.
6. Vatsyayan, Kapila, *The Square and the Circle of the Indian Arts*, Abhinav, Delhi, 1997.
7. Wagoner, Philip B., 'Ananda K. Coomaraswamy and the Practice of Architectural History', *Journal of the Society of Architectural Historians*, vol. 58, no. 1, 1999.

LEARNING OUTCOME

- Student will acquire knowledge and skill on Indian art, history and aesthetics, Indian architecture and Trends and development of Indian architecture

15FEMV0317- WORKSHOP CALCULATION AND SCIENCE-III (3 Credits)

OBJECTIVES:

- To learn the principles of lever, moments, torque and gear, velocity, acceleration, speed, force, mass, work done, vehicle dynamics and balancing of rotating components.

UNIT – I: Levers and moments **:** Data interpretation - Allegations or Mixture, torque and gears **-** definition of Levers, Principles of leverage- The principle of moments.The bell crank lever, a practical application of the bell crank lever in vehicle. Axle loadings, a steering mechanism as a machine

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

UNIT-III: Materials- Stress, strain**:** Definition of Stress, Types of Stress-Tensile, Compressive, Shear. Examples of the three basic stresses in automotive components, Calculation of Stress and Strain in automotive application, Stress raisers, Strain-, Tensile, Compressive, Shear stress, Tensile strength, Factor of Safety, Torsional stress, Strain energy.

UNIT-IV: Force, mass and acceleration **:** Newton's laws of motion, Relation between mass and weight. Inertia, Motion under gravity, Angular (circular) motion, Equations of angular motion Relation between angular and linear velocity, Centripetal acceleration, Accelerating torque- Vehicle dynamics **-**Load transfer under acceleration, Static reactions, Vehicle under acceleration, Definition of tractive effort, Tractive resistance- Rolling resistance, air resistance, gradiant resistance, Inertia. Power required to propel vehicle, Forces on a vehicle on a gradient – gradient resistance, Gradeability, Vehicle power on a gradient, Vehicle on a curved track, Overturning speed, Skidding speed

UNIT-V: Balancing and vibrations **:** Balance of rotating masses acting in the same plane (coplanar). Engine balance, Simple harmonic motion (SHM), Applications of SHM- Vibration of a helical coil spring, Torsional vibration, Free vibrations, Example of free vibrations, Forced vibrations- Resonance, Driveline vibrations, Damping, Vibration dampers, Dual mass flywheel, Cams.

REFERENCES

1. Properties of Matter, 2006, D.S.Mathur, Shyam Lal Charitable Trust, New Delhi

2. Vibration and Waves in Physics, 1995, Iain G Main, Cambridge University Press

LEARNING OUTCOME

- Student will understand benefits of lever, moments, torque and gear, velocity, acceleration, speed, force, mass, work done, vehicle dynamics and balancing of rotating components.

15FEMV0318- ENGINEERING DRAWING-III (3 Credits)

OBJECTIVES:

- To acquire knowledge about the free hand sketching of farm machineries.
- To simulate the shape and size of the components proportionately to the original

UNIT – I : Free hand sketching of tractor and power tiller and their components

UNIT – II : Free hand sketching of different tillage implements and their components

UNIT – III: Free hand sketching of rotavator, harrows, cultivators and their components

UNIT - IV: Free hand sketching of seed drills and seed planters and their components.

UNIT - V : Free hand sketching of weeders, bund former, ridger and their components.

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.

LEARNING OUTCOME

- 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

15FEMV0319- OPERATION AND MAINTENANCE OF TILLAGE MACHINERIES (3 Credits)

OBJECTIVES:

- To identify suitable farm implement based on soil and crop conditions.
- To learn field adjustments for achieving proper ploughing

UNIT-I: Mould board plough and Chisel plough

UNIT- II: Disc plough and Reversible disc plough

UNIT- III : Rotavator

UNIT- IV : Cultivator and Five Bottom plough

UNIT- V: Offset Disc Harrow

REFERENCES

1. Repair, Maintenance and Field Operation of Tillage Equipments, March 2011, Sector: Agriculture. For Modular Employable skills developed by National Instructional Media Institute, DGET, Ministry of Labour & Employment, Government of India, Chennai.
2. Ojha, T.P and A.M.Michael 2005. Principles of Agricultural Engineering VOL I. Jain Brothers, New Delhi. ISBN: 978-8186321638
3. Fundamentals of Agricultural Engineering, 2012, Er. Sanjay Kumar, Er. Vishal Kumar, Dr. Ram Kumar Sahu Published by Kalyani Publishers, Chennai, ISBN: 978-93-272-2168-8

LEARNING OUTCOME

- Student will be able to gain skill to identify suitable farm implement based on soil, moisture and crop conditions
- Student will acquire skill for adjusting the plough, harrows to reach the maximum output

15FEMV0320- OPERATION AND MAINTENANCE OF SOIL FORMING AND LAND SHAPING EQUIPMENTS (3 Credits)

OBJECTIVES:

- To acquire skills in operation of soil forming and land shaping equipments.
- To learn field adjustments and maintenance of equipments

UNIT-I Earth Moving Equipments: Leveller, Laser Leveller, Terracer, Dumper, Wheel dozer and Chain dozer

UNIT- II Ridger and Bund Former

UNIT- III Bed former and Posthole digger

UNIT- IV Plastic mulching equipment

UNIT- V Wet land equipments- Puddler, Trampler and cage wheel

REFERENCES

1. Repair, Maintenance & Field Operation of Land Shaping and Development Machinery, 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. Repair, Maintenance & Field Operation of Soil Farming 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.

