ARUNACHAL PRADESH
PUBLIC SERVICE COMMISSION
ITANAGAR::

No.PSC-R(B)/04/2025 Dated Itanagar, the 15th October, 2025

NOTIFICATION

The Arunachal Pradesh Public Service Commission hereby notifies the syllabus for combined recruitment examination to the post of Horticulture Development Officer, Agriculture Development Officer, Dairy Development officer, Veterinary Officer, Assistant Director (Sericulture), Fishery Officer and Assistant Director (Textile & Handicrafts). The syllabus for various posts is provided herewith in annexures as detailed below:

1. Horticulture Development Officer in Annexure – A
2. Agriculture Development Officer in Annexure – B
3. Dairy Development officer in Annexure – C
4. Veterinary Officer in Annexure – D
5. Assistant Director Sericulture in Annexure – E
6. Assistant Director Textile & Handicrafts in Annexure – F
7. Fishery Officer in Annexure – G

This issues with the approval of the Commission.

(Priytarshny P) IAS
Secretary, APPSC

No. PSC-R(B)/04/2025 Dated Itanagar, the 15th October, 2025

1. The PS to Hon'ble Chairman, APPSC for information please.
2. The Secretary, Department of Agriculture/ Department of Horticulture/ Department of Animal Husbandry & Dairy Development/ Department of Fisheries/ Department of Textile & Handicrafts for information please.
3. IT Section, APPSC to upload in the APPSC website.
4. Office copy.

(Priytarshny P) IAS
Secretary, APPSC

Annexure-A

SYLLABUS FOR HORITICULTURE DEVELOPMENT OFFICER

PAPER – I

1. **General Horticulture**: Agro climate zone of India and Arunachal Pradesh, Nature and Scope of Horticulture and its importance in Arunachal Pradesh, Classification of Horticulture Plants, Production and scopes of Horticulture in India and Arunachal Pradesh pertaining to fruits, vegetables, flowers, Spices and Mushroom and its cultural practices, Nutri-sensitive horticulture, Export potential of Horticultural Crops from NEH Region, Peri- urban horticulture, Vertical Farming.

2. **Pomology**: Definition, its scope, importance and production of fruit crops in India and Arunachal Pradesh, cultivation of Apple, Walnut, Citrus, Kiwi plum, Chestnut, Guava, Banana, Pineapple and uses of varieties and its cultural practices.

3. **Olericulture**: Definition, Classification, its scope, production and importance of growing vegetables in Arunachal Pradesh, cultural practices of major vegetables crop i.e. Cabbage, Cauliflower, Potato, Okra, Brinjal, Beans Pumkin, Cucumber etc. Vegetable seed production.

4. **Floriculture**: Definition, its scope and landscaping in Arunachal Pradesh, cultural practices of Roses, Begonia, Marigold, Calendula, Salvia, Chrysanthemum, Gladiolous, Orchids, Anthurium etc.

5. **Medicinal, Aromatic and Spices Plants**: Scope, opportunities and constrain in cultivation of medicinal, aromatic, spice and condiments in India and Arunachal Pradesh, cultural practices, training, promising of medicinal, aromatices and spices crops preparation of nurseries, after care and its importance in therapeutic and pharmaceutical uses.

6. **Propagation & Orchard Management**: Fundamental/Principle/methods of plant propagation of horticulture crops, Layout of orchard, system of plant and method of cultivation, planning and Management of nurseries, scope and zone-wise growing of Horticultural crops pertaining to temperate, sub-temperate, tropical, sub-tropical, Definition, its scope and importance of green house production and protection.

7. **Plant Physiology**: Absorption of water and nutrients, its movement in plant, factor affecting, photo respiration, evaporation, enzymes and enzymes activities in physiological process, stress at physiology by Horticulture crops with special reference to Arunachal conditions.
   Plant growth Hormones/ regulators substance: Definition, influence of growth in plant, physiological effects of a different growth hormone methods. Method of application and evaluation of responses. Pre-harvest regulation of Horticultural crops by usages of plant hormone.

8. **Genetics & Plant Breeding**: Elementary concept, principal of inheritance, interaction of gene, linkage crossing over, wild relation and resources of resistance to biotic, abiotic stresses and quality characters for fruit, vegetables, flowers, plantation crops, spices, medicinal and aromatic Horticulture crops. Breeding as modern science, classification of

crops according to breeding behavior, application of breeding method. Use of Biotechnological tools for improvement of horticultural crops.

9. **Soil Science**: Composition of soil, soil texture, soil water, soil colloid, minerals, organic and their natures and protection, concept of soil pH. Theories and concept of soil moisture, characterization of soil by dramatic mobilization organic matter, humus, its formation, preparation of CN ratio in soil, nitrification and its significance. Details of soil profile, land capability, classification, soil survey. Different types of soil Mirco-organism, soil texture evaluation methods and analysis. Soil acidity management.

Plant nutrition/Manure & Fertilizer: Definition of essential plant nutrition's mechanism of mineral absorption, soil reaction nutrient, deficiency symptoms and function of nutrient, method of application, importance of organic farming, special management practices for utilization of organic material in soil. Types of bulky organic manures.

PAPER – II

1. **Plant Pathology**:
   - i) Concept of disease in plant, importance of plant disease, classification of pant disease, various parasite and non-parasite, causes of plant disease, stages of disease development and their casual organism.
   - ii) Disease of fruit and plantation crops, its etiology, system of methods of spread, epidemiology of banana citrus, grape, apple, peach, walnut, pineapple, pear, kiwi and concept of integrated of control measures and their casual organism.
   - iii) Disease of vegetable tuber and spices crops, its etiology, epidemiology, method of spread and concept of integrated of control measure.
   - iv) Disease of ornamental, medicinal and aromatic plants, its etiology and management of disease of major crops, tube rose, rose, jasmine etc.
   - v) Definition of weeds, menace in Horticultural crops, classification of weeds, its control measure, their application methods and biology control of weeds. Modern concept of organic biological cropping.

2. **Entomology**: Classification of insects, Nematodes, its nature and extent of damage caused by the insects, life cycle, seasonal occurrence, its management practices of major pest of fruits crops, vegetable, spices, aromatic medicinal and flowers.

   Different pest control measure with special reference to IPM, classification of insecticide/ Pesticide and their physical, chemical and biological properties, type of formulation, different type of plant protection equipment, its maintenance, use in field maintenance and Toxicology.

   Nematodes, its pathogenesis, relationship with other micro-organism and nature of damaged and life cycle and its control measure.

