APPENDIX - III

Detail Syllabus of Agriculture Polytechnic (Diploma in Agriculture)

FIRST SEMESTER

Sr. No.	Subject Code and Title of Course
1	**Agron.1.1 Agricultural Heritage** **Credit hours: (1+0=1)** **Theory** Introduction of Indian agricultural heritage; Ancient agricultural practices, Relevance of heritage to present day agriculture; Past and present status of agriculture and farmers in society; Journey of Indian agriculture and its development from past to modern era; Plant production and protection through indigenous traditional knowledge; Crop voyage in India and world; Agriculture scope; Importance of agriculture and agricultural resources available in India; Crop significance and classifications; National agriculture setup in India; Current scenario of Indian agriculture; Indian agricultural concerns and future prospects.
2	**Agron.1.2 Fundamentals of Agronomy** **Credit hours: 4(3+1)** **Theory** Agronomy and its scope, seeds and sowing, tillage, land configuration and sub soiling, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency. Growth and development of crops. Agro-climatic zones of India and Gujarat. Classification of field crops and Factors affecting on crop production. Drought – definition – types of drought – effect of drought on crops – management of drought. Cropping systems – monocropping – definition and principles of crop rotation – mixed cropping – intercropping – relay cropping – multistoried cropping – sole cropping. Soil fertility and soil productivity – fertility losses – maintenance of soil fertility – soil organic matter Irrigation – Introduction, Importance, Definition and Objectives. Physical classification and Biological classification of water. Irrigation efficiency and water use efficiency, conjunctive use of water, Approaches for scheduling of irrigation; Methods of irrigation including micro irrigation system. Quality of irrigation water, water logging. Soil moisture constant: MWHC, ME, FC, PWP, Hygroscopic co-efficient. Weeds: definition, classification and characteristics. **Practicals** 1. Identification of crops, seeds, fertilizers, pesticides and tillage implements 2. Lay out and types of seed bed preparation 3. Practice of different methods of sowing 4. Study of yield contributing characters and yield estimation of major crops 5. Seed germination and viability test 6. Numerical exercises on plant population and seed rate 7. Use of tillage implements-reversible plough, one way plough, harrow and leveler 8. Study of sowing implements/equipment 9. Measurement of field capacity, bulk density and infiltration rate 10. Field layout of various irrigation methods 11. To work out the labour unit and unit of work for various field operations
3	**Hort. 1.1 Fundamentals of Horticulture** **Credit hours: 2(1+1)** **Theory** Horticulture-Its definition and branches, importance and scope; horticultural and botanical classification; climate and soil for horticultural crops; Plant propagation-methods and propagating structures; principles of orchard establishment; Principles and methods of training and pruning, bahar treatment, juvenility and flower bud differentiation; unfruitfulness; pollination, pollinizers and pollinators; fertilization and parthenocarpy; kitchen gardening; garden types and parts; lawn making; use of plant bio-regulators in horticulture. Irrigation & fertilizers application-method and quantity