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

4. Ojha, T.P and A.M.Michael 2005. Principles of Agricutural Engineering VOL I. Jain Brothers, New Delhi. ISBN: 978-8186321638

LEARINIG OUTCOME

- Student will gain skill in operation of soil forming and land shaping machineries

- Student become expert in adjustments and maintenance of machine to reach highest efficiency

15FEMV0321- REPAIR AND OVERHAULING OF TRACTOR ENGINE (6 Credits)

OBJECTIVES:

- To learn the importance of servicing of tractor engine.
- To acquire skills in engine overhauling.
- To identify faults in engine and its remedies

UNIT- I Servicing of tractor

UNIT- II Dismantling and assembling of engine components

UNIT- III Radiator

UNIT- IV Air cleaner and fuel feed pump

UNIT- V Fuel injection pump

REFERENCES

1. 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.
2. Repair & Maintenance of Radiator, 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.
3. Repair & Overhauling of Tractor, October 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.
4. Basic Tractor Servicing, 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.
5. Automobile engineering, 2006, Vol.2; Published by A.K.Jain, Standard Publishers Distributors, 1705-B, Nai Sarak, Delhi – 110 006, ISBN: 81-86308-01-6
6. 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 OUTCOME

- Student will know importance of servicing of tractor and acquire skills in engine overhauling
- Student will be able to identify the faults in engine and its remedies

15FEMV0322- IN-PLANT TRAINING-III (6 Credits)

OBJECTIVE:

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

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The inplant training 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 incharge. In addition, he/she has to submit weekly report to the department. During the inplant 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**

FOURTH SEMESTER

15CSAU04B1- INTERNET AND WEB TECHNOLOGY (4 Credits)

Credit: 3+1 Lectures hour per week: 3 Lab hours per week: 1

OBJECTIVES:

- To enable the students with the knowledge of Network, Internet and its applications.
- To make the students to be familiar with multimedia tools

UNIT- I: Information Technology **:** Information Technology introduction; Information systems and its components; Types of information systems; IT in business and industries; Application areas of IT- Education, Training, CAD and CAM; Application areas of IT- Entertainment, arts and science; GPS(Global positioning system)- Working method and its applications

UNIT- II: Communication Technology **:** Network basics and its terminologies introduction; Advantages of networks; Types of networks- LAN, MAN and WAN structure and its working principle; Network topologies- Bus, Star, Ring, Tree and Mesh; Communication channels- twisted pair, co-axial and fiber optics; Internetworking devices- bridges, routers and its gateways

UNIT- III: Internet **:** Internet basics and Internet terminologies; Applications of Internet- e-mail; Applications of Internet- Usenet, telnet, e-commerce; Applications of Internet- World Wide Web, Video Conferencing; Voice over internet protocol introduction, working principles and advantages; New internet technologies- cloud computing, virtualization, social network, web surf on any device, software defined radio and other technologies

UNIT- IV: Multimedia **:** Multimedia basics; Paint and draw applications of Multimedia basics and its applications; Various graphics effects and techniques and its varations; Sound and music and video tool of multimedia, various compression techniques; Multimedia authoring tools types; Various devices used in delivering multimedia; Role of multimedia in web designing

UNIT- V: Personal, Social and Ethical Issues **:** Personal, Social and Ethical Issue- computers and operator health; Viruses- worms- malware- anti-virus; Computer crime basics, types of crimes, security techniques; Cryptography- importance, techniques.

REFERENCES

1. Introduction to Information Technology, ITL education solution limited, Pearson Education India, New Delhi, July 2011
2. Fundamentals of Information Technology, 2/e, Alexis leon and Mathew leon, Vikas publication, New Delhi, 2009
3. Internet for everyone, 2/e, 2/e, Alexis leon and Mathew leon, Vikas publication, New Delhi, 2011

LEARNING OUTCOME

- At the end of this exercise students shall be able to identify the knowledge of Network, Internet and its applications.
- To make the students to be familiar with multimedia tools

15ENGU00C1- COMMUNICATION AND SOFT SKILLS (2 Credits)

OBJECTIVES:

- To enhance holistic development of students and improve their employability skills
- To develop inter personal skills and be an effective goal oriented team player.
- To develop professionals with idealistic, practical and moral values.
- To develop communication and problem solving skills.
- To re-engineer attitude and understand its influence on behavior.

