

TAMILNADU VETERINARY AND ANIMAL SCIENCES UNIVERSITY

USO.No.40062/E2/2019
(F.No.10317/E2/2019)

Office of the Registrar,
TANUVAS,
MMC, Chennai – 600 051.

Dated. 13.08.2019

PROCEEDINGS

Sub.: Education - TANUVAS - Board of Management – Ninety Second Meeting held on 21.06.2019 – Starting of M.Tech (Poultry Technology) degree programme at CPPM, Hosur **(FFS:11:2)** - approved – Orders – Issued.

Ref.: USO.No.60053/R1/BOM-92/2019 (No.7126/R.I/BOM-92-3-2/2019), dated.18.07.2019 of the Registrar, MMC, TANUVAS, Chennai-51.

The Board of Management in its Ninety Second Meeting held on 21.06.2019 considered the recommendation of the 67th Academic Council in its Meeting held on 22.05.2019 **(AC Agenda.67:8 (FFS:11:2))** and approved for starting of M.Tech (Poultry Technology) degree programme with allotment of **Six seats** at College of Poultry Production and Management, Hosur from the Academic Year 2019-20 onwards with the Academic Regulations and Syllabus mentioned in the Annexure.

The Chairman Admission Committee (PG), and Controller of Examinations, TANUVAS, Chennai is requested to take necessary action on the above matter.

P. P. Senthil
13/8/19
REGISTRAR.
36/46

To

The Chairman Admission Committee (PG), and Controller of Examinations, TANUVAS, Chennai-600 051.

The Dean, Faculty of Food Sciences, College of Poultry Production and Management, Hosur

Copy to:

The Section "C1" in Registrar Office, TANUVAS

The Section "E4" in Registrar Office, TANUVAS for take necessary action

The System programmer in Registrar Office, TANUVAS for take necessary action

The Section "R" in Registrar Office, TANUVAS

ANNEXURE

DETAILED SYLLABUS AND CURRICULUM FOR M.TECH POULTRY TECHNOLOGY

1. CURRICULUM: M.TECH. POULTRY TECHNOLOGY

1.1 General Features:

1. Qualification for Admission:

Four years **B.Tech. (Poultry Technology / Poultry Production Technology)** degree programme from a recognised University.

2. Number of seats : SIX

3. Distribution of Credits: (based on V Deans' Committee Recommendations)

A	Major	:	20 credits
B	Minor	:	9 credits
C	Supporting	:	5 credits
D	Seminar	:	1 credit
E	Research	:	20 credits

Total Credit load: 55 (35 Course work + 20 Research)

M.TECH POULTRY TECHNOLOGY

1.2 Course Structure

A. Major Courses		Total Credits 20
PPT 501	RECENT ADVANCES IN HOUSING AND MANAGEMENT OF CHICKEN	3+1
PPT 502	ADVANCES IN POULTRY FEEDING AND NUTRITION	2+1
PPT 503	ADVANCES IN FOOD PROCESSING ENGINEERING	2+1
PPT 504	POULTRY FARM EQUIPMENT DESIGN AND AUTOMATION	1+1
PPT 505	ADVANCES IN POULTRY PROCESSING TECHNOLOGY	2+1
PPT 506	ADVANCES IN QUALITY, SAFETY AND QUALITY ASSURANCE IN POULTRY PRODUCTS	1+1
PPT 507	POULTRY BUSINESSS MANAGEMENT AND INTERNATIONAL TRADE	2+1
B. Minor Courses*		Total Credits 9
PPT 511	ADVANCES IN POULTRY GENETICS AND BREEDING	2+1
PPT 512	RECENT DEVELOPMENTS IN DIVERSIFIED POULTRY PRODUCTION	2+1
PPT 513	REFRIGERATION ENGINEERING	2+1
PPT 514	CONCEPTS IN OPTIMIZATION RESEARCH TECHNIQUES	3+0
PPT 515	POULTRY MEAT AND EGG PRODUCTS TECHNOLOGY	2+1
PPT 516	POULRY FARM FINANCIAL MANAGEMENT AND ANALYSIS	2+1
C. Supporting Courses **		Total Credits 5
PPT 521	STATISTICAL METHODS	1+1
PPT 522	COMPUTER APPLICATIONS IN POULTRY INDUSTRY	1+2
PPT 523	ENVIRONMENT SCIENCE AND DISASTER MANAGEMENT	2+1
D. Compulsory Non-credit Courses***		
PGS 501	LIBRARY AND INFORMATION SERVICES	0+1
PGS 502	TECHNICAL WRITING AND COMMUNICATIONS SKILLS	0+1
PGS 503	INTELLECTUAL PROPERTY RIGHTS AND ITS MANAGEMENT	1+0
E. Seminar		Total Credits 1
PPT 540	MASTER'S SEMINAR	1+0
F. Research		Total Credits 20
PPT 550	MASTER'S RESEARCH	0+20

