Syllabus for Advance Diploma in Agriculture

Sem I

Agricultural Operation and Management

After successfully completing the courses of Semester-I, the students are expected to acquire the skills to beemployable as **Gardener and nursery raiser.**

NSQF Level / Semester	Course Code	Course Title	Course Credits		Marks
Level 4 / Semester I	**General Education**				
	AGRG101	Agricultural Heritage of India	Theory	3	75
	AGRG102	Basic laboratory concepts	Theory	1	25
			Practical	1	25
	AGRG103	Fundamentals of Horticulture	Theory	2	50
			Practical	1	25
	AGRG104	Introduction to Computer Application	Practical	2	50
	AGRG105	Agriculture Botany	Theory	2	50
	Skill Development Qualification Pack & On-Job-Training (OJT)				
	AGRS101	Gardener and nursery raiser (AGR/Q0809)	Theory	7	685
			Practical & OJT	11	
Total			**30**		**985**

Syllabus (Semester I)

Course Title: Agricultural Heritage of India **Course Code:** AGRG101
Credits: 3+0 **Marks:** 75
Hours: 45
Prerequisite courses: None

Objectives:

- To acquaint the students with the glorious history of Indian agriculture.
- To sensitize students about research and literature regarding agriculture and allied activities, Indigenous Technical Knowledge (ITK) and works done by Indian Sages.
- To sensitize the students about agricultural heritage of Goa.

Syllabus

Unit I (10 Lectures)

Development of human culture and beginning of agriculture .Indus civilization (3250 BC - 2750 BC).Status of farmers in the society during Indus, Vedic, Buddhist, Mauryan, Gupta and Sangam periods. Kautilya's artha-sastra- agriculture, animal husbandry, commodity trade etc., features of village. Astronomy - Prediction of Monsoon Rains; Parashara, Varamihira, Panchanga in comparison to modern methods.

Unit II (10 Lectures)

Ancient soil classification and maintenance of soil productivity.Water harvesting and irrigation developments during different periods,water storage – distribution and relevance to modern agriculture. Plant protection in ancient period, ITK, harvesting, threshing and storage.

Unit III (10 Lectures)

Crops: indigenous and introduced. History of rice, sugarcane, cotton, mango, cashew, coconut and areca nut.Gardening in ancient and medieval period, arbori horticulture, orchards.Traditional technical knowledge, vegetable farming, floriculture, perfumes and medicinal plants. Role of cattle and other domestic animals, management of cattle for draught and milk, indigenous breeds.

Unit IV (15 Lectures)

Journey of agriculture in Goa, features of Goan agriculture- Shifting cultivation, kulaghar, bhat, khajan cultivation, rainfed agriculture, water storage and conservation practices. Animal rearing, pasture lands. Agro-processing, marketing. Cultural aspects and festivals in relation to agriculture. Vision for the future.

References

- Nene, Y.L. and Choudhary, S.L. 2002. Agricultural heritage of India. Asian Agri – History foundation, Secundrabad.
- Razia Akbar (Tr) 2000. Muskha Dar Fauni – Falahat (The art of agriculture). Agri – History Bulletin No. 3. Asian Agri. History foundation, Secundrabad.
- Randhawa, M.S., 1980 – 86. A History of Agriculture in India. Vol. I, II, III and IV. Indian council of Agricultural Research, New Delhi.
- Albert Howard. 1940. An agricultural testament. Prabhat Prakashan.
- Ayachit, S.M. (Tr) 2002. Kashyapiya Krishisukt (A treatise on Agriculture by Kashyapiya). Agri – History Billetin No. 4. Asian – Agri History foundation, Secundrabad

Course Title: Basic laboratory concepts **Course Code:** AGRG102
Credits: 1+1 **Marks:** 50
Hours: 45
Prerequisite courses: None

Objectives:
To acquaint the students with handling and analyzing the high end equipments and learn disciplines, rules, precautions and economy of practical work carried in laboratory.

Syllabus

Theory

Unit I (04 Lectures)

Acquaintance with the laboratory, laboratory rules, disciplines, precautions, maintenance of records in notebook, introduction to common glassware.Introduction to various measures for handling chemicals and Laboratory Safety, laboratory accidents and first aids.

Unit II (05 Lectures)

Working principle of Bunsen burner and other heating equipments, basic theory related to cleaning and rinsing the apparatus, study of distillation principle, theories related to separation, purification, sedimentation, decantation, filtration, evaporation, digestion, sublimation, pyrolysis, oil extraction.

Unit II (06 Lectures)

Concepts of volumetric analysis, normality, molarities, stock preparation, standard solution, titration, molecular weight, atomic number, atomic weight, system of modern nomenclature, qualitative analysis.

Practical

Unit I (08 Hours)

Handling and Use of burettes, pipettes, measuring cylinders, flasks, beakers, reagents bottle, desiccators, pestle and mortar, water bath, Bunsen burner, tongs.

Unit I (07 Hours)

Handling of separator funnel, condensers, micropipettes, washing, drying and sterilization of glassware, Drying of solvents/chemicals.

Unit I (15 Hours)

Weighing and preparation and handling of solutions of different strengths and their dilution, Preparation of solutions of acids, Neutralization of acid and bases, demonstration of purification, sedimentation, evaporation, preparation of standard solutions, handling of titration unit by using normality and molarities solutions. Preparation of reagent solutions.

References

- Garg V.C. Practical chemistry, Pitambar Publishing Co. New Delhi.
- Hand Book of Laboratory Safety- CRC Press.
- Gabb M.H. & Latchem W. E.A Handbook of Laboratory Solutions.

Course Title: Fundamentals of Horticulture **Course Code:** AGRG103
Credits: 2+1 **Marks:** 75
Hours: 60
Prerequisite courses: None

Objectives:

- To acquaint the students with horticulture, its branches, importance and scope.
- To sensitize students about various agro-climatic zones and their features.
- To sensitize the students about various cultivation practices.

Syllabus

Theory

Unit I (05 Lectures)

Introduction to horticulture, meaning, branches of horticulture, Economic importance and classification of horticultural crops and their nutritive value; present status and prospects of crops.

Unit II (05 Lectures)

Agro-climatic zones of India; Orchards, gardens, nutrition and kitchen gardens.

Unit III (05 Lectures)

Selection of site for crop cultivation, Planning and layout of orchards, planting systems and planting densities, calculations based on area and spacing.