UNIT – I: Personality Traits **:** General and Individual Traits: An Introduction - Growth Traits: An Introduction

UNIT – II: General and Individual Traits : Honesty - Reliability

UNIT – III: General and Individual Traits **:** Good attitude - Common Sense

UNIT – IV: Growth Traits **:** Self-directed skills - Self-monitoring and accepting correction

UNIT – V: Growth Traits **:** Critical thinking skills - Commitment to continuous training and learning

TEXTBOOK:

1. Soft Skills for Positive Traits, 2014, OBS Board of Editors, Chennai

LERANING OUTCOME

- Student will be able to improve the interpersonal skills, identify and achieve the goal become professional and practical
- Student acquire moral values develop, communication and problem solving skills and can re-engineer attitude and understand its influence and behaviour

15FEMV0423- WORKSHOP CALCULATION AND SCIENCE- IV (3 Credits)

OBJECTIVES:

- To learn electrical principle, ohms law, measurement of current and voltage, resistance, temperature, relays, capacitors, electronic principles, light emitting diodes, transistors and refrigeration.

UNIT-I : The binary system- Most significant bit (MSB), Hexadecimal, Converting base 10 numbers to binary 10, Uses of binary numbers in vehicle. Electrical principles-Electrical current, Atoms and electrons, conductors and insulators,- Conductors, Semiconductors, Insulators, Electromotive force, Electrical power sources- producing electricity- Chemical power source, Magnetic power source, Thermal power resource, Effects of electric current- using electricity. Electrical circuits- Circuit principles, A simple circuit, Direction of current flow, Electrical units- Volt, Ampere, Ohm, Watt; Ohm's law, Resistors in series, Resistors in parallel, Alternative method of finding total current in a circuit, containing resistors in parallel, Measuring current and voltage, Ohmmeter, Open circuit, Short circuit.

UNIT- II : Temperature coefficient of resistance- Negative temperature coefficient; Electricity and magnetism- Permanent magnets, The magnetic effect of an electric current, Direction of the magnetic field due to an electric current in a straight conductor, Magnetic field caused by a coil of wire. Solenoid and relay, Electromagnetic induction, The electric motor effect, Fleming's rule, Alternating current- Cycle, Period, Frequency; Applications of alternating current, Transformer.

UNIT- III: Capacitors- Capacitance, Capacitors in circuits- Contact breaker ignition circuit, Capacitive discharge ignition system, Capacitors in parallel and series, Impedance. Electronic principles- Introduction, Semiconductors- Effect of dopants, Electrons and holes, The p-n junction, Bias, Behaviour of a p-n junction diode, Diode protection resistor, Negative temperature coefficient of resistance- semiconductor, The Zener diode.

UNIT- IV : Light Emitting Diode (LED)- Voltage and current in an LED, Photodiode, Bipolar transistors, Basic operation of transistor, Current gain in transistor, Current flow in transistors; Transistor circuit used in automotive applications- Voltage amplifier, Darlington pair, Heat sink.

UNIT- V : Filter circuits, Voltage divider, Integrated circuits, Sensors and actuators, Control unit (computer) inputs and outputs, Logic gates- The RTL NOR gate, Truth tables, Bits, bytes and baud. Properties of refrigerants, refrigerant oil, Fluorinated refrigerants, Refrigeration process- pressure/ enthalpy diagram

REFERENCES

1. Digital Principles and Applications, Leach and Malvind, Seventh Edition, Tata McGraw Hill
2. Basic Electronics for Scientist, fourth edition, Brophy J.J., McGraw Hill.
3. Electricity and Magnetism, Seghal, Chopra, Seghal, S. Chand & Co.

LEARNING OUTCOME

- Student will learn electrical principle, ohms law, measurement of current and voltage, resistance, temperature, relays, capacitors, electronic principles, light emitting diodes, transistors and refrigeration.

15FEMV0424 – ENGINEERING DRAWING- IV (3 Credits)

OBJECTIVES:

- To learn AutoCAD for drawing farm machineries.
- To design new or improvements in the farm machineries by using AutoCAD

UNIT- I : Introduction to AutoCAD, Starting AutoCAD, Exercises using Draw commands as- Line, Polygon, Rectangle, Circle, Ellipse. Exercise on using Edit commands as Erase, Copy, Mirror, Offset, Extend, Array, Move, Rotate, Scale, Trim, Chamfer, Fillet.

UNIT-II : Exercises on using X, Y, Z, coordinate entry system for Angular measurement, Absolute coordinate, Relative coordinate, Polar coordinate. Exercises on using Drawing Aids- grid and snap, ortho and polar tracking, PolarSnap, running object snaps, the From snap, and object snap tracking. Exercises on using Osnap commands as Endpoint, Intersection, Nearest, Midpoint, Tangent and Center. Exercises on using Layers as Create new layer, Assign layer color, Assign layer linetype.

UNIT-III : Exercises on using dimensions- Styling Dimensions, Adding Dimensions, Using Inquiry Commands, Adding Dimension Objects, Adding and Styling Multileaders, Editing Dimensions. Exercises on using Creating and Editing Text- Creating Text Styles, Writing Lines of Text, Creating Text to Fit, Justifying Text, Transforming and Creating Text, Editing Text

UNIT-IV : Exercises on using Zoom Commands- Zoom real time, Zoom window, Zoom previous, Zoom all, Pan realtime. Exercises on using Hatching and Gradients- Specifying Hatch Areas, Picking Points to Determine Boundaries, Selecting Objects to Define Boundaries, Associating Hatches with Boundaries, Hatching with Patterns, Specifying Properties, Separating Hatch Areas, Hatching with Gradients.