* Students should register 9 credits under minor courses from among the six courses listed in the minor courses based on their area of interest on research

** Student should register supporting courses for 5 credits

*** Non credit courses are compulsory and will not be considered in total credit calculation or OGPA calculation

M.TECH. POULTRY TECHNOLOGY

1.3 Course Contents:

A. MAJOR COURSES

PPT 501 RECENT ADVANCES IN HOUSING AND MANAGEMENT OF CHICKEN (3+1)

Theory

Selection of site and location of poultry farm - Poultry housing systems - Role of macro and micro environment on productive performance - Environmentally controlled houses and methods of ventilation - Requirements of floor space, watering and feeding space

Layer industry in India and the World - Systems and management of layer farming - Layer farm equipments - Lighting programme for egg type birds - Medication and vaccination schedules - Egg production and maintenance - Factors influencing egg production - Monitoring egg production and maintaining egg quality - Selection and culling of unproductive birds - Record keeping - Summer and winter management - moulting - SPF egg production - Designer egg production - Integration in layer production - Layer farm biosecurity and waste management

Broiler Industry in India and the World - Broiler farm equipment - Brooding and rearing of broilers - All in all out and multiple batch systems - Lighting for broilers - Feeding systems - Performance indices of broilers - Marketing of broilers - Organic broiler meat production - Broiler farm biosecurity and waste management

Planning a hatchery and breeder farm - Breeder farm and hatchery equipments - Breeder male and female management - Breeder feeding systems - Embryo development - Incubation principles and practices - Artificial incubation - Hatchery Management - Factors affecting fertility and hatchability - Breeder Farm biosecurity - Waste disposal and management

Scope of native chicken rearing - Management of Native, Cross bred, improved chicken under rural production systems - Nutritive requirement and feeding - Medication and vaccination schedules and procedure - Egg and meat production and marketing - Factors improve the production and marketing

Poultry welfare regulations and issues - Zoning and Compartmentalization - bio security - fly control in chicken production

Practical

Design and layout plans for layer, broiler, breeder farms and hatchery unit - Measurement and analysis of micro environment in a poultry house - Blue print of deep litter and cage system - Poultry farm cages and equipments - Construction co-efficient - Comparative cost analysis of various housing systems - Selection and culling of layers - Record keeping - Calculating performance indices and other economic traits in layer, broiler and breeder farms - Debeaking, dubbing, deworming, delicing, vaccination and other farm routines - Farm sanitation, disinfection and waste disposal - Analysis of fertility and hatchability and corrective measures - Chick sexing - Visit to commercial layer, broiler, breeder farm and hatchery unit

PPT 502 ADVANCES IN POULTRY FEEDING AND NUTRITION (2+1)

Theory

Digestive system in poultry – Factors influencing the feed consumption in poultry – Macro and micro-nutrients – Calorie: Protein ratio – Nutrient interrelationships – Factors influencing the nutrient requirements - Nutrient requirements for various species of poultry.