3. **Extension Education/ Rural Psychology**: Definition, meaning objectives of extension, importance of extension education in Horticulture and Rural Development, teaching, learning process, classification, characteristic of extension, reading method. Role of AV aids in extension, planning, Programme and Evaluation, teaching method, definition of rural psychology & its importance.

4. **Agricultural Economic and Management:** Concept of micro & macro-economic. Basic concept like wants goods, wealth, welfare value prices, consumption, exchange factors of production, law of diminishing return. Farm business organization, National income, per capita income. Basic concept of economic and Agricultural Economics, Division of Horticultural Economics, importance of the subject concept of supporting price.
Importance of Farm Management, its relationship with other science. Advantages of records and accounts.
System of book-keeping, types of farm record and act physical of financial principles involved in farm management decision, management of farm labour and wages record.
Planning labour, use for higher efficiency estimation of different kind of labour required in farm. Cost of production and return of farm. Cost of fencing, irrigation, farm layout. Agriculture marketing cooperation.

5. **Agriculture Engineering**: Scope of farm mechanization- benefits and limitations, sources of farm power, IC engines, elementary knowledge about tractors, types and system soil tillage implements, inter-culture implements/equipment harvesting and threshing equipment. Soil-plant-water relationship. Drainage engineering, surveying and levelling field structures and practices to control erosion by water. Different system of soil water conservation.

6. **Post-harvest management & Marketing**: Importance of post-harvest technology in horticulture crops, maturity indices, harvesting, grading of fruit, vegetable, cut flowers, plantation crops, medicinal and Aromatic spices contents crops. Pre-factor affecting quality control responsible for determination of horticultural produces, physiological and biochemical changes hardening and delaying ripening process pre-harvest treatment.
Different system of storage & packages, advance packaging, elementary principles of processing & preservation. Definition of marketing, importance of marketing, classification of marketing, special reference to Arunachal Pradesh, constrain of marketing for produces of Horticultural crops in Arunachal Pradesh, its solution. Role of government in promoting marketing in Arunachal Pradesh.

7. **Agro-Forestry & Agro-Technology**: Definition, objectives, potential, Agro forestry system, importance of Horti-Silviculture, Horti-Silvi-Pastoral, intercropping, home garden, wind breaks, Shelter belts and energy plantation. Shifting cultivation in its definition and its remedial and alternative for sustainable resources.
Definition of Agro methodology, objectives, scope and its factor and element of weather and climate. Use of remote sensing technology in Agro-methodology types of cloud precipitation, hail and frost etc. its effects and plant growth crops.

Annexure-B

SYLLABUS FOR AGRICULTURE DEVELOPMENT OFFICER

PAPER- I

1. Agronomy:

Agro-climatic zones of India and Arunachal Pradesh; crop classification; tillage operations and implements; cultural practices, crop varieties, seed selection, sowing methods, seedling raising, crop rotation, cropping intensity, multiple, inter-, mixed, and rainfed cropping systems. Production technologies of major crops: cereals (rice, maize, wheat, millets), pulses (black gram, green gram, pigeon pea, soybean, chickpea, lentil, field pea), oilseeds (mustard, sunflower, sesamum, groundnut), fibre crops (cotton, jute), sugarcane, potato, and fodders (napier, cowpea). Integrated farming systems with crop-livestock-horticulture components, resource recycling, diversification, and organic practices using biofertilizers and conservation measures. Watershed management with ridge-to-valley approach, soil-moisture conservation, water harvesting, and community-based planning. Weed classification, effects, competition, control methods, herbicide types, selectivity, resistance, and allelopathy. Agrometeorology: weather variables, monsoon dynamics, weather hazards (drought, flood, frost, hail), greenhouse effect, climate change, and instruments (thermometers, rain gauges, etc.). Soil-plant-water relations, irrigation quality and methods (surface, sprinkler, drip), water use efficiency, scheduling, and fertilizer efficiency. Contingency crop planning for aberrant weather. Conservation agriculture: minimal tillage, mulching, cover cropping, dryland farming, soil and water conservation techniques. Drought, its types, and drought mitigation strategies. Applications of nanotechnology such as nano-fertilizers, nano-pesticides, and nano-sensors, and the use of geospatial tools (GIS, GPS, remote sensing) for precision farming and real-time crop monitoring. Organic farming: concept, definition, production technologies of major crops, and certification processes. Natural farming: concept, definition, and its core pillars—Beejamrit, Jeevamrit, Acchadana, and Waaphasa with emphasis on its ecological approach, traditional compatibility, and zero-budget nature. Differences between Conventional, Organic and Natural farming, low-external-input, climate-resilient farming systems in the context of Arunachal Pradesh.

2. Horticulture:

Definition, scope, importance, and classification of horticultural plants. Fundamental principles of plant propagation with emphasis on the importance of rootstocks. Production technologies for major fruit crops including orchard layout, systems of planting, and crop establishment. Management of orchard soil, irrigation, and drainage systems, along with cultural practices involved in various horticultural operations. Planning and management of nurseries and orchards. Importance and scope of fruits with reference to classification, uses, varieties, soil and climate requirements, cultural practices, and production challenges. Important fruit crops of Arunachal Pradesh such as citrus, pineapple, banana, kiwi, walnut, and pear; potential crops including apple, persimmon, dragon fruit, and plum; and underutilized fruits with scope for mainstreaming including Garcinia species, rambutan, bael, aonla, ber, jamun, fig, tamarind, passion fruit, carambola, and jackfruit. Classification and production of vegetables with emphasis on regionally important crops like cabbage, cauliflower, tomato, brinjal, and chilli, alongside potential crops such as broccoli and sweet

P. Bhuyan

pepper. Underutilized vegetables including yam, colocasia, asparagus pea, winged bean, stinging nettle, and wild leafy greens. Major spice crops like ginger, turmeric, and large cardamom, along with underutilized spices such as wild turmeric, zedoary, black turmeric, large cardamom, and local landraces of ginger and chili. Tuber crops covering origin, distribution, and cultivation of tapioca, sweet potato, and colocasia. Elementary principles of processing and preservation of horticultural produce. Scope of landscaping and floriculture in Arunachal Pradesh, including principles of landscaping, landscape uses of trees, shrubs, and climbers. Importance and scope of ornamental crops, medicinal and aromatic plants (MAPs), and processing and value addition in ornamental crops and MAPs. Post-harvest handling and processing of fruits and vegetables, causes and extent of post-harvest losses, harvesting techniques, field handling, storage principles, and methods of preservation.