	Practicals 1.Identification of garden tools 2. Identification of horticultural crops 3. Preparation of seed bed/nursery bed 4. Practice of sexual and asexual methods of propagation 5. Layout and planting of orchard plants 6.Training and pruning of fruit trees 7. Transplanting and care of vegetable seedlings 8. Making of herbaceous and shrubbery borders 9. Preparation of potting mixture, potting and repotting 10. Fertilizer application in different crops 11.Visits to commercial nurseries/orchard
4	**GPB 1.1 Introductory Biology Credit hours: 2(1+1)** **Theory** Introduction to the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics. Introduction and characteristics of plant, Binomial nomenclature and classification Cell and cell division. Morphology and Micro-morphology of flowing plants. Seed and seed germination. Introduction to plant taxonomy and plant systematic. Role of animals in agriculture. **Practicals** 1. Morphology of flowering plants – root, stem and leaf and their modifications 2. Study of Inflorence, flower and fruits 3. Study of Cell, tissues & cell division 4. Study of Internal structure of root, stem and leaf 5. Study of specimens and slides 6. Description of plants - Malvaceae, Fabaceae, Cucurbitaceae, Brassicaceae, Euphorbiaceae, Apiaceae, Solanaceae, Asteraceae, Poaceae and Liliaceae.
5	**Ag. Ento. 1.1 Fundamentals of Entomology Credit hours: 3(2+1)** **Theory** **Part – I:** History of Entomology in India. Factors for insect's abundance. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda up to classes. **Part – II:** Morphology: Structure and functions of insect cuticle, moulting and body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, Wing. Metamorphosis in insects. Types of larvae and pupae. **Part – III:** Structure of male and female genital organs. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive systems in insects. Types of reproduction in insects. Major sensory organs. **Part – IV:** Classification of class Insecta upto Orders with Major characteristics of orders. Part V: Beneficial Insects: Honeybee, silkworm and lac insect **Practicals** 1. Methods of collection and preservation of insects including immature stages; 2. External features of Grasshopper/Cockroach; 3. Types of insect antennae, mouthparts and legs; types of wings. 4. Metamorphosis and diapause, 5. Types of insect larvae and pupae; 6. Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance.

6	**Pl. Path. 1.1 Fundamentals of Plant Pathology Credit hours: 3 (2+1)** **Theory** Introduction: Importance of plant diseases, scope and objectives of Plant Pathology. History of Plant Pathology with special reference to Indian work. Terms and concepts in Plant Pathology. Causes and factors affecting disease development: Disease triangle and tetrahedron and classification of plant diseases. Important plant pathogenic organisms (different groups): fungi, bacteria, phytoplasma, spiroplasma, viruses, viroids, algae, protozoa and phanerogamic plant parasites with example of diseases caused by them. Diseases and symptoms due to abiotic causes. Pathogenesis, Role of enzymes, toxins and growth regulators in disease development. Defence mechanism in plants. Epidemiology: Factors affecting disease development. Fungi: General characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction (asexual and sexual). Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to divisions, sub-divisions, orders and classes. Bacteria and mollicutes: General morphological characters. Basic methods of classification and reproduction. Viruses: Nature, architecture, multiplication and transmission. Growth and reproduction of plant pathogens. Liberation, dispersal and survival of plant pathogens. Types of parasitism and variability in plant pathogens. **Practicals** 1. Acquaintance with various laboratory equipments and microscopy 2. Preparation of media, isolation and Koch's postulates 3. General study of different structures of fungi 4. Study of symptoms of various plant diseases 5. Study of representative fungal genera 6. Staining and identification of plant pathogenic bacteria 7. Transmission of plant viruses 8. Study of phanerogamic plant parasites 9. Study of fungicides and their formulations 10. Methods of pesticide application and their safe use 11. Calculation of fungicide sprays concentrations
7	**Ag.Econ. 1.1 Fundamentals of Agricultural Economics Credit hours: 2(2+0)** **Theory** Economics: Meaning, scope and subject matter, definitions, activities, approaches to economic analysis; micro and macro economics, positive and normative analysis. Nature of economic theory; rationality assumption, concept of equilibrium, economic laws as generalization of human behavior. Basic concepts: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare. Agricultural economics: meaning, definition, characteristics of agriculture, importance and its role in economic development. Agricultural planning and development in the country.Demand: meaning, law of demand, demand schedule and demand curve, determinants, utility theory; law of diminishing marginal utility, equimarginal utility principle. Consumer's equilibrium and derivation of demand curve, concept of consumer surplus. Elasticity of demand: concept and measurement of price elasticity, income elasticity and cross elasticity. Production: process, creation of utility, factors of production, input output relationship. Laws of returns: Law of variable proportions and law of returns to scale. Cost: Cost concepts, short run and long run cost curves. Supply: Stock v/s supply, law of supply, supply schedule, supply curve, determinants of supply, elasticity of supply. Distribution theory: meaning, factor market and pricing of factors of production. Concepts of rent, wage, interest and profit. National income: Meaning and importance, circular flow, concepts of national income accounting and approaches to measurement, difficulties in measurement. Population: Importance, Malthusian and Optimum population theories, natural and socio-economic determinants, current policies and programmes on