Feed ingredients composition, feed storage technique – Feed milling and quality control - Processing of feed – Types and forms of feeds and feeding methods - Commonly occurring anti nutrients and toxicants in poultry feed ingredients – Mycotoxins and their prevention – Feeding chicks, growers, layers, broilers and breeders – Principles of computing feed – Balanced feeds -Least cost feed formulation and programming – Feeding in different seasons and stress conditions - Nutritional and metabolic disorders in poultry.

Systems of feeding – Use of Additives and Non additives- enzymes, probiotics, prebiotics, antibiotics, herbs, performance enhancers – Utilization of non-conventional feedstuff - Feeding of chicken, ducks, turkeys, Japanese quails, Guinea fowls. Organic, functional, designer and SPF feed production - Production of drug residue, pesticide residue and toxin free feeds – Feeding for functional, designer egg and meat production - regulations for Import and Export of feed and feed supplements.

Practical

Physical and sensory evaluation of feed ingredients- Sampling techniques for ingredients and compounded feed- Estimation of proximate principles of feed and feed ingredients – Computing various poultry feed formulae based on commonly available feed ingredients – Adulterants in feeds and feed stuffs - Estimation of Aflatoxin, Calcium, Available phosphorus, Sand, Silica and Salt – Mash, pellet and crumble feed preparation – Calculation of Feed Efficiency - Visit to feed mills – Preparation of Project report for a feed mill plant

PPT 503 ADVANCES IN FOOD PROCESSING ENGINEERING (2+1)

Theory

Mass transfer, molecular diffusion and diffusivity, equilibrium stage process, convective mass transfer co-efficient, mass transfer with laminar and turbulent flow. Design equations for convective mass transfer, simultaneous momentum, Separation by equilibrium stages, immiscible phases, distillation of binary mixtures and multi-component separations.

Engineering properties of foods, their significance in equipment design, processing and handling of food and food products, steady state and unsteady state heat transfer, Numerical, graphical and analogue methods in the analysis of heat transfer, Solution of unsteady state equations, solar radiation, Energy Audit.

Thermodynamic properties of moist air, kinetics of water absorption, mechanics of movement of air through stationary bed, thin layer and thick layer bed drying, simulation models for drying systems, use of weather data for drying operations, design of dryers, New direction infreeze bed drying, cyclic pressure freeze drying. Microwave drying and vacuum drying, efficient drying systems, infrared heating, freezing of foods, freeze concentration and drying, freezing point curves, phase diagrams, methods of freeze

concentration, design problems Aerodynamic and hydrodynamic characteristics, drag coefficient, terminal velocity and Reynold's number, application of aerodynamic properties to the separation, pneumatic handling and conveying of food products, material and energy balance.

Microwave and radio frequency processing: Definition, Advantages, mechanism of heat generation, application in food processing: microwave blanching, sterilization and finish drying. Hurdle technology: Types of preservation techniques and their principles, concept of hurdle technology and its application in liquid egg processing- High Pressure processing: Concept, equipments for HPP treatment, mechanism of microbial inactivation and its application in food processing. Ultrasonic processing: Properties of ultrasonic, application of ultrasonic as processing techniques. Application of above technology with respect to egg and poultry meat processing – Toxicants during food processing

Newer techniques in food processing: Application of technologies of high intensity light, pulse electric field, ohmic heating, IR heating, inductive heating and pulsed X-rays in food processing and preservation. Nanotechnology: Principles and applications in egg and poultry foods.

Practical

Determination of engineering properties of poultry products, measurement of heat transfer using selected heat exchangers in model study, evaluation of mass transfer and estimation of mass transfer coefficient of selected products in dehydrators, separation of immiscible phase using appropriate centrifuge, fractional distillation of multi component mixtures, air classification and determination of particle size index of powdered products, study of pneumatic conveyers using fluidized solids, determination of drying rate and curves under various drying conditions, determination of freezing curves for selected fresh poultry meat , Feed mill operation , Design of feed mill equipment with respect to poultry.