UNIT-V : Exercises on using Printing and plotting- Configuring Output Devices, Setting Up a System Printer, Setting Up an AutoCAD Plotter, Plotting in Modelspace, Plotting Layouts in Paperspace, Exporting to an Electronic Format. Introduction to Modeling- type of modeling- 2D wire frame, 3D wire frame, surface modeling, solid modeling. Exercises on using 3D primitives, Extrude, Revolve command, subtract, union 3D drawing by using User co-ordinate systems. Working drawing of Combine Harvester Using CAD.

REFERENCES

1. Venugopal.K. 2002, Engineering drawing and graphics with Auto CAD, New age International (p)Ltd., publishers, New Delhi – 110 002.
2. Natarajan,K.V. 1999, A text book on Engineering Drawing + Auto CAD, Dhanalakshmi Publications, Chennai.
3. Jaypoovan,T. 2001, Engineering Drawing with Auto CAD 2000, Vikas Publishing House Pvt. Ltd.,New Delhi – 110 014.
4. Narayana, K.N. and Kannaiah,P. 2000, Textbook on Engineering Drawing, Scitech Publications, Chennai – 600 017.

LEARNING OUTCOME

- Student will be able to operate AutoCAD software and can design new implements, new components in the farm machinery and also design improvements in the farm machinery by using AutoCAD

15FEMV0425- OPERATION AND MAINTENANCE OF SOWING AND WEEDING EQUIPMENTS (3 Credits)

OBJECTIVES:

- To learn skills in handling of different types of seed planters and transplanters.
- To practice on field adjustments.
- To operate different types of weeders in field conditions

UNIT - I: Manually operated seed drill- Dibbler, Broad casting devices, Direct paddy seeder

UNIT - II: Power tiller drawn seed planter

UNIT - III: Tractor drawn seed planter, Broad bed furrow cum seeder, vegetable planter

UNIT-IV: Transplanter- Manually operated rice transplanter and self propelled rice transplanter- Mat nursery, Pro-tray Seeder, Automatic Pro-tray seeder

UNIT- V: Manually operated- Dry land weeders, Cono weeder and Power weeder.

REFERENCES

1. Repair, Maintenance & Field Operation of Seed Drills, 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. Repair, Maintenance & Field Operation of Planters and Transplanter, May 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.
3. Fundamentals of Agricultural Engineering, 2012, Er. Sanjay Kumar, Er. Vishal Kumar, Dr. Ram Kumar Sahu, Published by Kalyani Publishers, Chennai ISBN: 978-93-272-2168-8

LEARNING OUTCOME

- Student will acquire skill in handling of different types of seedling, planter, transplanter and practice on field adjustments and operates different types of weeders in field conditions

15FEMV0426- OPERATION AND MAINTENANCE OF PLANT PROTECTION EQUIPMENTS (3 Credits)

OBJECTIVES:

- To learn different types of sprayers and dusters and its application in field conditions.
- To identify the repairs and its remedies.
- To practice on field adjustments

UNIT – I: Lever operated Knapsack sprayer, Foot sprayer, Foot rocker sprayer

UNIT- II : Battery operated Knapsack sprayer, Hand sprayer, Hand held ULV sprayer

UNIT- III : Power sprayer, Power duster, Hand rotary duster

UNIT- IV : High volume sprayer, Unimobile sprayer, Avenger ULV sprayer

UNIT- V : Tractor operated Tall tree sprayer

REFERENCES

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

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

LEARNING OUTCOME

- Student acquire skill in operation and maintenance of different types of sprayers and dusters and its application in field conditions
- Student identify the repair and remedies of the sprayer and duster
- Student become expert in the operation and field adjustments of these machines

15FFEMV0427- REPAIR AND OVERHAULING OF TRACTOR TRANSMISSION SYSTEMS AND CONTROLS (6 Credits)

OBJECTIVES:

- To learn overhauling of tractor transmission systems.
- To identify the defects in transmission system and its remedies

UNIT- I : Clutch

UNIT- II : Gear box

UNIT- III : Differential

UNIT- IV: Rear axle

UNIT- V : Steering box

REFERENCES

1. 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.
2. Repair & Overhauling of Chassis System (Heavy Vehicle), March 2010, Sector : Automotive Repair for Modular Employable Skills, 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 OUTCOME

- Student become expert in overhauling in tractor transmission system and can identify the defects in the tractor transmission system and also rectify the same

15FEMV0428- INPLANT TRAINING-IV (6 Credits)

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

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The inplant training 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 incharge. In addition, he/she has to submit weekly report to the department. During the inplant 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**

FIFTH SEMESTER

15ENGU05C2- FUNCTIONAL ENGLISH (3 Credits)

OBJECTIVES:

- To improve the language abilities of average language users
- To facilitate graded reading that progresses from easy to difficulty
- To help the student improve his speaking and writing skills in English

UNIT – I: Grammar : Nouns – Pronouns – Adjectives & Determiners

UNIT – II : Listening : Descriptions – Story Narrations

UNIT – III : Reading & Vocabulary : Graded reading comprehension passages

UNIT – IV : Speaking Skills : Face to Face Conversation

UNIT – V : Writing Skills : Descriptive Paragraphs – Note making

TEXT BOOK

Functional English – I Textbook / Course Material to be prepared y the Faculty

REFERENCES

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

LEARNING OUTCOME

- Students can improve their language abilities of average language users
- Students facilitate graded reading that progresses from easy to difficulty
- Students can improve their speaking and writing skills in English

15FEMV0529- ENTREPRENEURSHIP DEVELOPMENT (3 Credits)

OBJECTIVES:

- To expose the students about the scope for identifying and establishing enterprises in their locality.