	population control. Money: Barter system of exchange and its problems, evolution, meaning and functions of money, classification of money, money supply, general price index, inflation and deflation. Economic systems: Concepts of economy and its functions, important features of capitalistic, socialistic and mixed economies, elements of economic planning. Forms of business organizations, international trade and balance of payments.GST and its implication on Indian economy.
8	**Eng. 1.1 Comprehension and Communication Skills in English** **Credit hours: 2(1+1)** **Theory** Selected Short Stories of eminent writers from India and abroad: Rabindranath Tagore, Mulk Raj Anand, Premchand, R K Narayan, Isaac Asimov (Science Fiction), Sudha Murthy, Leo Tolstoy, O Henry, Anton Chekhov, Guy De Maupassant, K A Abbas Basic Grammar: Articles, Prepositions, Concord, Transformation, Synthesis, Reported Speech, Active- Passive Voice **Practicals** Reading Comprehension Practice in reading short paragraphs, notices, announcements, advertisements, newspaper articles, reports, etc. Writing Skills: Writing experimental reports and journals, Writing informal letters, leave applications, Writing short notices, announcements, Filling simple forms for different purposes, Short Notes Listening Comprehension: Listening to announcements at public places like Railway Station, Bus Station, Airports, Malls, etc., Listening to short conversations on basic language functions, Listening to short speeches and lectures, Listening to news on TV & Radio Speaking: Introduction, Greeting people on different occasions, Carrying out basic language functions like Asking for Permission, Asking and Showing directions, Describing people and places, Reporting ongoing events, etc.
9	**HVE 2.1 Human Value and Ethics (Non-gradial)* Credit hours: (1+0=1)** **Theory** Values and Ethics-An Introduction. Goal and Mission of Life. Vision of Life. Principles and Philosophy. Self Exploration. Self Awareness. Self Satisfaction. Decision Making. Motivation. Sensitivity. Success. Selfless Service. Case Study of Ethical Lives. Positive Spirit. Body, Mind and Soul. Attachment and Detachment. Spirituality Quotient. Examination.
10	**PE 1.1 NSS/NCC/Physical Education & Yoga Practices Credit hours: (0+1)** **(Non-gradial)*** **Theory** Course aims at evoking social consciousness among students through various activities viz., working together, constructive and creative social work, to be skilful in executing democratic leadership, developing skill in programme development to be able for self employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society. Following activities are to be taken up under the NSS course: • Introduction and basic components of NSS: Orientation • NSS programmes and activities • Understanding youth • Community mobilisation • Social harmony and national integration • Volunteerism and shramdan • Citizenship, constitution and human rights • Family and society • Importance and role of youth leadership • Life competencies

	• Youth development programmes • Health, hygiene and sanitation • Youth health, lifestyle, HIV AIDS and first aid • Youth and yoga • Vocational skill development • Issues related environment • Disaster management • Entrepreneurship development • Formulation of production oriented project • Documentation and data reporting • Resource mobilization • Additional life skills • Activities directed by the Central and State Government All the activities related to the National Service Scheme course is distributed under four different courses viz., National Service Scheme I, National Service Scheme II, National Service Scheme III and National Service Scheme IV each having one credit load. The entire four courses should be offered continuously for two years. A student enrolled in NSS course should put in at least 60 hours of social work in different activities in a semester other than five regular one day camp in a year and one special camp for duration of 7 days at any semester break period in the two year. Different activities will include orientation lectures and practical works. Activities directed by the Central and State Government have to be performed by all the volunteers of NSS as per direction.
	Course Title: National Service Scheme I Introduction and basic components of NSS: Orientation: history, objectives, principles, symbol, badge; regular programmes under NSS, organizational structure of NSS, code of conduct for NSS volunteers, points to be considered by NSS volunteers awareness about health NSS programmes and activities Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analysing guiding financial patterns of scheme, youth programme/ schemes of GOI, coordination with different agencies and maintenance of diary Understanding youth Definition, profile, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change Community mobilisation Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilisation involving youth-adult partnership Social harmony and national integration Indian history and culture, role of youth in nation building, conflict resolution and peace-building Volunteerism and shramdan Indian tradition of volunteerism, its need, importance, motivation and constraints; shramdan as part of volunteerism Citizenship, constitution and human rights Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information Family and society Concept of family, community (PRIs and other community based organisations) and society