Unit IV(15 Lectures)

Principles and methods of pruning and training of fruit crops; types and use of growth regulators in horticulture; water management, weed management and nutrient management, mulching; Harvesting and maturity standards; packaging and storage of horticultural produce.

Practical

- Planting of mango or cashew sapling / graft.
- Selection and planting of coconut seedling.
- Study of layout systems of orchard.
- Layout of kitchen garden.
- Surface irrigation methods.
- Sprinkler and drip irrigation systems.
- Study of inter-cultivation practices – fencing, weeding, fertilizer application.
- Training and pruning in horticultural crops.
- Use of plant growth regulators.
- Maturity and harvesting indices of horticultural crops.

References:

- Principles of Horticulture and fruit growing – Y.N. Kunthe, M.P. Kawthalker, K.S. Yawalwakar revised by P.P. Deshmukh
- Home gardening- Agriculture officers association of Goa
- Introduction to Horticulture – Dr. N. Kumar
- Handbook of Horticulture- Dr. V. S. Bose
- A2Z Solutions Horticulture at a Glance Vol.-I, Fruits and Plantation Crops- B. Salaria,
- Principles of Fruit Production- S. Prasad and U. Kumar

Course Title: Introduction to Computer Application **Course Code:** AGRG104
Credits: 0+2 **Marks:** 50
Hours: 60
Prerequisite courses: None

Objectives:

To acquaint the students with the knowledge and use of computers and to introduce the basic principles, organization and operational aspects of computers.

Syllabus

Unit I (14 hours)
Microsoft Word and its applications (in relation with Agriculture &Food Industry)
Font formatting, Paragraph formatting, Inserting images, auto shapes symbols, diagrams, header & footer, References, watermarks and Hyperlinks, Style & Formatting, Mail Merge through word, Excel, Access database, Page setup, Printing a document.

Unit II (14 hours)
MS Excel and its applications (in relation with Agriculture &Food Industry)
Making column chart & pie chart and chart formatting, Use of general functions & formula (autosum, using basic arithmetic operators: +,-,*,/), Use of filter & sorting, Cell references, header & footer, age setup, use of page break preview, printing worksheets.

UNIT III (15 hours)
MS Power-Point and its applications (in relation with Agriculture &Food Industry)
Creating own design, formatting objects on a slide, Use of Slide Master to control the design & formatting of a presentation, Use of Image, audio, video in the presentation, Slide show setup, slide transition, use of animation, Use of narration in presentation, Print setup & Printing handouts of a presentation.

UNIT IV (07 hours)
Internet & Web Applications (in relation with Agriculture &Food Industry)

UNIT V (10hours)
Websites,Internet applications, Google Applications (G-mail, Google search, G Drive, Google Docs) and other Email Services, Industry customer approach.

Practicals (30hours)

- Applications of MS Excel to solve the problems of Agriculture
- Statistical quality control, Sensory evaluation of food, and Chemical kinetics in food processing;
- Use of word processing software for creating reports and presentation;
- Familiarization with the application of computer in Agriculture -Milk plant, Bakery Units, Fruit &Vegetable processing Unit;
- Familiarization with software related to agriculture marketing;
- Ergonomics application in the same;
- Visit to Industry and case study problems on computer.

References

- Fundamentals of Computers by E. Balagurusamy (Author) Publisher: McGraw Hill Education (India)Private Limited.
- Ms Office 2007 in a Nutshell by S. Saxena (Author) Publisher: S. Chand (G/L) & Company Ltd.
- Computer Fundamentals Paperback – by P. K. Sinha (Author) Publisher: BPP

Course Title: Agriculture Botany **Course Code:** AGRG105
Credits: 2+0 **Marks:** 50
Hours: 30
Prerequisite courses: None

Objectives:

- To acquaint the students with the knowledge of plant biology.
- To acquaint the students with various plant parts, their functions, functioning and their relations.

Syllabus

Theory

Unit I (02 lectures)

Agriculture Botany, meaning, its importance, scope in general and agriculture in particular.

Unit II (05 lectures)

Plant parts and their functions, Floral biology: parts and their functions, pollination, fertilization; Types of root system.

Unit III (02 lectures)

Plant cell structure and functions,

Unit IV (06 lectures)

Plant physiology: Introduction, Definition, importance in agriculture. Growth and development- Definition, Determinate and indeterminate growth, measurement of growth, growth analysis, growth characteristics - Definition and mathematical formulae.

Unit V (09 lectures)

Crop water relations: physiological importance of water to plants, Transpiration: significance, transpiration in relation to crop productivity, water use efficiency, Photosynthesis: energy synthesis, relationship of photosynthesis and crop productivity. Photorespiration: factors affecting photosynthesis and productivity, photosynthetic efficiency, dry matter partitioning.

Unit VI (06 lectures)

Harvest indices of crops; Respiration and its significance, Nutriophysiology: Definition, functions of plant nutrients - deficiency and toxicity symptoms of plant nutrients foliar nutrition-hydroponics.

References

- Botany for degree students- A.C. Dutta
- Textbook of Plant Physiology- P.L. Kochar
- Crop physiology- G.C. Shrivastva

Skill Development Qualification Pack

Course Title: Gardener and nursery raiser Course **Course Code:** AGRS101
Credits: 07+11 **Marks:** 685
Hours: 470
Prerequisite courses: None

Course/Package objectives:
To enable students toperform various activities in plant propagation, nursery management and gardening viz. for care and maintenance of nursery and garden, undertaking different plant propagation methods, design of garden components, maintenance of lawn, planting new saplings etc.

Package Syllabus (Adopted Model Curriculum of Agriculture Skill Council of India)

- Lecture Hours and Marks Distribution as per ASCI standard mentioned in Model Curriculum
- Unit Contents as mentioned in the courseware designed by ASCI for 'Gardener and Nursery Raiser'.

Unit I Introduction **(05 hours)**
Unit II Carry out Nursery Chores(AGR/N0820) **(125 hours)**
Unit III Carry out Maintenance of Nursery (AGR/N0821) **(50 hours)**
Unit IV Nursery Management and propagation of plant material (AGR/N0801)**(65 hours)**
Unit V Designing of Garden components (AGR/N0802) **(100hours)**
Unit VI Plantation, maintenance and care of garden(AGR/N0803) **(65 hours)**
Unit VII Maintain health and safety at work place (AGR/N9903) **(20 hours)**
Unit VIII Developing Entrepreneurship skills(FIC/N9005) **(40 hours)**

Recommended References:

- ASCI courseware module for 'Gardener and Nursery Raiser'.