3. **Plant Physiology:**

Absorption of Water, Water Movement in Plants, Solute Absorption – Factors and Mechanisms, Transpiration and Evapo-transpiration – Factors and Regulation, Mineral Nutrition – Essential Elements and Deficiency Symptoms, Enzymes and Enzymatic Activity in Plant Processes, Photosynthesis – Carbon Assimilation and Light/Dark Reactions, Respiration and Photorespiration, Nitrogen Metabolism – Nitrate Reduction and Ammonia Assimilation, Fat Metabolism, Plant Growth Hormones – Types and Functions, Role of Growth Regulators in Agriculture and Horticulture, Photoperiodism – Concept and Agricultural Importance, Vernalization – Mechanism and Role in Crop Production.

4. **Genetics and Plant Breeding:**

Genetics, principles of inheritance, Chromosomal theory of inheritance, Cell component, concept of cytoplasmic inheritance, Concepts of sex determination, mutation, methods of induction, and applications in crop improvement, evolution, elementary concept of genes, gene action, structure and function of DNA and RNA, molecular basis of transcription and translation. Principle of inheritance, interaction of gene and modification of F_2 ratio, linkage and crossing over. Planting breeding and modern science, classification of crops according to breeding behavior. Application of breeding methods. Application of principle of plant breeding to the improvement of major crops like rice, wheat, maize, vegetable, pulses, oil seeds. modes of reproduction, apomixis, self-incompatibility, and male sterility. Methods for improvement of self-, cross-, and asexually propagated crops including mass and pure line selection, hybridization, population improvement methods, and hybrid seed development, and pre-breeding support development of climate-resilient and high-yielding varieties. Application of biotechnology through marker-assisted selection, varietal identification, and GM crop detection, plant genetic resources, breeding objectives, and legal aspects like plant breeder and farmer rights, Maintenance of genetic purity during seed production, Seed certification, phases and procedure for seed certification, field inspection. Seed Act and Seed Act enforcement. Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test and organic seed production.

5. **Soil Science:**

Soil Profile, Composition of soil, classification and soils of India, Soil physical and chemical properties: soil-texture, structure, density and porosity, soil colour, and plasticity. Soil air,

composition, Soil temperature and its effect on plant growth. Soil colloids-minerals and organic minerals, their natures and properties. Concept of soil pH. Development/reclamation of Acid/Alkalic soils. Organic matter-humus, its formation, nature and properties, CN ratio in soil and its significance. Important biological process in soil, ammonization, ammonification, nitrification, denitrification and nitrogen fixation. Concept of soil productivity and fertility, essential elements for plants, their forms, availability and functions Critical levels of different nutrients in soil and Plants. Methods of fertilizer recommendations to crops, Deficiency symptoms of nutrients in plants. Fixation and release of nutrients in soil, Factor influencing nutrient use efficiency (NUE), Methods of application under rainfed and irrigated conditions. Nitrogen fixation, symbiotic and non-symbiotic nitrogen fixation. Biofertilizers and their use. organic manures - importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Land capability classification, soil survey definition, purpose and types. Chemical fertilizers, nano Fertilizers, Reclamation and management of Acidic, Saline and sodic soils, Soil pollution - behaviour of pesticides and inorganic contaminants, prevention and mitigation

PAPER– II

1. Plant Pathology:

Concept of diseases in plants, importance of plant diseases. Classification of plant diseases, various parasitic and non-parasitic causes of plant diseases. Diagnosis of plant disease, stage of disease, development i.e. inoculation, penetration, infection, invasion, growth and reproduction, effect of environment including adaphic factors in plant disease. Principles of disease management. Concept of integrated control measures. Symptoms, etiology, disease cycle and management of common diseases of major field crops, vegetables, fruit crops, major pulses, oil seeds, commercial crops like sugarcane, potato, chilies etc. Methods of detection and diagnosis of diseases. Calculation and dynamics of economic injury level and importance of Economic threshold level.

Importance of microbiology, classification of micro-organism, different types of bacteria, brief classification of bacteria structure and classification of moulds and viruses. Antibiotics and antibodies. Microbiology of soil, water, air and food.

2. Entomology & Nematology:

Categories of pests. Concept of IPM, Practices, scope and limitations of IPM. Different methods of pest control with special reference to Bio Intensive Pest Management, Identification of biocontrol agents, different predators and natural enemies. Mass multiplication of *Trichoderma, Pseudomonas*, *Trichogramma*, NPV etc. Classification of insecticides, toxicity of insecticides and formulations of insecticides. classification of pesticides and their physical, chemical and biological properties. Types of formulations, Insecticide and their precautionary measures. Chemical control importance, hazards and limitations. Different types of plant protection equipment, their maintenance and their use in. Recent methods of pest control, repellents, hormones, attractants, gamma radiation. Insecticides Act 1968- Important provisions. Symptoms of poisoning, first aid and antidotes. Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Factors affecting losses of stored grain and role of physical, biological,

mechanical and chemical factors in deterioration of grain, Stored grain pest and their control, rodent and their control measures. Importance of beneficial Insects, Identification of major parasitoids and predators commonly being used in biological control. Productive insects with special reference to sericulture, apiculture and lac-culture. Insect orders bearing predators and parasitoids used in pest control and their mass multiplication techniques. Important species of pollinator, weed killers and scavengers with their importance. Nematodes – Their pathogenicity, relationship with other micro-organisms. Different types of harmful and useful insects. Identification, nature and extent of damage caused by insect, life history, seasonal occurrence, management practices of major pests of field crops, fruits and vegetables.

3. **Extension Education:**

Concept, Philosophy and Principles of Extension Education, Objectives and Functions of Extension, Rural Development Programmes in India, Teaching-Learning Process in Extension, Extension Teaching Methods – Individual, Group and Mass Contact Methods, Communication – Elements, Models and Barriers, Adoption and Diffusion of Innovations, Attributes of Innovations, Rural Sociology – Social Stratification, Culture, Social Values, Social Change, Leadership, Social Institutions, Psychology and Behavioural Change, Motivation and Learning, Programme Planning and Evaluation, Monitoring and Feedback Mechanisms, Extension Reforms, Role of ICT in Agricultural Extension, Use of Mobile-based Services, e-Extension, Digital Platforms, Role of FPOs and SHGs in Rural Development, Participatory Rural Appraisal (PRA), Capacity Building and Skill Development, Public-Private Partnership in Extension, Linkages and Coordination among Extension Agencies, Gender Issues in Agriculture and Extension, Extension Approaches and Models, Entrepreneurship Development and Market-led Extension, Climate Smart Extension and Role in Sustainable Agriculture. various extension/ agriculture development programmes launched by ICAR/ Govt. of India, Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs, Government policy and programs and institutions for entrepreneurship development, Financing of enterprise, Opportunities for Agri entrepreneurship and rural enterprise.