	National Cadet Corps 1. Aims, objectives, organization of NCC and NCC song. DG's cardinals of discipline. 2. Drill- aim, general words of command, attention, stands at ease, stand easy and turning. 3. Sizing, numbering, forming in three ranks, open and close order march and dressing. 4. Saluting at the halt, getting on parade, dismissing and falling out. 5. Marching, length of pace, and time of marching in quick/slow time and halt. Side pace, pace forward and to the rear. 6. Turning on the march and wheeling. Saluting on the march. 7. Marking time, forward march and halt. 8. Changing step, formation of squad and squad drill. 9. Command and control, organization, badges of rank, honours and awards 10. Nation Building- cultural heritage, religions, traditions and customs of India. National integration. 11. Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizen. 12. Leadership traits, types of leadership. Character/personality development. 13. Civil defense organization, types of emergencies, fire fighting, protection, 14. Maintenance of essential services, disaster management, aid during development projects. 15. Basics of social service, weaker sections of society and their needs, NGO's and their contribution, contribution of youth towards social welfare and family planning. 16. Structure and function of human body, diet and exercise, hygiene and sanitation. 17. Preventable diseases including AIDS, safe blood donation, first aid, physical and mental health. 18. Adventure activities 19. Basic principles of ecology, environmental conservation, pollution and its control. 20. Precaution and general behaviour of girl cadets, prevention of untoward incidents, vulnerable parts of the body, self defense.
	Semester I:Physical Education and Yoga Practices 1. Teaching of skills of Football – demonstration, practice of the skills, correction, involvement in game situation (For girls teaching of Tennikoit) 2. Teaching of different skills of Football – demonstration, practice of the skills, correction, involvement in game situation (For girls teaching of Tennikoit) 3. Teaching of advance skills of Football – involvement of all the skills in game situation with teaching of rules of the game 4. Teaching of skills of Basketball – demonstration, practice of the skills, correction of skills, involvement in game situation 5. Teaching of skills of Basketball – demonstration, practice of the skills, involvement in game situation 6. Teaching of skills of Basketball – involvement of all the skills in game situation with teaching of rule of the game 7. Teaching of skills of Kabaddi – demonstration, practice of the skills, correction of skills, involvement in game situation 8. Teaching of skills of Kabaddi – demonstration, practice of the skills, correction of skills, involvement in game situation 9. Teaching of advance skills of Kabaddi – involvement of all the skills in game situation with teaching of rule of the g0ame 10. Teaching of skills of Ball Badminton – demonstration, practice of the skills, correction of skills, involvement in game situation 11. Teaching of skills of Ball Badminton – involvement of all the skills in game situation with teaching of rule of the game

	12. Teaching of some of Asanas – demonstration, practice, correction and practice 13. Teaching of some more of Asanas – demonstration, practice, correction and practice 14. Teaching of skills of Table Tennis – demonstration, practice of skills, correction and practice and involvement in game situation 15. Teaching of skills of Table Tennis – demonstration, practice of skills, correction and practice and involvement in game situation 16. Teaching of skills of Table Tennis – involvement of all the skills in game situation with teaching of rule of the game 17. Teaching – Meaning, Scope and importance of Physical Education 18. Teaching – Definition, Type of Tournaments 19. Teaching – Physical Fitness and Health Education 20. Construction and laying out of the track and field (*The girls will have Tennikoit and Throw Ball).