UNIT – I: Introduction to Entrepreneurship: Definition – concept – industrial small entrepreneurship – meaning – Important – Significance and Scope – characteristics of entrepreneur – Factors influence rural entrepreneurial development.

UNIT – II: Industries for Small Entrepreneurs : General study of cottage and Small Scale Industries – Enterprise Management – Need and Important – Women Entrepreneurship development through SHG – Entrepreneurial Competencies.

UNIT – III: Registration & Financing : Identification of opportunities – choice of product – preparation of feasibility – Report – Registration and License – Financial assistance Nationalized banks – State financial corporation – DIC – KVIB – KVIC – NSIC, SIDBI,NABARD, SMAM and NHB – Incentives and Government support from Ministry of Agriculture, GoI.

UNIT – IV: Entrepreneurial Development: Approaches to Entrepreneurship Development – EDP–Issues–Entrepreneurial Training - Methods and Institutions offers Entrepreneurial Training – Market Survey – Model Project Report.

UNIT – V: Regularity Laws : Central Excise – Income Tax – Sales tax – Licensing Authority – Export and Import Regulatory Acts.

REFERENCES:

1. Women Entrepreneurship: Opportunities, Performance, Problems, 2002, Dhumija, S.K., published by Deep and Deep publications, New Delhi.
2. Entrepreneurial Development, 2005, Khanka, S.S., published by S. Chand & Co. publications, New Delhi.
3. Training for Entrepreneurship and Self Employment, 1999, Malli, D.D, published by Mittal publications, New Delhi.
4. Empowerment of Women through Entrepreneurship, 2008, Rathakrishnan L, Gyan Publishing House, New Delhi. 464.
5. Entrepreneurship and Small Business Management, 2003, Shukla, Published by Kitab Mahal publications, Agra.
6. Small – scale Industry and Entrepreneurship,2003, Vasanth Desai, Himalaya Publishing House, Mumbai.

LEARNING OUTCOME

- Students will learn the procedure for starting an enterprises and its feasibility in given situation.

15FEMV0530- FOOD PROCESSING (4 Credits)

OBJECTIVES:

- To learn the operation of machineries used for making value added products.
- To understand the process, nutritive and market value of the value added products.

UNIT – I: Importance and scope of food processing- cereals, millets and pulses- introduction- processing methods- puffing- popping- flaking- malting

UNIT- II : Convenience foods- ready to use- extruder foods- bakery products- cakes- biscuits and bread

UNIT- III : Milk and milk product- processing of milk products- ice cream- panner- kulabjamun

UNIT- IV : Principles and methods of fruit and vegetable preservation- fruit and vegetable products- jam, jelly, beverages, pickles- drying and dehydration- Ripening chamber and cold storage- packaging- principles in the development of protective packaging

UNIT- V : Food safety standards- introduction-Food Safety and Standards Act- eight laws, The Food and Drug Administration, Fruit Product Order, Bureau of Indian Standards, Prevention of Food Adulteration Act, Fair Average Quality , Hazard Analysis and Critical Control Point, ISO 22000, AGMARK, FSSAI-entrepreneurship-marketing-project preparation-cost economics.

REFERENCES

1. Fundamentals of Agricultural Engineering, 2012, Er. Sanjay Kumar, Er. Vishal Kumar, Dr. Ram Kumar Sahu, Published by Kalyani Publishers, Chennai ISBN: 978-93-272-2168-8
2. Bakers Handbook on Practical Baking, 1994, US wheat Associate, New Delhi
3. Post Harvest Technology of cereals and pulses, 1991, Chakravarthy,A and O.S.De, Oxford and IBH Publ.Co., New Delhi.
4. Presentation of Fruits and Vegetables, 1995 Giritharilal and G.S.Sighappa, published by publication and Information Division. ICAR New Delhi.
5. Food Processing, 1993, Pothy,V.H. and M.J.Mulky, Oxford and IBH Publ.Co., New Delhi.
6. Fruits and Vegetables preservation, 1998, Srivastava,R.P. and Sanjeev Kumar, International Book Distributing Co.Lucknow.
7. Outlines of Dairy Technology, 1980, Sukumar,De, Oxford University Press, Delhi.

LEARNING OUTCOME

- Students able to procure raw materials, operate the machineries for making value added products
- Assess nutritional value and scope of marketing

15FEMV0531- OCCUPATIONAL SAFETY AND HEALTH EDUCATION (2 Credits)

OBJECTIVES:

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

UNIT – I : 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 – II: Occupational Hazards **:** Basics Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/Disorders & its prevention

UNIT-III : Accident & Safety **:** 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-IV: First Aid **:** Burns, Fractures,Toxic Ingestion, Bleeding, Wounds and Bandaging, Artificial Respiration, Techniques of Resuscitation.