Qualification Pack Hyperlink:
https://asci-india.com/nos-panel/uploadPDF/QP%20-%20Gardener%20cum%20Nursery%20Raisera5181e1ebe3fc0c5940a554adc07a5ed.pdf

Sem II

After successfully completing the courses of Semester-II, the students are expected to acquire the skills to be employable as **Irrigation Service Technician.**

NSQF Level / Semester	Course Code	Course Title	Course Credits		Marks
Level 5 / Semester- II	**General Education**				
	AGRG201	Agriculture Policies and Development Programmes	Theory	2	50
	AGRG202	Agriculture Economics	Theory	2	50
	AGRG203	Communication Skills	Practical	2	50
	AGRG204	Environmental Studies - I	Theory	2	50
			Practical	1	25
	AGRG205	Human Nutrition	Theory	3	75
	Skill Development Qualification Pack & On-Job-Training (OJT)				
	AGRS201	Irrigation Service Technician - (AGR/Q1104)	Theory	7	300
			Practical & OJT	11	
Total			**30**		**600**

Syllabus (Semester II)

Course Title: Agriculture Policies and Development Programmes **Course Code:** AGRG201

Credits: 2+0 **Marks:** 50

Hours: 30

Prerequisite courses: None

Objectives:

- To acquaint students with various Government Policies and programmes related to Agriculture in Goa and India.

Syllabus

Unit I (02 lectures)

Introduction to agricultural policies, Introduction to agricultural policies of Goa and of India - need and importance - National Agricultural Policy in brief.

Unit II (04 lectures)

Agricultural policies regarding land and labour: Agricultural policies regarding land - need and scope for land reforms - Abolition of intermediaries - Tenancy reforms - Ceiling on land holdings - appraisal of land reforms.- Size pattern of operational holdings, problem of sub-division and fragmentation of holdings.

Unit III (03 lectures)

Agricultural policies regarding labour - present position of agricultural labour - minimum wages - abolition of bonded labour - Recommendations of the National Commission on Rural Labour – NREGP.

Unit IV (05 lectures)

Agricultural policies regarding seeds and fertilizers Agricultural policies regarding seeds - National Seeds Policy -varietal development and plant variety protection - seed production - quality assurance - seed distribution and marketing - infrastructure facilities - transgenic plant varieties - import of seeds and planting material - export of seeds -promotion of domestic seed industry, Protection and preservation of traditional seed and plant varieties.

Unit V (04 lectures)

Agricultural policies regarding fertilizers - Fertilizer pricing policy - payment of subsidy. Agricultural policies regarding plant protection chemicals - pesticide production and consumption in India - protection of consumers from adverse impacts of pesticides.

Unit VI (03 lectures)
Agricultural policies regarding irrigation, soil and water conservation, machinery, technology etc.

Unit VII (05 lectures)
Agricultural policies regarding credit: Agricultural policies regarding credit - Co-operatives and rural credit - Commercial banks and rural credit - Regional Rural Banks - Lead Bank Scheme - NABARD. Agricultural policies of Goa and of India- regarding agricultural products and their marketing, export and prices - food security. Five Year plans – strategies and challenges;

Unit VIII (04 lectures)
Five Year Plans-Government policies and programs in agriculture and rural development.IADP - IAAP- IWDP- Watershed development Programmes- IRDP, NREGP- SGSY - etc. Peoples' Plan- Decentralised planning- current Plans - Agricultural development programmes and schemes of the dept. of Agriculture.

References:

- Government of India Economic Survey. Published by Planning Commission (various issues)
- Government of India Economic Review. Published by State Planning Board (various issues)
- Indian Economy: Performance and policies (2018) by Uma Kapila
- Government of Goa. Economic Survey (Various issues)
- Citizen Charters published by Dept. of Agriculture & Dept. of Panchayat (Govt. of Goa)
- http://www.planningcommission.nic.in/reports/genrep/bkpap2020/24_bg2020.pdf
- http://ageconsearch.umn.edu/bitstream/182350/2/IAAE-CONF-051.pdf

Course Title: Agriculture Economics **Course Code:** AGRG202
Credits: 2+0 **Marks:** 50
Hours: 30
Prerequisite courses: None

Objectives:

- To acquaint students with the knowledge of agricultural economics.
- To acquaint students with various theories and laws applied in economics.
- To acquaint students with the knowledge of applying principles of economics in farm management.

Syllabus

Unit I (07 lectures)

Economics: Meaning, Definition, Division of Economics (Production, Exchange, Distribution, Market supply), importance of Economics;Agricultural Economics: Meaning, Definition;Basic Concepts: Goods, Services, Utility, Value, Price, Wealth, Welfare,Wants: Meaning.

Unit I (07 lectures)

Theory of consumption: Law of Diminishing Marginal Utility, Meaning, Definition, Assumption, Limitations, Importance.

Unit I (10 lectures)

Production Economics: Meaning, Definition Nature and Scope of Agricultural Production Economics. Concepts of Production. Production Functions: Meaning, Definition, Types. Laws of returns: Increasing, Constant and decreasing. Demand – supply relationship, Factor - Product Relationship. Determination of optimum input and output. Factor relationship.Product relationship.Types of enterprise relationships. Returns to scale: Meaning, Definition, Importance.

Unit I (06 lectures)

Farm Management: Economic principles applied to the organizations of farm business. Types and systems of farming, Farm planning and budgeting, Risk and uncertainty, Farm budgeting.

References:

- Dhondyal. S. P. "Farm Management", Friends Publications, 90 Krishanapa, Meerut.
- Johl S. S. and T.R. Kapur Fundamental of Farm Business.
- Talathi Naik, 2008, Introduction to Agricultural Economics and Agri Business Management.
- Singh J. J. Element of Farm Management Economics, East West Press Pvt. Ltd., New Delhi.
- S. Subha Reddy and P. Raghu Ram, Agricultural Finance and Management

Course Title: Communication Skills **Course Code:** AGRG203
Credits: 0+2 **Marks:** 50
Hours: 60
Prerequisite courses: None

Objectives:

- To enhance verbal and non verbal communication skills of students with an intension to improve the skills of reading and writing, language and conversational ability in various mediums such as presentation (written - graphics and audio) face to face etc.
- To enable the student to ultimately explain / defend his/her commercial idea / product to single person or panel.

Syllabus

Unit I (03hours)
Formal and Informal Introduction; Verbal and non verbal communication - Body language and vocalic.