PPT 504 POULTRY FARM EQUIPMENT DESIGN AND AUTOMATION (1+1)

Theory

Basic Scientific and Engineering principles of equipment design and process control - Properties of substances - Chemical equation and stoichiometry - Engineering properties of materials and their significance in equipment design - Design of Vessels: Codes and regulations - Materials of construction- Corrosion mechanism and control- Design for internal and external pressure

Design and specification for various types of cages used in poultry production – Conventional, Californian, Reverse cages, furnished cages - Design and specifications of different type of feeders and waterers used in poultry production – Conventional – Automatic feeders and drinkers – brooder equipment – Feed storage and milling equipments – Debeaking equipments - various types of incubators – hatchery equipment – various type of vaccinators – scope of automation in commercial layer and broiler production – Chick transportation, welfare and specifications – broiler transportation welfare and specifications – culled bird transportation - egg, meat transportation and specifications- water treatment and sanitation equipment in poultry production - Scope of automation in litter management -Generator

Practical

Design of cylindrical and spherical vessels - Design of shell and tube, double pipe, scarp surface and spiral tube heat exchangers - Design of jacketed vessels - Design of various types of cages, crates, feeders, waterers, vaccinators - management of water treatment equipment - Specifications for chick, adult, egg, meat transportations - welfare measures specifications - Nest boxes - perches - Field study on chick, egg and meat transportation.

PPT 505 ADVANCES IN POULTRY PROCESSING TECHNOLOGY (2+1)

Theory

Status of poultry processing in India - Poultry processing plant - Layout, construction, design, operation and maintenance of poultry processing plants - Humane and ritual slaughters - Slaughter and dressing of different kinds of poultry - Factors affecting poultry meat quality - Chilling and freezing of poultry carcasses - Judging, grading and standardization of dressed poultry - Packaging of poultry carcasses

Poultry Meat Inspection - Ante mortem and Post mortem inspections and Judgment - Mechanical separation of poultry meat - Cleaning and sanitation of poultry processing plant - Sanitary standards for poultry processing plants

Structure, chemical and biochemical composition of muscle - Nutritive value of meat from different kinds of poultry - Comparative carcass and meat characteristics - Evaluation of various types of avian species meat - Design of vehicles for transport of live birds and poultry meat - Automated and Semi-automated poultry processing - Equipment involved in primary processing and fabrication of poultry - Mobile poultry processing unit - Utilization of poultry processing plant by products - Disposal of condemned materials - Layout and design of poultry carcass utilization plants - Rendering - Treatment and Disposal of effluents from poultry processing plant - Regulations pertaining to poultry carcasses and meat.

Practical

Preparation of layout for small, medium and large poultry processing plants - Slaughter and dressing of poultry - Calculation of the dressing percentage, carcass yields and by product yields - Grading of poultry carcasses - Different types of packaging materials, their qualities, advantages and disadvantages - Harvesting, Collection and Handling of primary poultry by products - Production of secondary by-products - Poultry carcass rendering - Production of poultry carcass meal and their quality assessment - Measurement of effluent characteristics

PPT 506 ADVANCES IN QUALITY, SAFETY AND QUALITY ASSURANCE IN POULTRY PRODUCTS (1+1)

Theory

Quality characteristics of poultry meat and eggs - Physical, chemical, microbiological and organoleptic characteristics of poultry meat and eggs - Shelf life assessment - Sensory evaluation of poultry products - Subjective and objective evaluation

Types of microorganisms associated with poultry carcasses and shell eggs - Contamination and spoilage of poultry meat and eggs - Microbiological safety in poultry

meat and egg -Standard methods for isolation, identification and enumeration of indicator and pathogenic organisms in poultry products - Microbiological standards for different poultry products - Chemical residues in poultry meat and eggs - Risk assessment in Poultry Industry. Sanitary and phyto-sanitary measures for poultry and egg processing industries