4. **Agri. Economics and Farm Management:**

Basic concepts of economics including wants, goods, wealth, welfare, value, price, and consumption; definition and scope of agricultural economics and its importance. Law of demand and supply, elasticity of demand and supply, and consumer behavior. Production function and laws of returns, cost concepts and cost curves, and farm income measures. Farm planning and budgeting, farm records and accounting, types and systems of farming, landholding and land tenure systems. Agricultural marketing: concept, types of markets, characteristics, marketing functions and market augmentation; concepts of producer surplus and consumer surplus, marketing efficiency—its definition and methods of measurement; price spread, marketing channels, market structure, and price determination. Agricultural price policy, minimum support price (MSP), and market intervention schemes. Risk and uncertainty in agriculture, crop insurance schemes, and their importance. Agricultural finance: sources, classification, and principles of agricultural credit; credit appraisal methods and repayment planning. Role of NABARD, commercial banks, cooperatives, and microfinance institutions in agricultural development. Impact of WTO on Indian agriculture,

agricultural subsidies, and the functioning of the Public Distribution System (PDS). Concepts of resource use efficiency, farm business analysis, and principles of farm management. Applications of tools like linear programming, input-output analysis, and cost-benefit analysis in decision-making. Natural resource economics, sustainable agriculture, and environmental economics. Agribusiness management including entrepreneurship, contract farming, and agro-based enterprises. Role of ICT in agricultural economics, Farmer Producer Organizations (FPOs) and their linkages to market, value chain, and supply chain management. Overview of agri export-import policy and its implications for rural and national economic growth.

5. **Agri. Engineering:**

Scope of Farm Mechanization – Benefits and Limitations, Sources of Farm Power – Human, Animal, Mechanical and Renewable, Internal Combustion Engines – Basics and Applications, Types and Components of Tractors, Tractor Maintenance and Operation, Primary and Secondary Tillage Implements, Intercultural Tools and Equipment, Sowing and Planting Equipment, Harvesting and Threshing Machinery, Soil-Plant-Water Relationship, Irrigation Methods – Surface, Sprinkler, and Drip, Irrigation Scheduling and Efficiency, Drainage Engineering – Types and Design, Land Surveying – Chain Survey, Levelling, Compass and Theodolite Survey, Soil and Water Conservation – Contour Bunding, Terracing, Check Dams, Vegetative Barriers, Erosion Control Structures, Watershed Management Concepts, Field Structures – Farm Roads, Fencing, Drying Yards, Godowns and Silos, Post-Harvest Technology – Threshing, Drying, Cleaning, Grading, and Packaging, Grain Storage – Structures and Principles, Renewable Energy – Solar, Wind, Biogas and Agricultural Applications, Protected Cultivation – Greenhouses, Shade Nets, Precision Agriculture Tools, ICT in Agricultural Mechanization, Farm Safety and Ergonomics.

Annexure-C

SYLLABUS FOR DIARY DEVELOPMENT OFFICER

B.Tech (DIARY TECHNOLOGY) PAPER-I

1. Dairy Technology

1. Market Milk
2. Fat Rich Dairy Products
3. Traditional Indian Dairy Products
4. Condensed & Dried Milks
5. Cheese Technology
6. Ice-cream & Frozen Deserts
7. Packaging of Dairy Products
8. By products Technology
9. Sensory Evaluation of Dairy Products
10. Food Technology
11. Dairy Plant Management
12. Waste Disposal & Pollution Abatement
13. Fermented Milk Products
14. Prospect and Retrospect of the Indian Diary Industry

2. Dairy Engineering

1. Engineering Drawing
2. Workshop Practice
3. Fluid Mechanics
4. Heat & Mass Transfer
5. Thermodynamics
6. Basic Electrical Engineering
7. Boilers and Steam Generation
8. Refrigeration & Air-conditioning
9. Dairy Engineering
10. Dairy process Engineering
11. Instrumentation & Process control
12. Material strength & Dairy Machine Design
13. Food Engineering
14. Energy conservation and management
15. Dairy Plant Design and Layout

B.Tech (DIARY TECHNOLOGY) PAPER-II

1. Dairy Chemistry

1. Physico-chemical properties of milk
2. Chemistry of milk lipids
3. Chemistry of milk proteins
4. Enzymes in dairy industry
5. Role of milk in Human nutrition
6. Chemical Quality Assurance
7. Food Chemistry

2. Diary Microbiology

1. Microbiological deterioration of milk and milk products
2. Probiotics used in dairy industry
3. Microbiology of Dairy Products
4. Starter cultures and fermented milk products
5. Quality and safety monitoring in Dairy Industry
6. Food and Industrial Microbiology

3. Dairy Business Management

1. Milk Production Management and Dairy Development
2. Communication Skills
3. Environmental Studies
4. Economic Analysis
5. Computer and Application software Packages
6. Fundamentals of Dairy Extension
7. ICT in Dairy Industry and Operation Research
8. Marketing Management & International Trade
9. Financial management and cost Accounting
10. Entrepreneurship Development
11. Industrial Statistics

Annexure-D

SYLLABUS FOR VETERINARY OFFICER

PAPER-I

(1) General Animal Husbandry Practices:

(i) Role of Veterinarian in livestock management
(ii) Food security.
(iii) Livestock Population Census in the nation and state.
(iv) National and State Government Policies and Programmes on Animal Husbandry.
(v) Legislation for control of animal diseases.
(vi) Contribution of the Livestock Sector to the National and State Economy. Export and import of livestock and livestock products.
(vii) Conditions and considerations for Establishing Livestock Farms
(viii) Livestock entrepreneurship

(2) Animal Physiology:

(i) Physiology of blood - Blood constituents, Blood Cell Formation, Haemoglobin synthesis, Plasma Proteins Production, Coagulation of Blood, Haemorrhagic Disorders, Anti-coagulants, Blood Groups, Blood Volume, Plasma Expanders, Buffer Systems in Blood.
(ii) Circulation - Physiology of heart, cardiac cycle, heart sounds, heartbeat, electrocardiograms, metabolism of cardiac muscle, nervous and chemical regulation of heart, effect of temperature and stress on heart, blood pressure and hypertension, osmotic regulation, arterial pulse, vasomotor regulation of circulation, shock, Coronary and Pulmonary circulation, Blood-Brain barrier Cerebrospinal fluid-circulation in birds.
(iii) Respiration - Mechanism of respiration, Transport and exchange of gases, neural control of respiration, Chemo-receptors, hypoxia, respiration in birds.
(iv) Excretion - Structure and function of kidney, formation of urine, methods of studying renal function, renal regulation of acid-base balance, physiological constituents of urine, renal failure, passive venous congestion, Urinary secretion in chicken, Sweat glands and their function. Bio-chemical test for urinary dysfunction.
(v) Endocrine glands - Functional disorders, their symptoms and diagnosis. Synthesis of hormones, mechanism and control of secretion, hormonal receptors, classification and function. Endocrine glands in health and disease.
(vi) Biochemical tests and their significance in disease diagnosis.
(vii) Animal Reproduction-Detection of estrus and time of insemination for better conception. Anoestrus and repeat breeding.
(viii) Embryology- Embryology of vertebrates with special reference to Aves and domestic mammals, gametogenesis, fertilization, foetal membranes and

placentation (types of placenta in domestic mammals), Teratology, Twins and twinning-organogenesis, Germ layer derivatives-endodermal, mesodermal and ectodermal.