Unit II (04hours)
Reading Comprehension: using Dictionary, reading dialogues, rapid reading, intensive reading, improving reading skills; Passages for locating main idea and supporting details; Passages for skimming and scanning, Note making, Summary.

Unit III (07hours)
Writing Skill: Mechanics of good letter, Effective business correspondence, Personal Correspondence. Preparation of Curriculum vitae (CV) and Job application- The Style, Importance of professional writing- Choice of words and Phrases, precision, conciseness clichés, redundancy. jargon, foreign words. Precise writing and synopsis writing.

Unit IV (04hours)
Phonetics (Sounds of English): Introduction to phonetics; vowels, consonants, long and short vowels, syllables (stressed and unstressed), intonation.

Unit V (03hours)
Building Vocabulary Skills

Unit VI (05hours)
Communicative Grammar

Unit VII (06hours)
Oral Presentation of Reports: Seminars and conferences, features of oral presentation, regulating speech, physical appearance, body language, voice, audience, preparation of visual aids.

Unit VIII (05hours)
Theme Based Presentations (Power Point and LCD Projector)

Unit IX (03hours)
Telephonic Conversation

Unit X (06hours)
Mock Meetings

Unit XI (06hours)
Mock Interviews

Unit XII (08hours)
Skits, Group Discussions and Debates on Current Topics- Review or Feedback Evaluation / Continuous assessment of sessional work may consist of evaluation of individual's writing and presentation skills, project work, power point presentations etc.

References:

- Geetha Jajivan, Kiranmai: Course in listening and speaking Skills part I, Foundation Books Pvt Ltd.
- Lorven: Enrich your communication in English

Course Title: Environmental studies I **Course Code:** AGRG204
Credits: 2+1 **Marks:** 75
Hours: 60
Prerequisite courses: None

Objectives:

- To acquaint the students with the natural resources and the ecosystem, and ecology.
- To sensitise students about environmental issues.

Syllabus

Unit I (18 Lectures)

Environment: Meaning, Significance, natural resources and alternatives. Man-Nature relation and interaction with respect to food, clothing, shelter and occupation.

Ecosystem: Concept, Structure, Functions, Components (producers, consumers, decomposers), Energy flow in an ecosystem, Ecological succession; Ecological niche (concept); major ecosystems in brief.

Biodiversity: meaning, hotspots of biodiversity in India, threats to biodiversity; bio geographical classification of India; Biodiversity conservation efforts; genetically modified foods. Role ofan individual in conservation of natural resources.

Unit II (12 Lectures)

Environmental Degradation: Meaning; Degradation of Urban Land, Forest and Agricultural Land due to natural causes and human interference.

Environmental pollution: Types of Environmental Pollution: Water, Air, Marine, Land, Noise, Thermal Pollution; for each type of pollution - meaning, Quality standards (where applicable), sources of pollution, pollutants and effects.

Practical

Unit I (15 hours)

Visit to a local area to document environmental assets, river/forest/grasslands, Visit to Mhadei basin to document environmental diversification in river and uplands. Study of common plants, insects, birds. Documenting the special resource features of individual ecosystems. (river/ forest). Documenting the environmental assets and comparing with local gazettes, Understanding Village Biodiversity Register.

Unit II (10 hours)

Visit to a local polluted site. Visit to a public place and document garbage / waste, Enlisting the types of pollutants/wastes visible in Sand Extraction Site. Observing the anthropogenic change at Ponda Nullah / Taleigao creek. Visit to garbage collection and segregation site.

Unit III (05 hours)

Study of simple ecosystems, Observing water from a pond under the microscope for measuring flora, fauna and turbidity. There are a large number of algae and zooplankton that form the basic food chains of the aquatic ecosystem.

References

- Kumarasamy, K., A.Alagappa Moses And M. Vasanthy, 2004. Environmental Studies, Bharathidsan .University Pub, 1, Trichy
- Rajamannar, 2004, Environemntal Studies, Evr College Pub, Trichy
- Shinde, Pendse, Donge, Environmetal Education, Sheth Publication.

Course Title: Human Nutrition **Course Code:** AGRG205
Credits: 3+0 **Marks:** 75
Hours: 45
Prerequisite courses: None

Objective

- To acquaint the students about importance of nutrition, balanced diets, therapeutic diets for health and role of food and nutraceuticals in health.

Syllabus

Unit I(12 Lectures)
Introduction to human nutrition, Macronutrients and micronutrients- Classification and functions, Digestion, absorption and assimilation of nutrients.

Unit I(18 Lectures)
Energy metabolism- Components of energy expenditure, Basal Metabolic Requirements and Activity, Recommended Dietary Allowances, Food Groups, Concept of a balanced diet, Methods of evaluation ofnutritive value of foods, Nutritional assessment and nutritional policies- Salient features, concept of community nutrition.

Unit I(15 Lectures)
Carbohydrates- Types, functions, sources, requirement, storage, Effect of deficiency and excess.

Proteins- Types, functions, sources, requirement, storage, Effect of deficiency and excess.

Fat- Types, functions, sources, requirement, storage, Effect of deficiency and excess.

Vitamin- Types, functions, sources, requirement, storage, Effect of deficiency and excess.

Minerals- Types, functions, sources, requirement, storage, Effect of deficiency and excess.

Water and electrolytes- Concept and importance

Constipation; Malnutrition; Fast-food and its impact.

References:

- Nutrition Science by B. Srilakshmi
- Fundamentals of Foods & Nutrition by Sumati R. Mudambi
- Textbook of Nutrition : A Life cycle approach by Ravinder Chadha.

Skill Development Qualification Pack

Course Title: Irrigation Service Technician **Course Code:** AGRS201
Credits: 07+11 **Marks:** 300
Hours: 200
Prerequisite courses: None

Course/Package objectives:
To enable students forinstallation, repair and maintenance of centrifugal pumps, sprinkler systems, drip irrigation systems and other water lifting devices.

Package Syllabus (Adopted Model Curriculum of Agriculture Skill Council of India)

- Lecture Hours and Marks Distribution as per ASCI standard mentioned in Model Curriculum
- Unit Contents as mentioned in the courseware designed by ASCI for 'Irrigation Service Technician'.

Unit I Introduction **(02 hours)**
Unit II Carry out Installation, repair and maintenance of tube-well irrigation system(AGR/N1113) **(88 hours)**
Unit III Carry out Installation, repair and maintenance of micro irrigation system(AGR/N1114) **(90 hours)**
Unit IV Maintain health and safety at work place (AGR/N9903) **(20 hours)**

Recommended References:

- ASCI courseware module for 'Irrigation Service Technician'.