UNIT-V: 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

LEARNING OUTCOME

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

15FEMV0532- OPERATION AND MAINTENANCE OF POWER TILLER (3 Credits)

OBJECTIVES:

- To acquire skills in operation and maintenance of power tiller.
- To learn adjustments in engine and transmission system

UNIT – I : Familiarizing the tools for maintaining the power tiller- Identifying the different system of power tiller

UNIT – II : Dismantling and assembling of the power tiller engine- Overhauling, dismantling and assembling of main clutch of power tiller- Overhauling of steering clutch and brake of the power tiller

UNIT – III: Adjustment of clutch assembly- Adjustment of transmission system

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

UNIT – V: Periodical maintenance of the power tiller-Preventive maintenance of the power tiller- Important brake down maintenances- Field operations of the power tiller and its 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. Practical Agricultural Engineering, 1993, R K Ghosh & S Swain, Naya proksah publications, Kolkata, ISBN: 81-85421-15-3

LEARNING OUTCOME

- Student become expert in the operation and maintenance of power tiller
- Student can be expert in the adjustments of the engine and transmission system of the power tiller

15FEMV0533- SERVICING OF AUTO ELECTRICAL AND ELECTRONIC SYSTEM
(3 Credits)

OBJECTIVES:

- To learn electrical and electronic systems used in tractor.
- To service the electrical system in tractor

UNIT – I : 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

UNIT – II : 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 – III: Testing of alternator output voltage, circuit voltage drop and trouble shooting in charging system- Dismantling and assembling of alternator and trouble shooting of alternator

UNIT – IV: Dismantling and assembling of starter motor- Replacement of brushes and commutator- Checking up of spark plug, head light, ignition coil and condenser

UNIT – V: Battery servicing- Study of rectifiers, diodes and charging systems- Study on sensors, electronic control assembly, engine scanners and different wiring systems

REFERENCES

1. Repair & Overhauling of Auto Electrical & Electronic System, March 2010, Sector : Automotive Repair for Modular Employable Skills, Developed by National Instructional Media Institute, Directorate General of Employment & Training, Ministry of Labour & Employment, Government of India, 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, 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

- The students acquire skill to identify the repairs in electrical and electronics system used in the tractor and service the alternator and starting motor of the tractor.

15FEMV0534- MAINTENANCE AND SERVICING OF HYDRAULIC SYSTEM IN TRACTOR (3 Credits)

OBJECTIVES:

- Familiarizing with field operation of hydraulic system. Identifying trouble shooting of hydraulic system and its solutions

UNIT–I: Identify the tools needed for maintenance of hydraulic system; Constructional details of hydraulic system; Types of pumps and valves used in hydraulic system

UNIT–II: Dismantling and assembling of hydraulic system; Check, repair, replace and adjustments of hydraulic system

UNIT–III : Constructional details of draft control, positional control and mixed control; Practice on changing the drive mechanism of hydraulic system

UNIT–IV: Describe the components of three point linkage; Practice on hitch agriculture equipments with three point linkage; Identification of the faults and remedies of three point hitch system

UNIT–V: Practice on field operation, care and maintenance of hydraulic system; Trouble shooting of hydraulic system- Problem, causes and solution

REFERENCES

1. Repair & Overhauling of Hydraulic System, October 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. 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
3. 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

LEARNING OUTCOME

- Student become expert in the identification of repair and maintenance of the hydraulic system of the tractor

15FEMV0535- MAINTENANCE OF BATTERIES AND WHEELS
(3 Credits)

OBJECTIVES:

- Identify the various tyre defects and its solutions
- Care and maintenance of tyres and tubes. To learn battery servicing and testing

UNIT- I : Identify the tools needed for maintenance of tyres and tubes; Identify the types and components of wheels and tyres; Remove wheel from tractor, dismantle and assemble tyre from wheel; Refit the wheel on the tractor

UNIT- II : Maintain the tyres and tubes; Maintain the tyres by vulcanizing method; Maintain the tyre by cold patch and hot patch; Practice on the tyre rotation, check and inflate correct tyre pressure; Tighten the wheel nut in a sequence, Ballasting of Wheels

UNIT-III : Adjust wheel track; Identify the various tyre defects- wear on edges, wear at centre, wear on spots, uniform wear all around, wear on inner edge, wear on outer edge; Practice on the maintenance of tyres, Trailer wheel with power assisted brake

UNIT- IV : Identify and measure voltage of Dry cells/ Battery; Identify the parts of a battery charger and test for its operation; Charge a Secondary Battery

UNIT-V: Maintain service and trouble shoot a battery charger; Form a DC source 6V/ 500mA using 1.5 V cells; Maintenance of Lead- Acid Batteries; Battery Servicing and Testing.