Rules and regulations for setting up of a poultry and egg processing unit - Pre requisite Programmes and best practices for poultry and egg processing industry- Establishment and implementation of HACCP - Continuous Assessment System - Food laws and regulations – PFA, 1954 - Export (quality control and Inspection) act, 1964, Food Safety and Standards Act 2006. - BIS standards –code of practices, guidelines and standards specified in Codex Alimentarius with respect to poultry meat, egg and their products, Role of WTO, ISO, WHO and FAO, FSSAI and APEDA with emphasis to poultry meat, egg and their products–Quality and/ safety management systems -Total Quality Management and quality audits - Global Food Safety Initiative (GFSI), International Food Standard (IFS), British Retail Consortium (BRC), Safe Quality Food (SQF) 2000 and ISO 22000:2005, FSSC/FS 22000, PAC secure, Global GAP Poultry standard – Meat Speciation, Residues MRL for Veterinary drugs/pesticides, Integrated fly control

Practical

Physical and chemical methods to assess the quality of poultry meat and meat products - Subjective and objective sensory evaluation of poultry products - Shelf life assessment of poultry products - Identification of chemical spoilage of poultry meat and egg products - Microbiological tests for assessment of equipment and personal hygiene - Isolation, Identification and Enumeration of indicator and pathogenic organisms in poultry products - Detection of chemical residues by using rapid techniques - Application of HACCP principles in poultry meat processing, meat products preparation and egg processing – MOCK Auditing - Risk assessment in poultry industry

PPT 507 POULTRY BUSINESS MANAGEMENT AND INTERNATIONAL TRADE

(2+1)

Theory

Poultry Business in India - Status and scope and prospects. Changing dimensions in Poultry business in India - Types of poultry business. Characteristics of poultry products: Marketable surplus – Definition, Factors affecting and causes of low marketable surplus in India. Problems in measuring marketable surplus. Buffer stock Procurement and working of public distribution system. Various sectors in poultry production system - functioning and role of NABARD, APEDA etc in poultry production - Role of NECC and BCC in pricing and marketing.

Marketing systems of egg, meat, live birds, culled birds, value added poultry products etc – Strategies and scope - Problems in processing and suggestion for improving efficiency delivery system and channels in marketing. Role of different sectors in poultry marketing - IT application in poultry marketing and trading.

Export / Imports status and scope in poultry sector - Supply chain management – definition, strategic advantages and need. International trade – meaning, scope – international trade vs. domestic trade – motivation to export, difficulties in international trade – globalization pros and cons. Market selection and entry decision – competitive intelligence – international trade policies, tariffs, subsidies and quotas. International

economic environment: IMF, GATT, WTO – Exim Bank – Export Finance – ECGC – Exim policies. Procedure for execution of export order – export of goods by air and sea – export documents.

Practical

Determination of absolute and comparative advantage. Calculation of production cost of egg, broiler etc - Study of table egg marketing channel, live and processed broiler marketing channels, culled birds marketing channel, value added egg and meat product channels- Visit to poultry egg and meat export unit – Impact study of GST in poultry production and marketing- Estimation of production coefficients. Measurement of effects of tariff imposition. Effects of tariff and non-tariff barriers on domestic supply and imports. Preparation of BOP accounts – Survey and analysis of egg marketing, broiler marketing, culled bird marketing, value added chicken marketing et.

B. MINOR COURSES

PPT 511 ADVANCES IN POULTRY GENETICS AND BREEDING (2+1)

Theory

Genetic classification of Poultry – Origin and breed characteristics of poultry - Qualitative and Quantitative traits in Poultry - Sex linked, Sex limited and Sex influenced traits – Auto sexing - Heritability – Quantitative inheritance -- Phenotype, Genotype and environment interactions. Systems of Breeding - Inbreeding and hybridization - Systems of Mating – Breeding programme for developing egg-type and broiler type hybrids - Modern methods in commercial layer and broiler breeding – Pure line breeding – Formation of synthetic lines - Selection methods for single and multiple traits – Indirect selection – Reciprocal recurrent selection – Recurrent selection - Selection limit – Osborne's index – Construction of selection index for multiple traits. Use of molecular genetics in poultry breeding - Quantitative trait loci and marker-assisted selection - Methods of production and applications of transgenic chicken - Conservation of poultry genetic resources- Artificial insemination in poultry - .