Qualification Pack Hyperlink:
https://asci-india.com/nos-panel/uploadPDF/QP-Irrigation%20Service%20Technician7a6f23ec1b95203c4059d6d410bb7834.pdf

Sem III, IInd year

After successfully completing the courses of Semester-III, the students are expected to acquire the skills to be employable as **Floriculturist (Open cultivation).**

NSQF Level / Semester	Course Code	Course Title	Course Credits		Marks
Level 6 / Semester III	**General Education**				
	AGRG301	Agro-Eco tourism	Theory	1	25
			Practical	1	25
	AGRG302	Introduction to Soil science	Theory	2	50
	AGRG303	Social and Farm forestry	Theory	2	50
			Practical	1	25
	AGRG304	Application of laboratory techniques in plant science	Theory	1	25
			Practical	1	25
	AGRG305	Environmental Studies - II	Theory	3	75
	Skill Development Qualification Pack & On-Job-Training (OJT)				
	AGRS301	Floriculturist (Open cultivation) AGR/Q0701	Theory	7	300
			Practical & OJT	11	
Total			**30**		**600**

Syllabus (Semester III)

Course Title: Agro-Eco tourism **Course Code:** AGRG301
Credits: 1+1 **Marks:** 50
Hours: 45
Prerequisite courses: None

Objective

- To acquaint the students about importance of agro-eco-tourism and its relevance in present context.
- To acquaint the students about various tourism models and services required.
- To enable students to visualise aspects related to planning and promote inclusive development through tourism.

Syllabus
Theory

Unit I(03 Lectures)
Agro-tourism: Introduction, importance and scope; relevance in present context, forms of agro-tourism, objectives, basic principles, advantages and implementations, components and future perspective of Agro-ecotourism.

Unit II(07 Lectures)
Requirements for Agro-tourism.Farm, forest, garden, fish tank/ponds, residential huts, etc.Introduction to various Agro-ecotourism models.Requirement of services for the tourists Constraints in operation and management of Agro-tourism activities. Management of resources – Human resources, Natural resources and Garbage management at Agro-tourism centre. Entrepreneurship development: Role and functions, Hospitability: Food and beverages and accommodation services. Communication skill and service; Capital investment, sources and capital budgeting, Business promotion and ethics.

Unit III(05 Lectures)
Socio economic aspects of Agro-eco-tourism.Tourism on Co-operative basis; Involvement of agriculture institutes, Farmers clubs, SHGs;Government policies, legislation in respect of tourism and agro-tourism and special emphasis on environment protection laws.Introduction to Goan culture.Incredible India and Goa Tourism Development Corporation.

Practicals

Unit I (12 hours)

Visit to various nearby agro-tourism centres / sights /agro technology parks and study of different types of Agro- tourism modelsand services offered by them.Planning various agro tourism models.

Unit II (18 hours)

Study of promotional schemes of Agro-ecotourism. Project proposal- Preparation and feasibility tests, Accounts and record keeping etc. Marketing strategies for Agro-tourism products and services. Publicity of tourism, Advertisement and use of media in widening scope of Agro-ecotourism. Report on agro-tourism project.

References:

- Talwar, Prakash. Travel and Tourism Management. Gyan Books Pvt., Ltd., Main Ansari Road, Darya Ganj, New Delhi- 110 002.
- Bagri, S. C. Trends in Tourism Promotion 2003.International Books Distributors, 9/3, Rajpur Road, Dehradun-248 001 Uttarakhand (India).
- Available recent literature and publications, Government policies on Agro-tourism.
- S. B. Barbuddhe, 2014, Agro-Eco-Tourism: A new dimension to Agriculture, ICAR-CCARI, Old Goa.

Course Title: Introduction to Soil science **Course Code:** AGRG302
Credits: 2+0 **Marks:** 50
Hours: 30
Prerequisite courses: None
Objective

- To provide the knowledge to students about soil and its formation.
- To acquaint the students about physical, chemical and biological properties of soils.
- To enable students to visualise aspects related to problematic soils and their reclamation.

Syllabus
Theory

Unit I (06 Lectures)
Soil: Pedological and edaphological concepts, Definition of Rocks and minerals. Primary and secondary minerals, Weathering, soil formation factors and processes, components of soils, Soil profile, Phases of Soil.
Unit II (09 Lectures)
Physical properties of soil: Soil Texture and Textural Classes, Soil Structure and Classification, Soil Consistency, Soil fertility and productivity factors. Bulk density, particle density and porosity - Soil colour – significance. Soil temperature – Soil air – Soil water- Soil water potentials – Soil moisture constants – Movement of soil water. Infiltration, hydraulic conductivity, percolation, permeability and drainage Integrated nutrient management,
Unit III (07 Lectures)
Chemical properties: Soil colloids – Properties, types and significance – Ion exchange – CEC, AEC and Base saturation –Factors influencing Ion exchange - significance. Soil reaction, Buffering capacity and EC.
Unit IV (08 Lectures)
Problematic soils and their reclamation. Biological properties of soil; Study of different soil types, soil series found in Goa including their physical, chemical, biological characteristics.

References:

- Textbook of soil science- Dr. J.A. Daji, Revised by Dr. Jr. Kadam and N.d.Patil
- A Handbook of Soil Analysis-B. K. Yadav and J. C. Taftardar
- Manual on Soil, Plant And Water Analysis (3Rd Reprint)- Dhyan Singh Westville
- Text book of Soil Science- Biswas, T. D. and S. K. Mukharjee
- Soil microbiology- Martin Alexander
- Fundamentals of Soil Science- ICAR Publication, New Delhi.

Course Title: Social and Farm forestry **Course Code:** AGRG303

Credits: 2+1 **Marks:** 75

Hours: 60

Prerequisite courses: None

Objective

- To provide the knowledge to students about role of forest in agriculture activities.
- To acquaint the students regarding afforestation technics.

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Syllabus

Theory

Unit I (10 Lectures)

Role of forests- productive and protective; Study of Indian and Goan forests; Agro-forestry – definition – different terminologies – components – distinction between agro-forestry and social forestry.Benefits and constraints of agro-forestry.

Unit I (10 Lectures)

Classification of agro-forestry systems on structural, functional, socio- economic and ecological basis; Agri-silvicultural systems; Silvi-pastural system; Agri-silvi-pastural systems.