REFERENCES:

1. Repair and Maintenance of Tyres and Tubes, March 2011, Sector: Agriculture. For Modular Employable Skills, NIMI Publications, Chennai
2. Maintenance of Batteries, May 2013, Sector: Electrical. For Modular Employable Skills, NIMI Publications, Chennai
3. Automobile engineering, 2006, Vol.2; Dr. Kirpal Singh, Published by A.K.Jain, Standard Publishers Distributors, 1705-B, Nai Sarak, Delhi, ISBN: 81-86308-01-6
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 OUTCOME

- Student will be able to identify the various repairs in the battery, tyres and tubes and able to rectify the same

15FEMV0536- IN-PLANT TRAINING- V (6 Credits)

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

Students have to undergo four weeks training in any Agricultural Machinery Manufacturing Industry / Training Institutes to acquire relevant skills. The in-plant training 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**

SIXTH SEMESTER

15CSAU0637- COMPUTER-TALLY (3 Credits)

OBJECTIVE:

- Basic principle of Accounts, Trail balance, Ledger opening and posting of Vouchers also to introduce Tally software, ERP 9 for elementary book keeping.

UNIT – I : Introduction to Accounts – Features, Types, Rules, Account Transactions, Transaction Entry, Balance Sheet, Trial Balance, Profit & Loss accounts, manual Exercise with Accounts

UNIT – II : Tally – fundamentals, Features, Startup, Screen Components, Mouse/ Keyboard functions, Screen Areas, Company Data, Creation / Altering Company in Tally, Base of Currency information, Working with Multiple company – Practical Exercise – Banking Deposits & advance, lending schemes / Government Schemes – Maintenance of records & book keeping - Methodology

UNIT – III : Tally Accounting, Ledger Creation, Single & Multiple ledger creation, Director income / Expenses, Indirect income / Expenses, Opening Balance, payment Vouchers and Receipt Vouchers – Accounts only Voucher Entry (individual company creation & Voucher Entry) – Practical.

UNIT – IV : Charts of accounts, Pre-defined Groups, Manual Group Creation, Multiple Ledger creation, Multiple Ledger creation, Practical and Multiple Groups / Ledger – Tally Vouchers, Credit / Cash Purchase and Sales Vouchers, Payment / Receipt Vouchers for Inventory, Journal Vouchers, Stock Journal, Stock Journal, Sales returns and Purchase returns, Delivery Note, Receipt Note, Memo Vouchers, Post Dated Vouchers, Display and Alter Option for voucher types, Voucher creation.

UNIT – V : Working with Tally Inventory, Configuration / Features Settings with Tally, Inventory Masters, Stock Categories, Location / Godowns, Creating Sing & Multiple Stocks, Single / Multiple stock items, Displaying and altering stocks groups / items – Practical Exercise

REFERENCES

1. Tally (Vet, 9) by Nellai Kannan.
2. Tally ERP 9 BPB Publications, Author : K.K.Nathani

LEARNING OUTCOME

- Student can write their own accounts and able to record it using Tally system.

15FEMV0638- AGRIBUSINESS AND PROJECT MANAGEMENT (3 Credits)

OBJECTIVES:

- To identify Agriculture Business and to draw plans to reach the objectives and to manage the staff.

UNIT - I : Introduction to Management and evolution of management thoughts : Management - Definition - Importance of Management - Management Thought and Process - Significance of Management - Nature of Management functions - Management Roles - Functions at various levels of Management - Management skills in organising business.

UNIT - II: Agribusiness Management : Agribusiness - Definition - Evolution of Agribusiness - Agribusiness status in developed and developing nations. Special features of Agribusiness - Scope for Agribusiness in India. Government Promotional Programmes in Agribusiness. Classification of Enterprises - Micro, Small, Medium and Large. Forms of Business Organisation - Sole Proprietorship - Partnership - Private and Public Limited.

UNIT–III: Project Characteristics : Meaning and definition of project - Types and characteristics of project - Project Life Cycle - Phases in Project Management. Agencies involved in Developing Agri. Projects - NABARD, Cooperative Banks, DIC and Commercial banks, National Institutes and Project incubation Centres.

UNIT - IV: Project Formulations : Project formulation - Methods - Feasibility analysis, Techno economic analysis - Project design and feasibility report for Agribusiness. Role of government and entrepreneur in project formulation.

UNIT - V: Project Appraisal : Objective of Appraisal; Appraisal of feasibility report and project report - appraisal of project funds and social cost benefits. SWOT analysis.

REFERENCES

1. Goel B.B., Project Management - A Development Perspective, Deep or Deep Publishers, New Delhi.
2. Gary R.Heerkens, Project Management, Tata McGraw Hill, New Delhi.
3. S.K.Kapur, Principles and Practice of Management, S.K. Publishers, New Delhi, 2004.
4. Heinz Weihrich and Harold Koontz., Management: A Global Perspective, McGraw Hill, New York, 2006.

LEARNING OUTCOME

- Student can identify Agriculture Business and to draw plans to reach the objectives and to manage the staff.

15FEMV0639- MILLET PROCESSING AND CROP RESIDUE MANAGEMENT EQUIPMENTS (3 Credits)

OBJECTIVES:

- To study the engineering properties of millets
- To learn the millet processing equipment operation and maintenance
- To study crop residue management equipments

UNIT – I : Engineering properties of millets

UNIT – II : Drying, Dehusking of millets

UNIT – III : Rubber roller Sheller and polishers.