(3) Veterinary Anatomy:

(i) **Histology and Histological Techniques**: Paraffin embedding technique of tissue processing and H.E. staining, Freezing microtomy, Microscopy Bright field microscope and electron microscope. Cytology- structure of cell organelles and inclusions, Cell division & Cell types, Tissues and their classification, embryonic and adult tissues, Comparative histology of organs-Vascular, Nervous, digestive, respiratory, Musculo-skeletal and urogenital systems, Endocrine glands, Integuments, sense organs.

(ii) **Bovine Anatomy**: Regional Anatomy, Paranasal sinuses of Ox, surface anatomy of salivary glands. Regional anatomy of infra-orbital, maxillary, mandi-bulo alveolar, mental and cornual nerve block. Regional anatomy of paravertebral nerves, pudental nerve median, ulnar and radial nerves tibial, tibular and digital nerves, Cranial nerves structures involved in epidural anaesthesia, superficial lymph nodes, surface anatomy of visceral organs of thoracic, abdominal and pelvic cavities, comparative features of locomotor apparatus and their application in the biomechanics of mammalian body.

(iii) **Anatomy of Fowl**: Musculo-skeletal system, functional anatomy in relation to respiration and flying, digestion and egg production.

(4) Livestock Production Management:

(i) Common terms used in Animal Husbandry, Identification, Dentition, Casting, restraining.

(ii) Indices to assess the reproductive efficiency of Dairy animals.

(iii) Laws and practices governing Dairy sector in India.

(iv) Climatology and livestock production - effect of photo period on livestock productivity, Livestock and global warming.

(v) Economic importance of Integrated Farming System (IFS).

(5) Animal Nutrition:

(i) Nutritional terms and definitions.

(ii) Classification of feeds and fodders.

(iii) Storage and conservation of feeds and fodders.

(iv) Utilization of unconventional feeds, Industrial and animal by-products.

(v) Wildlife nutrition.

(vi) Use of feed additives.

(vii) Feed milling technology.

(viii) Laws and regulations of the feed manufacturing industry, Codex Alimentarius Commission (CAC), Hazard Analysis and Critical Control Points (HACCP).

(ix) Therapeutic diets for pet animals.
(x) Feeding of animals during disaster.
(xi) Hydroponic fodder.

(6) Animal Genetics & Breeding:

(i) Important breeds of cattle, buffalo, sheep, goat, pig and poultry with special reference to economic characters.
(ii) Principles of Genetics and Cytogenetics.
(iii) Molecular techniques and their applications in Animal Breeding, including DNA chips and selection of High Genetic Merit breeding stock.
(iv) Current livestock and poultry breeding policies and programmes of the Government.
(v) Wild animal breeding in captivity.
(vi) Conservation of Animal Genetic Resources.

(7) Milk Technology:

(i) Prospects of Milk Industry in India.
(ii) Composition, nutritive value & Physio-chemical properties of milk.
(iii) Layout of milk processing plant and its management.
(iv) Good Manufacturing Practices (GMP) and implementation of Hazard Analysis and Critical Control Point (HACCP) in milk plant, Food safety standards for milk and milk products.
(v) Sampling of milk, Platform tests, Estimation of fat, solid not fat (SNF) and total solids, Cream separation, Detection of adulteration of milk.
(vi) Food Safety and Standards Authority of India (FSSAI).
(vii) Milk Parlour Systems.

(8) Meat Science & Technology:

(i) Layout and management of rural, urban, and modern abattoirs.
(ii) HACCP concepts in abattoir management.
(iii) Animal Welfare and Pre-Slaughter Care of Meat Animals.
(iv) Significance of Meat Inspection in Wholesome Meat Production.
(v) Procedures of ante mortem and post-mortem examination of meat animals.
(vi) Slaughtering and dressing of meat animals and birds.
(vii) Importance of evaluating meat animals and grading their carcasses.
(viii) Utilization of abattoir byproducts, rendering and treatment of condemned meat and carcasses.
(ix) Management of effluent treatment from the abattoir.
(x) The prospect of the meat industry in India.
(xi) Structure and composition of muscle.
(xii) Nutritive value of meat.
(xiii) Fraudulent substitution of meat.

(xiv) Preservation of meat and poultry; drying, salting, curing, smoking, chilling, freezing, canning, irradiation, and chemicals.
(xv) Modern Processing Technologies for Meat and Meat Products.
(xvi) Concept of value addition - Importance of value addition in the meat industry.
(xvii) Physicochemical and microbiological quality of meat and its products.
(xviii) FSSAI Codex Alimentarius Commission rules and regulations on meat.
(xix) Duties and role of Veterinarians in slaughterhouse.
(xx) Byproducts from the slaughterhouse and their economic utilisation.
(xxi) Methods of collection, preservation, and processing of the hormonal glands for medicinal use.

PAPER-II

(1) Veterinary Microbiology:

(i) General Microbiology, Bacterial Growth, Bacterial Nutrition, Metabolism, Bacterial Genetics, Determinants and pathogenicity markers, Bacteriophages, Antimicrobial agents - resistance and susceptibility. Morphological structure of the virus, classification of the virus, Replication of DNA & RNA viruses, Viral Interactions, pathogenesis, Oncogenic virus. Immune response to viral infections. Systematic Veterinary Bacteriology and Virology: Bacterial and Viral diseases of veterinary importance.
(ii) Prions, emerging & trans-boundary diseases.
(iii) Veterinary immunology - Poultry & livestock immune system, types of immunity, Organs and cells of the Immune system, Antigens and their characteristics, Immunoglobulins, Major Histocompatability Complex (MHC), Hypersensitivity, Antigen-antibody Interaction, Immunological diseases.
(iv) New Diagnostic Techniques- ELISA, PCR, Genome sequencing.
(v) Veterinary Vaccine, Quality control, recent advances in Vaccine Delivery, Adjuvants & Vaccine failure.
(vi) Veterinary Mycology, morphology, cultural characters, virulence factors, Antigenic components, pathogenesis, Diagnosis and control of fungal infection, Systematic study & animal mycoses.