Unit I (10 Lectures)

Role of trees in soil fertility - Economics of agro-forestry; Community forestry – evolution of social forestry concepts; Wasteland development – definition – extent and classification.
Study of various forest trees suitable fordifferent systems.

Practical: (30 hours)

Units

- Identification and Study of various forest trees;
- Suitable trees for problem soils – planting technique for wastelands;
- Trees in soil and water conservation;
- Afforestation for sand dune stabilization, mine burden, coastal and hilly areas;
- Silvicultural practices for *Terminaliatomentosa / crenulata*, Teak, Tamarind, Karanj, siras, Bayo, Behada,Hirda, Nano, Palas, Pimpal, ritha, Pangara and Bamboos;
- Visit to Joint forest management committee;
- Visit to Goa State Forest Development Corporation.

References:

- Biophysical research for Asian agro-forestry. Winrock International, USA & South Asia Books, USA.
- Principles and Practices of Indian Silviculture. Surya publications, Dehradun.
- Multipurpose Trees for Agro-forestry and Wasteland Utilization. Oxford and IBH Publishing company, New Delhi.
- A Hand book of Social Forestry. International Book Distributors, Dehradun.
- Principles of Social cum Community Forestry; International Book Distributors, Dehradun.
- Social Forestry Plantations. Oxford and IBH Publishing company, New Delhi.

Course Title: Application of laboratory techniques in plant sciences **Course Code:** AGRG304

Credits: 1+1 **Marks:** 50

Hours:45

Prerequisite courses: None

Objective

- To acquaint students about knowledge of various physiological processes.
- To acquaint students about knowledge of collection of samples of plant parts, soil, insects and agro-chemical.
- To acquaint students about knowledge of storage, treatment of plant parts, insect & disease specimen and laboratory analysis of samples.

Syllabus
Theory

Unit I (03 Lectures)
Importance of collection, drying, processing, preserving and handling techniques of soil, plant, seed, weed, insect, pest, herbarium.

Unit II (05 Lectures)
Basic concept of seed development, seed germination, dormancy, seed treatments. Study of photosynthesis and important physiological functions like plant water relationship, transpiration, guttation, respiration, vernalization, senescence, nutrio-physiology.

Unit III (03 Lectures)
Study of some important orders of insects related to agriculture and their metamorphosis.

Unit IV (04 Lectures)
Common weeds, their dispersal, harmful effects on crop cultivation and control measures, introduction to growth regulators and some agrochemicals,

Practical: (30 hours)

Units

- Collection, processing, handling, storage and preservation of herbarium, plants samples and soil samples,
- Preparation of seed album according to their botanical nomenclature,
- Insect collection and maintenance of insect collection box,
- Collection of plant specimen having nutrient deficiencies
- Preparations of agrochemicals and growth regulators in laboratory and in fields,
- Identification of chlorofilic pigments by spectro-photometry,
- Demonstration of ascent of sap, imbibition, transpiration,
- Demonstration of seed treatments and viability test.

References:

- A textbook of soil science- Dr. J.A. Daji
- Handbook of Agriculture- Arun Katyayan
- College botany- A.C. Datta
- A textbook of crop physiology- A.B. Jadhav and S.B. Borgaonkar

Course Title: Environmental Studies - II **Course Code:** AGRG305
Credits: 3+0 **Marks:** 75
Hours: 45
Prerequisite courses: None

Objective

- To acquaint the students with global environmental issues like climate change, global warming etc and different techniques involved in preserving the environment.

Syllabus

Unit I(18 Lectures)

Environmental Pollution: definition, Causes and effect. Global Environmental Issues: Climate Change, Global Warming and Green House Effect, Acid Rain, Depletion of Ozone layer; ecological and carbon footprints; Role of the individual in the prevention of environmental degradation and pollution.

Population Growth, World and Indian scenario, Population explosion, Population and Environmental Degradation.

Urbanization: Urban population growth and Environmental problems, Food: Sources of food, Global and Indian food demand scenario, Limits of food production, Environmental effects on Agriculture, Human – animal conflicts.

Environment and Human Health, Climate and Health, Infectious Diseases, Water-Related Diseases, Climate protection protocols.

Unit II(17 Lectures)

Environmental Assessment – Environmental Impact Assessment (EIA), Environmental Auditing, Environmental accounting.

Environmental management: concept and significance; Emerging environment management strategies, Indian initiatives.

Carbon Bank, carbon credits and carbon offsets

Environmental Protection Movements and reputed NGOs in India.

Sustainable development: meaning and significance; sustainable development goals (SDGs).

Environmental Ethics: Environmental Ethics and Environmental values, Code of Ethics, Importance and limitations of ethics; Environmental Ethics in India.

Unit III(10 Lectures)

Environmental Legislation and Goa's Initiatives for Environmental Protection, Environmental Acts and Regulations:

Brief description and major provisions of

- Water (Prevention and Control of Pollution) Act 1974,
- Air (Prevention and Control of Pollution) Act 1981,
- Environment Protection Act, 1986
- Coastal Regulation Zone Regulations and Rules
- E Waste (Management) Amendment Rules, 2018
- Biological Diversity Act 2002

References

- Kumarasamy, K., A. Alagappa Moses and M. Vasanthy, 2004. Environmental Studies, Bharathidsan, University Pub, 1, Trichy
- Rajamannar, 2004, Environemntal Studies, Evr College Pub, Trichy
- Kalavathy,S. (Ed.) 2004, Environmental Studies, Bishop Heber College Pub., Trichy
- N. Balsubramanya, Gurudeep, Chatwal , Environmental Studies , Himalaya Publication.
- KumariVeena, Environmental Pollution and Health Hazard, Ishwar Book.

Other References:

1. Kumar Rajesh Prakash Kutir, Mining and Environmental Sustainability

2. S.C. Santra, Environmental Science, New Book Agency Pvt Ltd. Kolkata.

3. Shinde, Pendse, Donge, Environmental Education, Sheth Publication.

4. Dr. Vijay Kumar, Environmental Studies Text Book, Himalaya Publication.

5. Singh, Anoop Kumar, Environmental Management in mining areas, Ishwar Books

6. Singh Chandrama Prakash and Kuter, Sustainable Development and Environment

7.http://nbaindia.org/uploaded/Biodiversityindia/Legal/31.%20Biological%20Diversity%20%20Act,%202002.pdf

8.http://egazette.nic.in/WriteReadData/2019/195679.pdf

9.http://www.mondaq.com/india/x/624836/Waste+Management/Environment+Laws+In+India

Skill Development Qualification Pack

Course Title: Floriculturist (Open cultivation) **Course Code:** AGRS301
Credits: 07+11 **Marks:** 300
Hours: 200
Prerequisite courses: None

Course/Package objectives:
To enable students to take up flower cultivation in open fields.