Practical

Breeds of poultry - Breeding program for developing commercial hybrid layers, broilers, Japanese quail, duck and turkey - Inheritance of qualitative traits and selection in fancy birds. Pedigree hatching – Chick sexing - Analysis of breeding data collected from breeding records – Individual, within family, family and combined (Osborne's index) selection methods - Development of cross bred for rural poultry production – Improvement of native chicken - Semen collection, evaluation and artificial insemination in chicken and turkey - Use of computers to maintain breeding records and for selection.

PPT 512 RECENT DEVELOPMENTS IN DIVERSIFIED POULTRY PRODUCTION (2+1)

Theory

Breeds and varieties of Turkey, Duck, Goose, Pigeon, Guinea fowl, Budgerigar, Japanese quail – Characteristics of Emu and Ostrich – Incubation periods & incubation procedure for different species – Housing, cage & equipments for different species – Duck,

Turkey, Japanese Quail, Guinea fowl, Emu, Ostrich production and rearing under different systems. Management and rearing of Turkey, duck, goose, Guinea fowl, Japanese quail, pigeon, emu and ostrich- Feeding standards and feeding, watering and rearing systems and procedure for different species of poultry- Breeding policies of egg and meat production in different species – Preparation of Project reports for different species for commercial exploitation. Common diseases affecting poultry other than chicken and their control – Regulations for import and export of different species of poultry – prevention of exotic diseases through import of poultry products and live birds.

Practical

Layout and design of housing & cages for other species of poultry. Visit to commercial Japanese quail, turkey and duck farms. Incubation and care of hatching eggs and young ones – Rearing practices followed by duck, quails and turkey farmers under field conditions. Preparing project reports for different species and calculating the cost of production.

PPT 513 REFRIGERATION ENGINEERING (2+1)

Theory

Refrigeration Types - Vapour compression refrigeration system- Vapour compression cycle, Theoretical COP - Effect of operating parameters on COP - Multi-pressure commercial refrigeration systems - Vapour absorption refrigeration system - Ammonia -Water system, Vapour absorption refrigeration cycle and its representation on Enthalpy composition diagram; Absorption system calculations. Heat Pumps: different 'heat pump circuits'; analysis of heat pump cycle; Use of heat pumps in dairy plant for energy conservation.

Non-conventional refrigeration systems: Thermo electric refrigeration, vortex tube, cooling by adiabatic demagnetization. Design elements of Refrigeration equipments: compressor condenser, evaporator, cooling tower, spray pond etc. Balancing of different components. Design of cold storage and air-conditioning systems: types of cooling loads and their calculation, design of cold storage for food products, construction of cold storage, equipment selection, insulating materials, vapour barriers, Ice bank tank. Control and maintenance of a commercial refrigeration plant: Pressure regulating valves, Thermostatic valves, LP/ HP cutouts, high to low side bypass valve, condenser water regulating valve, capacity control devices, pump down control, defrosting methods, liquid charging; General preventive maintenance of refrigeration plant.

Practical

Comparison of theoretical and actual COP of a small refrigeration unit on Refrigeration Tutor. Study and design of refrigeration components of a meat storage plant. Visit to a commercial refrigeration plant for cold storage/ ice bank unit and calculation of its theoretical COP by making cycle on P-h chart. Calculation of theoretical work and comparing it with actual work for some specified cooling job in a commercial plant. Study of various control and safety devices in a commercial refrigeration plant. Design problems on cold storage for different food/ dairy products. Use of Computer software specific to cold store AC design. Study the working of an actual heat pump system.