UNIT – IV : Destoner, Grader and Pulveriser.

UNIT – V : Shredder, Baler and chaff cutter.

REFERENCES

1. Directory of Rural Technologies, Vol.1, Farm & Post-harvest Equipment, 1986, Published by Council for Advancement of Rural Technology, New Delhi
2. Principles of Agricultural Processing, 1994, P.H.Pandey, Published by Kalyani Publishers, New Delhi
3. 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

- Students able to study the engineering properties of millets
- Students able to learn the millet processing equipment operation and maintenance
- Students able to study crop residue management equipments

15FEMV0640- CUSTOM HIRING OF AGRICULTURE MACHINERY (3 Credits)

OBJECTIVE:

- To study different types of custom hiring.
- To learn the procedure for obtaining loan / subsidy.
- To learn bank account maintenance

UNIT- I : Primary criteria of tractor selection size of land holding and type of operation, working time available, type of soil, type of implement, horse power requirements to operate the implement; Secondary criteria – running cost, after sales and repair facilities.

UNIT- II : Custom hiring – definition, types of custom hiring, advantages and disadvantages of custom hiring; Rental – definition, difference between rental and custom hiring, types of rental programme – pure and rollover; Leasing- definition, merits.

UNIT – III : Cash purchase and credit purchase – merits & demerits; Procedure for obtaining loan / subsidy – eligibility, quantum of loan, margin, cost of machinery repayment and interest; Norms for financing of tractors - acreage, insurance, selection of tractors and security.

UNIT – IV : Log book and history sheet – important and use, maintenance; cost of utilizing the machine – Fixed cost – depreciation, interest, tax, housing and insurance, variable cost – cost of fuel, oil, repair and maintenance and driver wages;

UNIT – V : Survey on farmers field – detail of field / crop available for engaging tractor on custom hiring basis; off season storage of tractor and agricultural machinery bank account maintenance.

REFERENCE

1. Custom Hiring of Agriculture Machinery, March 2011, Sector : Agriculture for Modular Employable Skills, Published by National Instructional Media Institute, Directorate General of Employment & Training, Ministry of Labour and Employment, Government of India, Chennai.

LEARNING OUTCOME

- Student will be able to study different types of custom hiring. To learn the procedure for obtaining loan / subsidy and to learn bank account maintenance

15FEMV0641- OPERATION AND MAINTENANCE OF CROP HARVESTERS (3 Credits)

OBJECTIVES:

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

UNIT-I: Potato Digger

UNIT – II: Groundnut Digger

UNIT-III: Turmeric Digger

UNIT-IV: Sugarcane Harvester

UNIT-V : Maize Harvester

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. Fundamentals of Agricultural Engineering, 2012, Er. Sanjay Kumar, Er. Vishal Kumar, Dr. Ram Kumar Sahu 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 OUTCOME

- Student able to operate and maintain the different types of root crop harvesting machineries

15FEMV0642- OPERATION AND MAINTENANCE OF COMBINE HARVESTER (3 Credits)

OBJECTIVES:

- To learn field operation and maintenance of combine harvester
- To study the types of losses and their remedies

UNIT- I: Identify the tools needed for maintenance of combine harvester; Classification of combine harvester- pull type harvesting combines, pull type with auxiliary engine and self propelled harvesting combine; Different systems of combine harvester; Advantages and disadvantages of combine harvester

UNIT-II: Constructional details of combine harvester- Dismantling and assembling the combine harvester; Check and repair cutter bar, feeder, thresher, straw walker, sieves, blower and augers

UNIT- III: Practice on checking the drive mechanism of combine harvester and replace thresher cylinder for Paddy/ Maize and adjustments.

UNIT- IV: Adjust cutter bar, feeder, thresher, straw walker blower and augers; Practice on the field operation of combine harvester for Paddy/ Maize harvesting and assess losses and remedies

UNIT- V: Identify the faults and remedies of combine harvester and set the precaution while handling in field; Practice on the maintenance and storage of combine harvester.

REFERENCES

1. Repair, Maintenance & Field Operation of Combine Harvester, 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. Practical Agricultural Engineering, 1993, R K Ghosh & S Swain, Naya Prokash publications, Kolkata, ISBN: 81-85421-15-3

LEARNING OUTCOME

- Student learn to operate and maintain the combine harvester in the field condition and also they learn to identify the different losses during harvest and able to rectify the same.

15FEMV0643- OPERATION AND MAINTENANCE OF POST HARVESTING EQUIPMENTS (6 Credits)

OBJECTIVES:

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

UNIT-I : Paddy thresher, Paddy winnower, Multicrop thresher

UNIT- II : Groundnut thresher, Pulse thresher, Mini dhal mill

UNIT- III : Arecanut dehusker, Castor sheller, maize sheller, Sunflower seed sheller

UNIT- IV : Seed cleaner cum grader, Groundnut grader, Potato grader

UNIT- V : 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

15FEMV0644- PROJECT WORK (6 Credits)

The 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 a 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.