Package Syllabus (Adopted Model Curriculum of Agriculture Skill Council of India)

- Lecture Hours and Marks Distribution as per ASCI standard mentioned in Model Curriculum
- Unit Contents as mentioned in the courseware designed by ASCI for 'Floriculturist (Open cultivation)'.

Unit I	Introduction	**(05 hours)**
Unit II	Preparatory Cultivation of flower crops(AGR/N0701)	**(45 hours)**
Unit III	Harvest and post harvest management in floriculture(AGR/N0702)	**(60 hours)**
Unit IV	Maintain health and safety at work place (AGR/N9903)	**(25 hours)**

Recommended References:

- ASCI courseware module for 'Floriculturist (Open cultivation)'.

Qualification Pack Hyperlink:
https://asci-india.com/nos-panel/uploadPDF/QP-Floriculturist-Open%20Cultivatione9fb632fbebce833925e9549aea0a7fc.pdf

Sem IV

After successfully completing the courses of Semester-IV, the students are expected to acquire the skills to be employable as **Farm Supervisor.**

NSQF Level / Semester	Course Code	Course Title	Course Credits		Marks
Level 6 / Semester IV	**General Education**				
	AGRG401	Integrated farming System	Theory	3	75
	AGRG402	Introduction to Organic farming	Theory	2	50
			Practical	1	25
	AGRG403	Statistics	Practical	2	50
	AGRG404	Agribusiness Management	Theory	2	50
	AGRG405	Creative thinking	Theory	2	50
	Skill Development Qualification Pack & On-Job-Training (OJT)				
	AGRS401	Farm Supervisor AGR/Q1206	Theory	7	600
			Practical & OJT	11	
Total			**30**		**900**

Syllabus (Semester IV)

Course Title: Integrated farming System **Course Code:** AGRG401
Credits: 3+0 **Marks:** 75
Hours: 45
Prerequisite courses: None

Objectives:

- To apprise about different enterprises suitable for different agro-climatic conditions for sustainable agriculture.
- To sensitize students about importance, scope, components and interaction within components of Integrated farming system.

Syllabus

Unit I (07 Lectures)

Farming systems: definition and importance; classification of farming systems according to type of rotation, intensity of rotation, degree of commercialization, water supply, enterprises. Concept of sustainability in farming systems; efficient farming systems; natural resources - identification and management.

Unit II (10 Lectures)

Integrated farming system- meaning, importance and scope; advantages, components of IFS; Production potential of different components of farming systems; interaction and mechanism of different production factors; stability in different systems through research; eco-physiological approaches to intercropping; IFS for different Agro-climatic conditions.

Unit III (14 Lectures)

Various agriculture related concepts and their relevance in IFS- Crop rotations, cropping systems, cropping pattern, sustainable agriculture, farming systems, monoculture, multiple cropping, intercropping, mixed cropping, sequential cropping, multi-storey cropping, terra farming, Agro-forestry systems, permaculture, Allelopathy, organic farming, mushroom cultivation, bee keeping, sericulture, pisiculture in pond, aqua forestry, boundary plantations, shelterbelts, wind breaks, duckery, poultry farming, vermin-composting,

Unit IV (07 Lectures)

Simulation models for intercropping; soil nutrient in intercropping; Study of different Integratedfarming system models; evaluation of different farming systems;

Unit V (07 Lectures)

Production and Economics of IFS, IFS for small and marginal farmers, Visits to few IFS models.

References:

- Balasubramanian P &Palaniappan SP 2006. Principles and Practices of Agronomy. Agrobios.
- Joshi M &Parbhakarasetty TK. 2005. Sustainability through Organic Farming. Kalyani.
- Veeresh GK, Shivashankar K &Suiglachar MA. 1997. Organic Farming and Sustainable Agriculture. Association for Promotion of Organic Farming, Bangalore.
- A. K. Sarkar, R. S. Singh, M. S. Yadav, C. S. Singh, 2011, Integrated Farming Systems for Sustainable Production. Agrotech Publishing Academy.
- Panda S.C. 2004. Cropping systems and Farming Systems. Agribios.

Course Title: Introduction to Organic farming **Course Code:** AGRG402
Credits: 2+1 **Marks:** 75
Hours: 60
Prerequisite courses: None

Objectives:

- To apprise students about concept of organic farming.
- To sensitize students about various cultivation practices in organic farming.
- To sensitize students about various organic preparations and quality considerations for organic produce.

Syllabus

Theory

Unit I (04 Lectures)
Organic farming - Introduction, concept, relevance in present context, organic production requirements.

Unit II (07 Lectures)
Biological intensive nutrient management: organic manures, vermicomposting, green manuring, recycling of organic residues, bio-fertilizers, use of Panchgavya; Effective microorganisms (EM).

Unit III (08 Lectures)
Soil improvement and amendments. Soil organic matter – Composition – decomposition and mineralization, C: N ratio, Carbon cycle – Fractions of soil organic matter – Humus formation. Soil organisms - Beneficial and harmful effects.

Unit IV (06 Lectures)
Integrated diseases and pest management - use of biocontrol agents, bio-pesticides, pheromones, trap crops, bird perches; Weed management.

Unit IV (05 Lectures)
Quality considerations - certification, labeling and accreditation process, marketing and export.

Practical:(30hours)

- Vegetable and ornamental nursery raising organically.
- Raising of vegetable crops organically.
- Preparation of FYM.
- Preparation of compost, vermicompost.
- Preparation of Panchagavya.
- Preparation of Effective microorganisms (EM) stock solution and demonstrate its use.
- Preparation of Amrutpani and demonstrate its use.
- Preparation of organic pesticides.
- Marketing of organically raised produce.
- Visit to bio-control lab, bio-fertilizer unit, organic farm and vermicompost unit.
- Study of formats used in organic certification process.
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References:

- Dahama, A.K., Organic farming for sustainable agriculture, 2005. Agrobios Publication, Jodhpur.
- Palanippan, S.P. and Anandurai, K. 1999. Organic Farming - Theory and Practice. Scientific Publishers, Jodhpur.
- Sharma, A.K., Handbook of Organic Farming.
- Singh, R.P. Sustainable Development of Dry-land Agriculture in India.
- Thapa, U. and Tripathi, P. 2006. Organic Farming in India, Problems and Prospects.