PPT 514 CONCEPTS IN OPERATIONAL RESEARCH TECHNIQUES (3+0)

Theory

The phase of an operation research study – Linear programming – Graphical method– Simplex algorithm – Duality formulation – Sensitivity analysis - Applied Problems related to feed preparation. Transportation Assignment Models – Travelling Salesman problem-Networks models – Shortest route – Minimal spanning tree – Maximum flow models –Project network – CPM and PERT networks – Critical path scheduling – Sequencing models. Application problems related to poultry production and feed mill management

Inventory models – Economic order quantity models – Quantity discount models – Stochastic inventory models – Multi product models – Inventory control models in poultry and feed mill operation practice. Queueing models – Queueing systems and structures – Notation parameter – Single server and multi server models – Poisson input – Exponential service – Constant rate service – Infinite population – Simulation.- Net work construction- Time chart, crashing of project net work-cost trade off- Project scheduling with constrained resources

Decision models – Game theory – Two person zero sum games – Graphical solution-Algebraic solution- Linear Programming solution – Replacement models – Models based on service life – Economic life- Single / Multi variable search technique – Dynamic Programming – Simple Problem.

PPT 515 POULTRY MEAT AND EGG PRODUCTS TECHNOLOGY (2+1)

Theory

Scope for utilization various species of poultry meat in product processing – Preservation of poultry meat – Tenderization of spent poultry meat – Principle of poultry products development – Basic processing procedures for poultry product processing – Functional properties of meat -meat and non-meat ingredients in poultry meat processing - Further processed commercial chicken meat products- Exotic poultry meat products – comminuted and non-comminuted meat products - canned poultry meat products – cured and smoked poultry products – Restructured meat products - Retort processing - Enrobed poultry meat products –Sensory evaluation of poultry meat products – Equipment for poultry meat processing - Economic formulation for poultry meat products – Packaging of processed poultry products - Present status of Indian egg industry - Structure and composition of eggs - Nutritive value of eggs – Physico -chemical properties of eggs - Functional properties of eggs -packaging of shell eggs - Preservation of eggs – Egg Processing plant - Conversion of shell eggs to liquid, frozen dried products and value added egg products - Egg breaking - Liquid egg preservation - Freezing egg products - Frozen egg products - Egg dehydration - Egg pasteurization – Desugarization of egg products - Egg powder -Development of value added egg products - Coagulated egg products - Egg foam products - New egg products - Hard-Cooked eggs - Whole egg value added products – Microbiology of shell eggs and egg products - Packaging of processed egg products - Industrial uses of egg and egg products

Practical

Estimation of pH - Water holding capacity - Fragmentation index - Estimation of texture profile of poultry meat - Proximate composition of poultry meat and meat products - Determination of emulsion stability - Determination of cooking loss - Preparation ready to eat poultry meat products - Preparation of indigenous poultry meat products - Egg quality measurements - Evaluation of functional quality of egg and egg products - Preservation of eggs - Preparation of value added egg products including dehydrated and convenient egg products

PPT 516 POULTRY FARM FINANCIAL MANAGEMENT AND ANALYSIS (2+1)

Theory

Financial management - meaning, objectives, scope and uses - finance functions - financial forecasting - sources of finance - financial information system - leverage and types of leverage - Management of working capital: concepts, need and determinants - operating cycle- Management of cash, inventory management - bank finance - Cost of capital - concepts and significance - computation of cost of equity capital, cost of debt, cost of preference share capital - cost of retained capital, weighted average cost of capital - Insurance - meaning and definition, nature and characteristics of insurance.

Factors influencing the cost of production of various outputs in poultry operation - Labour welfare and management - Formulation viable projects for various types of poultry farming activities - Commercial layer Farm project, Broiler farm project, Layer and Breeder farm project, hatchery unit project, Feed mill project, project for integrated broiler production, Native chicken production etc.