(2) Veterinary Pathology and Parasitology:

(i) Pathology of disturbances in circulation and growth.
(ii) Inflammation & its classification.
(iii) Various cell types and their functions.
(iv) Pathology of autoimmune diseases.
(v) General characteristics and classification of neoplasms.
(vi) Post- mortem techniques, Collection, preservation, and dispatch of morbid materials for diagnosis.

(vii) Diseases affecting the Digestive System, Respiratory System, Musculoskeletal System, Cardio- vascular System, Hematopoietic System, Lymphoid System, Urinary System, Reproductive System, Nervous System, Endocrine System, Skin and Appendages, Ear and Eye.

(viii) Pathogenesis, gross and microscopic pathology of various bacterial, viral, fungal, and parasitic diseases of animals and poultry.

(ix) Pathological changes in nutritional and metabolic diseases.

(x) Pathogenesis, gross and microscopic pathology of heavy metal toxicities.

(xi) Classification of parasites, Types of Parasitism, Commensalism, Symbiosis, and Predatorism.

(xii) Types of hosts.

(xiii) Immunity against parasitic infections.

(xiv) Standardized nomenclature of animal parasitic diseases.

(xv) General description of helminth parasites, Classification, life cycle in relation to transmission, pathogenesis, epidemiology, diagnosis, and control of various helminthes of animals and birds.

(xvi) General description, classification, lifecycle, transmission, pathogenesis, and control of various insects and Arachnida affecting domestic animals and birds.

(xvii) Classification, life cycle in relation to transmission, pathogenesis, diagnosis and control of protozoal diseases of animals and poultry.

(xviii) Important Parasitic and Zoonotic Diseases.

(3) Veterinary Pharmacology and Toxicology:

(i) Drug action, Pharmacokinetics (absorption, distribution, biotransformation, and excretion) and Pharmaco dynamics (structure and function of receptors, dose response curve).

(ii) Anesthetics (local and general), sedatives, analgesics.

(iii) Antibiotics and Chemotherapy (general principles including resistance, antibacterials, anthelmintics, antiprotozoal).

(iv) Ethno -Veterinary medicine.

(v) Pharmacy - Preparation of ointments, liniments, and injectables.

(vi) Dispensing of pharmaceutical preparations.

(vii) Toxicology (General principles of treatment of poisoning, antidotes, toxicity of pesticides, herbs, venoms, and toxins).

(viii) Herbal drugs in Veterinary Practice.

(ix) Dose calculations, prescription writing & drug approval process.

(4) Veterinary Clinical Medicine:

(i) General, Special and systemic clinical examinations of livestock & poultry.

(ii) Clinical Diagnostic Techniques.

(iii) Diseases of digestive system, cardiovascular, respiratory, urinary, nervous,

musculoskeletal, hemopoietic, mammary gland, skin, and sense organs - Etiology, clinical signs, pathogenesis, diagnosis, treatment, prevention and control.

(iv) Routes of administration of drugs / medicines / vaccines to Livestock & Poultry.

(v) Prevention and control of metabolic diseases and deficiency diseases.

(vi) Diseases of toxicants.

(vii) Fluid therapy including blood transfusion, emergency and critical care medicine.

(viii) Interpretation of laboratory results.

(5) Veterinary Public Health:

(i) **Zoonoses**: Classification, definition, role of animals and birds in prevalence and transmission of zoonotic diseases- occupational zoonotic diseases.

(ii) **Epidemiology**: - Principle, definition of epidemiological terms, application of epidemiological measures in the study of diseases and disease control. Epidemiological features of air, water and food borne infections.

(iii) Veterinary Jurisprudence – Duties of Veterinarian, Common offences against animals and Laws governing import and export of animals, Certification of products, Drugs and Cosmetic Act 1940, Manufacturing Practices of Veterinary Biological, Basic knowledge on Institutional Bio safety Committee (IBSC), Committee for the control and supervision of experimentation on animals (CCSEA) and Animal Welfare Board (AWB).

(iv) Vetero-legal cases, Certifications, Materials and Methods of collection of samples for Vetero-legal investigation.

(6) Veterinary Surgery & Radiology:

(i) Basic principles of surgery.

(ii) Preparation of the operation theatre, operative sites and instruments for surgery.

(iii) Types of wounds and fractures, their correction in domestic animals.

(iv) Types of suture materials and their use.

(v) Surgical procedures for abscesses, hematoma, cysts, tumors, necroses, and treatment of burns.

(vi) Common anesthetic techniques used in domestic animals.

(vii) Chemical restraint of domestic & Wild animals.

(viii) Common surgical problems and their surgical correction in domestic animals (example: debudding, horn cancer, tail gangrene, paraphimosis, dermoid cyst,

hoof trimming, preparation of teaser, ovario-hysterectomy, rumenotomy, atresia-ani, repair of hernia etc.).

(ix) Advances in surgery - intra-medullary pinning, laparoscopic surgery.

(x) Basic radiography technique and use of ultrasonography in livestock.

(xi) Methods of Castration & Spaying technique.

(7) Gynaecology & Obstetrics:

(i) Hormones in animal reproduction and their clinical use.

(ii) Estrus cycle in different animal species and signs of estrus.

(iii) Maternal recognition of pregnancy in different animal species.

(iv) Methods of pregnancy diagnosis in different species.

(v) Estrus synchronization in domestic animals.

(vi) Infertility in male and female domestic animals.

(vii) Parturition in domestic animals, diseases, and accidents of gestation.

(viii) Causes of dystocia in different animal species and their correction.

(ix) Post-partum complications in different animal species.

(x) Procedures of semen collection, processing, and artificial insemination in cattle, buffalo, and other species.

(xi) Animal birth control programs.

(8) Animal Husbandry Extension Education:

(i) Principles and Elements of Extension Management in Animal Husbandry.

(ii) Extension Teaching Methods, Audiovisual Aids, emerging social media use.

(iii) Characteristics of Rural & Urban societies.

(iv) Human Resource Management in the Animal Husbandry sector (Importance of trainings for stakeholders: women, youth, farmers, entrepreneurs).