Course Title: Statistics
Credits: 0+2
Hours: 60
Prerequisite courses: None

Course Code: AGRG403
Marks: 50

Objectives:

- To acquaint students about statistical computing.
- To improve skills in description, interpretation and exploratory analysis of data by graphical and other means.

Syllabus

Unit I (10hours)

Statistics-Definition, Use, Limitations; Core concepts of statistics; Collection and arrangement of data, description, interpretation and exploratory analysis of data by graphical and other means.

Unit I (08 hours)

Frequency Distribution and Frequency Curves.

Unit II (22 hours)

Measures of Central Tendency- Characteristics of Ideal Average. Computation of Arithmetic Mean, Median, Mode and their Merits and Demerits; Measures of Dispersion.Standard Deviation, Variance and Coefficient of Variation for ungrouped and grouped data.

Unit I (20 hours)

Probability- Definition and concept of probability; Normal Distribution and its properties; Introduction to Sampling, Application of statistics in agriculture.

References:

- Mohammed A. Shayib, Applied Statistics, Bookboon.
- Sture Holm, Understanding Statistics, Bookboon.
- R. Rangaswamy, A textbook of agricultural statistics, New age International.
- https://upload.wikimedia.org/wikipedia/commons/8/82/Statistics.pdf

Course Title: Agribusiness management **Course Code:** AGRG404
Credits: 2+0 **Marks:** 50
Hours: 30
Prerequisite courses: None
Objective

- To provide the knowledge to students about the raw material collection, management, organizational behaviour and managerial accounting and PEM (project engineering management)

Syllabus

Theory

Unit I (07 Lectures)
Agribusiness – definition and nature, components of agribusiness management, changing dimensions of agricultural business. Emerging trends in production, processing, marketing and exports; policy controls and regulations relating to the industrial sector with specific reference to agro-industries.
Agribusiness policies- concept and formulation; and new dimensions in Agri business environment and policy.
Agricultural price and marketing policies; public distribution system and other policies.

Unit II(07 Lectures)
Organizational Behaviour and Human Resource Management- The agri-business system; management processes, planning, controlling, organizing, motivating and leading; decision making; managerial skills; level of managers; organizational context of decisions; organizational culture; management of organizational conflicts; managing change; leadership styles; group dynamics; motivation.

Unit III(08 Lectures)
Managerial Accounting and Control Financial Accounting- Meaning, Need, Concepts and Conventions; Advantages and Limitations and Standards of financial accounting;. Cost Accounting – Significance of Cost Accounting; Classification of Cost; Marginal Costing and cost volume profit Analysis- Its Significance, Uses and Limitations; Standard Costing – Its Meaning, Uses and Limitations; Determination of Standard Cost, Variance Analysis-Material, Labour and Overhead.

Unit I(08 Lectures)
Project Management and Entrepreneurship Development Concept, characteristics of projects, types of projects, project identification, and Project's life cycle; Project feasibility-market feasibility, technical feasibility, financial feasibility, and economic feasibility, social cost-benefit analysis, project risk analysis;

References:

- Martand T. Telsang, S. Chand, Industrial & Business Management.
- J Tony Arnold & Stephen N. Chapman, Pearson Education Asia, Introduction to Materials Management.
- Adam, Pearson Education /PHI, Production & Operations Management.
- Sinha, Pearson Education Asia, Industrial Relations, Trade Unions &Labour Legislation.
- Tulsian, Pearson Education Asia, Business Organisation& Management.

Course Title: Creative thinking **Course Code**: AGRG405
Credits: 2+0 **Marks**: 50
Hours: 30
Prerequisite courses: None

Objectives:

- This is a course on study of creative/lateral thinking and problem solving techniques those are essential to solve real world problems. Causal, deductive, and inductive arguments are described as well as the use of persuasion.

Syllabus

Unit I (05lectures)

- The way the mind works
- Difference between lateral and vertical thinking
- Attitudes towards lateral thinking
- Basic nature of lateral thinking

Unit II (07lectures)

- The use of lateral thinking
- Techniques
- The generation of alternatives
- Challenging assumptions
- Innovation

Unit III (05lectures)

- Suspended judgment
- Design
- Dominant ideas and crucial factors
- Fractionation
- The reversal method

Unit IV (06lectures)

- Brainstorming
- Analogies
- Choice of entry point and attention area
- Random stimulation

Unit V (07lectures)

- Concepts/divisions/polarization
- The new word po
- Blocked by openness
- Description/problem solving/design

References:

- Rod Judkins, 2015, The art of creative thinking, Hachette Book Publishing

- Michael Michalko, 2006, Thinker toys: A Handbook of Creative- Thinking Techniques, Ten Speed Press

Skill Development Qualification Pack

Course Title: Farm Supervisor **Course Code:** AGRS401
Credits: 07+11 **Marks:** 600
Hours: 220
Prerequisite courses: None

Course/Package objectives:
To enable students to take up flower cultivation in open fields..
Package Syllabus (Adopted Model Curriculum of Agriculture Skill Council of India)

- Lecture Hours and Marks Distribution as per ASCI standard mentioned in Model Curriculum
- Unit Contents as mentioned in the courseware designed by ASCI for 'Farm Supervisor'.

Unit I Introduction **(02 hours)**
Unit II Maintenance of farm assets and records(AGR/N1226) **(38 hours)**
Unit III Soil Health(AGR/N1227) **(30 hours)**
Unit IV Growth and harvesting of crops(AGR/N1228) **(25 hours)**
Unit V Post harvest activities(AGR/N1228) **(25 hours)**
Unit VI Farm operations(AGR/N1229) **(40 hours)**
Unit VII Personal hygiene practices and cleanliness around workplace(AGR/N9911) **(15 hours)**
Unit VIII Safety guidelines and rendering of emergency Procedures(AGR/N9911) **(15 hours)**
Unit IX Leading the workers(AGR/N9915) **(10 hours)**
Unit X Completion of work as per the expected standards(AGR/N9915) **(10 hours)**
Unit XI Queries, concerns and welfare of workers(AGR/N9915) **(10 hours)**

Recommended References:

- ASCI courseware module for 'Farm Supervisor'.

Qualification Pack Hyperlink:
http://www.asci-india.com/nos-panel/uploadPDF/QP_Farm%20Supervisor199ce4f37452b8bfd0e9638bc30ba893.pdf