(v) About RSETI-Rural Self Employment Training Institute, A-HELP - Accredited Agent for Health and Extension of Livestock Production, Pashu Sakhi, MAITRI-Multipurpose Artificial Insemination Technician in Rural India.

(vi) ICT initiatives in the Livestock Sector of State and Central Governmental Schemes

(vii) Livestock entrepreneurship, avenues, and job opportunities.

Annexure-E

SYLLABUS FOR ASSISTANT DIRECTOR (SERICULTURE)

PAPER – I

Sericulture in India: - History of Sericulture, Why sericulture, Types of silkworm and their food plants, status of sericulture in India, life cycle of mulberry and non-mulberry silkworms.

Mulberry cultivation: - Establishment of mulberry garden, soils and climate, preparation of land, mulberry varieties, method of propagation, preparation of nursery, planting systems, types of plantation. Cultivation practices, pruning, manures and fertilizers application, irrigation, weed management, leaf/shoot harvest, yield and quality assessment.

Mulberry diseases: - Integrated pests and their management. (IPM)

Silkworm breeds: - Races and their characteristics. Selection of silkworm breed for rearing, pre-requisites for silkworm rearing. Estimation of leaf yield and rearing capacity.

Disinfection and hygiene: - Selection of disinfectant, method of disinfection, preparation of disinfectant, estimation of disinfectant solution, hygiene maintenance.

Silkworm rearing house: - Models of rearing houses, selection of site, orientation, space requirements, young and late age rearing house, mounting hall.

Silkworm seed production: - Seed organization, basic seed farms, seed cocoon generation, commercial egg production, loose egg preparation, egg preservation, acid treatment, hibernation schedules.

Incubation and silkworm rearing: - Egg transportation, surface sterilization, methods of incubation, incubation devices, loose egg incubation, black boxing, hatching and brushing.

Chawki rearing: - Characteristics of young silkworms, chawki rearing methods, commercial chawki rearing, mulberry garden management for chawki rearing. Transportation of chawki worms. Use of bed disinfectants.

Late age rearing: - Characteristics of late age silkworms, rearing methods, advantages and disadvantage, leaf quality and quantity, space requirement, rearing management in different season, use of bed disinfectants, molting care, identification of spinning larvae, types of montages, advantages and disadvantages, mounting methods, mounting care, mechanization in silkworm rearing.

Harvesting and marketing of cocoons: - Time of harvest, deploring, sorting, cocoon assessment, stifling, transportation and marketing.

Silkworm diseases, pests and their management.

Economics of sericulture: - Different scales of rearing, chawki rearing, cost- benefit ratio.

Sericulture & Rural economic Development in NE Region and in particular in Arunachal Pradesh Areas/ Locations of sericulture development activities in Arunachal Pradesh.

PAPER -II

Sericulture and rural development: - Silk global scenario, world silk production vis-à-vis India production. Area, distribution, cocoon markets, silk exchanges. NGO's in sericulture, woman and sericulture development, establishment of centra silk board, research and extension organization for development of sericulture. Training programmers in sericulture. Self help groups, quality clubs, institute village linkage program me. Problems for sericulture development in India and measures to overcome.

Silk technology: - Importance of silk and its uses, importance of reeling industry for development of sericulture, problems. Assessment of cocoon properties, shell ratio% filament length, filament size, reel ability % estimated renditta, raw silk%, kakame cost, influence of cocoon characters on reeling and raw silk quality, cocoon testing and grading, cocoon stifling, methods of stifling. Usna koti, advantages and disadvantages. Cocoon cooking, mechanism of cooking, cooking methods, cocoon brushing, devices for brushing, reeling, principles involved in direct system of reeling and indirect system of reeling, cottage basins, multi-end reeling machine, re-reeling, lacing, skeining, package and storage, factors influencing price of raw silk, price stabilization.

Raw silk testing, winding test, size test, evenness test, cleanness and neatness test, tenacity and elongation, cohesion test, raw silk grading. International standards, silk throwing, weaving, de-gumming, bleaching, dyeing fabric finishing spun silk.

SILK TECHNOLOGY:

Cocoons: - Sorting of cocoons, cocoons cocoon testing, storage of cocoons, stifling of cocoons, Drying of cocoons- cooking of cocoons. Methods employed- Character of cocoons.

Reeling: - Methods of Silk Reeling- Charkha-cottage, basin, s-Filatures-Semi-automatic and Automatic types.

Raw silk testing: - Packing of raw silk-Utilization of by-products.

Silk Throwing: - Manufacturing of yarns for use in ordinary, chiffon, crepe, georgette fabrics-number of piles and different twist levels used.

Weaving Industry: Warp and Weft preparation – Machineries employed in small scale scale and organized section. Silk weaving -Handloom and power loom Weaving-Special features of silk looms- modification required on power loom weave silk fabrics.

Spun Silk-Industry: - Raw materials for spun silk yarn production, production of spun yarn and their properties.

Processing Industry: - Degumming and drying of silk yarns – Dyeing, Printing and Finishing of Silk fabrics.

Non-Mulberry sericulture: - Cultivation of tasar food plants, cultivation of muga food plants, cultivation of eri food plants, disease and pests of non mulberry host plants and thief management, non-mulberry host plants and their management, non-mulberry silkworm rearing

methods, outdoor tearing for tropical tasar and muga, indoor rearing for temperate tasar and Eri, care furing rearing, mounting, harvesting. Economics of tasar, muga and Eri culture, disease and pests of non-mulberry silkworms.

Sericulture Extension and Management: - Resource system analysis, micro planning for sericulture, socio economic status, importance of sericulture in development plan sericulture in employment generation. Application of management principles in cocoon production and silkworm seed production. Managerial problems, role of cooperatives in sericulture extension in india, peoples participation, participatory rural appraisal, rapid rural appraisal, role and responsibility of different categories of extension warders, local leaders, contact farmers and representatives of local government institutions, special difficulties confronting extension program me methods to over term, integrated rural development project, study of different programmes at national level, IRDP DWACRA, TRYSEM, JRY, Antyoodaya, PMRY, cases of sericulture development in other countries, Japan China, Korea and Brazil.

Cultivation of various type of Silkworm food plants/types of silkworm reared in Arunachal Pradesh. Production of cocoon / yarn in Arunachal Pradesh.

Problems & prospects of Sericulture Development in Arunachal Pradesh.

Annexure-F

SYLLABUS FOR ASSISTANT DIRECTOR (TEXTILE & HANDICRAFTS)

PAPER- I

1. Textile Fibres:

Study of different structures of textile fibres using various techniques – Study of different properties of various textile fibres i.e., moisture relations, mechanical properties, optional properties, electrical properties and thermal properties.

Study of different man – made fibre spinning – Fundamentals of fluid flow in man – made fibre spinning T3 High speed melt spinning – Production of micro denier and special shaped fibres.

Production and Properties of various regenerated fibres- Production of various raw materials for different synthetic fibres-Properties of different synthetic fibres – Effect of various parameters on carious synthetic fibres- Study of semi-continuous and integrated continuous process for production of Nylons.

Study of different high performance fibres.

Study of spin finish-heat setting and drawing of fibres.

Study of different methods of texturizing and various parameters affecting texturizing -Test methods of textured yams.

2. Yarn Manufacture:

Ring Spinning: Principle and method of working of ring spinning process – Blowroom, carding, combing, drawframe, speedframe, ringframe; post Spinning process, viz. Bundling, baling and reeling.

Doubling: Objects- Dry doubling and wet doubling- fancy yarns – Hosiery and shiny threads- properties and end uses.

Open end spinning: Principles of Break- spinning-comparison of ring and OE yarn developments in OE spinning-different types rotors and opening rollers.

Modern yarn production methods: Twist least spinning- self twist spinning- wrap spinning -friction spinning and air-jet spinning, comparison of the above methods for their principles and yarn properties, end used and techno-economics feasibility- siro and cover spinning methods.

3. Fabric Manufacture:

Unconventional Weaving Machine: Study of Gripper- Rapier- Air Jet, Water Jet machine.

Non ovens: Classification web productions techniques- Properties of Binders- Geometry of non-woven structure Identification and testing of non-woven study of thermal, spun bonding and spun lacing.

Knitting: Weft basic stitches-Jersey-Rib-Purl-Inter Look-Warp Basic Stitches-Atlas-Tricot-Study of circular weft knitting machines-advantages of positive feed- study of warp knitting machines- Tricot and Raschel.

4. **Chemical Processing of Textile:**

Dyeing:

Coloration –Theories of coloration / dyeing –factor affect Dyeing –Mechanism of dyeing

Mechanism used for dyeing –classification of dyes dyeing of nature fivers using direct, reactive, acid, complete Vat, sulphur, Ingrain dyes and other popular dyes using-different methods- After treatment and testing dyed materials –Yarn package dyeing –Dyeing of knitted fabrics –dyeing of garments.

Printing: Design development for printing –sources of inspection - the design tools and work space- Different techniques for design generation reproduction-Transfer of designs on wooden block screen and Scope of printing –Batik printing, resist printing, Tie and dyed. Methods and principles – Machineries used for Textile printing- Passage of Material through machines.

Finishing: Object of finishing –various methods of finishing –cotton, silk, warp worsted fabric – chemical formulation of different finished – Machines used for finishing – specialty chemicals used for finished finishing of Garments.

PAPER- II

1. **Fabric Structure:**

Extra wrap and extra weft cloths –double cloth Terry weaves- valued velveteen - Gauge and Leno-Damask –Brocade cloths.

2. **Fashion Design and Garment Technology:**

Terms and Definitions used in Fashion and Garment Industries –that art and Techniques of Body measurements and standard sizes (8 – head theory & 10 – head theory) and measurements prevalent in Garment Industries.

Principles and practices of pattern making – Gracing –Computer Aided pattern making and grading-cutting room operation –Laying –Cutting Numbering – Bundling –Sewing operation, –Classes of seams and stitch, sewing threads, defects is sewing & seam.

Garment finishing section- Buttoning, Labelling, tagging, Checking, pressing, Folding, packing and packing standard, fusing.

Quality control in garment Industry – Garments washing- dyeing and finishing Brand culture and apparel.

Apparel: brand names. Sourcing and Merchandising -Apparel Engineering and Production Control.

3. **Embroidery Technology:**

Planning of colour scheme. Design making, transferring of design, different types of stitches for embroidery, tampur, work, feather stitches, applique designing, picture making in applique, lion and children panel in applique, details about smocking, drawn thread work, cut work, Metal thread embroidery. Beading crewel work,quality work machine embroidery, tools of embroidery, canvas work, Half cross stitches, tent stitch, stem stitch, mosawd stitch, cheveron stitch.

4. **Handloom & Handicrafts for rural economic development in Arunachal Pradesh.**

Prospects and problems of Handloom & Handloom & Handicrafts development in Arunachal Pradesh including NER.

Study of different Handloom design/weaving pattern of people of Arunachal Pradesh.

Study of different local handicraft items of Arunachal Pradesh.

NHDP components: - Policy and implementation.

Annexure-G

SYLLABUS FOR FISHERY OFFICER

1. BFSc. Paper-I:

(a) Aquaculture

1. Principles of Aquaculture
2. Fresh water Aquaculture
3. Fin fish breeding & Hatchery management
4. Pond and fish farm construction
5. Shell fish breeding & Hatchery management
6. Fish genetics & Biotechnology
7. Coastal Aquaculture
8. Fish nutrition and feed technology
9. Integrated Aquaculture
10. Upland cold-water fisheries
11. Fish disease diagnosis and management
12. Ornamental fisheries

(b) Fisheries Resource Management

1. Taxonomy of Finfishes
2. Fundamentals of microbiology
3. Biology of Fin and Shell Fishes
4. Taxonomy of shell fishes
5. Inland capture Fisheries
6. Food chemistry and nutrition
7. Anatomy of Fin and Shell fishes
8. Fish biochemistry
9. Physiology of Fin and Shell fishes
10. Marine capture fisheries
11. Population dynamics and stock assessment
12. Fishery microbiology and quality control

(c) Aquatic Environment Management

1. Water and soil chemistry
2. Meteorology, Climatology and Geography
3. Limnology
4. Fishery oceanography
5. Marine Biology
6. Aquatic pollution
7. Aquatic Ecology, biodiversity and disaster management
8. Management of biological productivity in pond water

2. BFSc. Paper-II

(a) Fish Processing Technology

1. Fish in Nutrition
2. Freezing technology
3. Fishing craft and gear technology
4. Fish products and value addition
5. Microbiology of fish and fishery products
6. Fish canning technology
7. Fish by-products and waste utilization
8. Packaging technology
9. Quality assurance of Fish and Fishery products

(b) Fisheries Extension, Economics and Statistics

1. Statistical methods
2. Fisheries economics
3. Fisheries Policy and law
4. Fisheries Business Management and Entrepreneurship development
5. Project formulation, implementation and evaluation
6. Fisheries Cooperative and marketing management
7. Fisheries extention education
8. Information and Communication technology
9. Communication skills and personality development