Marketing strategies - Application of quantitative techniques in marketing. Markov chain analysis, decision theory, transportation model, network analysis. Demand and supply of farm products. Cobweb model. Demand- supply models- Estimation of elasticities. Demand supply projections - Marketed surplus model- Raj Krishna, Behrman, Janvry and Kumar. Demand and supply of factor inputs in agriculture. Leontif input - output analysis. Price policy models for inputs and output. Market integration. Storage, buffer stocks and price stabilisation measures and policies. Vertical integration.

Practical

Computation of marketing costs and estimation of marketing margins and price spread. Statistical assessment of market integration. Hedging. Solving marketing problems using transportation, Markov Chains, decision theory, and network models. Estimation of demand and supply elasticity. Different estimate formulas of economic traits - Projecting demand and supply. Estimation of marketed surplus - Evaluation of various Projects in poultry production and marketing

C. SUPPORTING COURSES

PPT 521 STATISTICAL METHODS (1+1)

Theory

Descriptive statistics, Mean, variance, probability, conditional probability, Probability distribution. Density functions, Mean variance. Data and its nature; data representation; diagrams and graphs using MS Excel, Measures of Central tendency; Dispersion, Skewness and Kurtosis; Binomial and Normal Distributions. Confidence Interval of mean; Test of significance; Non-parametric tests; Simple, Partial and Multiple correlations. Estimation, confidence intervals hypothesis testing, Basic principles of Experimental Designs; Analysis of Variance; Elements of Quality Control.

Practical

Exercises as per each of the Units in theory.

PPT 522 COMPUTER APPLICATIONS IN POULTRY INDUSTRY (1+2)

Theory

Importance of Computerization and IT in poultry Industries Computers, operating environments and information systems for poultry industries; Principles of Communication. Role of Computer in Optimization: Introduction to operation Research; A Computer Oriented Algorithmic approach; Queuing systems and waiting models; PERT, CPS and CPM. Poultry Process Modeling and Simulation; CAD and CAM in Food Industry: instrumentation, process Control, inventory Control, Automation, Robotics, Expert system and artificial intelligence. Disease surveillance data analysis, interpretation of laboratory results, Artificial intelligence, Robotics, Internet of things, Block chain application in poultry.

Practical

Applications of MS Excel to solve the problems of poultry technology: Statistical quality control, Sensory evaluation of food, and Chemical kinetic in poultry processing; Use of word processing software for creating reports and presentation; Familiarization with the application of computer in poultry industries - Familiarization with software related to food industry; Ergonomics application in the same; Visit to Industry and case study problems on computer.

PPT 523 ENVIRONMENT SCIENCE AND DISASTER MANAGEMENT (2+1)

Theory

Environmental Science - An introduction. Ecosystem: kinds, structure, characteristics, functioning. Biochemical cycles. Natural resources and its managements. Environmental pollution. Air pollution. Water pollution. Solid waste pollution. Noise pollution. Soil pollution. Radio active pollution. Food processing industry waste and its management. Management of urban waste water. Recycling of organic waste. Recycling of factory effluent. Control of environmental pollution through law. Composting of biological

waste. Sewage, uses of water disposal effluent treatment, microbial examination. Green house gases and global warming. Water and energy management systems.

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, Drought, Cyclone, Earthquakes, Landslides, Avalanches, Volcanic eruptions, Heat and cold Waves, Climatic Change: Global warming, Sea Level rise, Ozone Depletion. Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire. Oil fire, air pollution, water pollution, deforestation, Industrial wastewater pollution, road accidents, rail accidents, air accidents, sea accidents. Disaster Management- Efforts to mitigate natural disasters at national and global levels. International Strategy for Disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, Community-based organizations, and media. Central, State, District and local Administration; Armed forces in Disaster response; Disaster response: Police and other organizations.

Practical

Environment and its analysis. Water quality parameters. Collection of sample for pollution study. Determination of pH/ acidity/alkalinity from sample. Estimation of dissolved oxygen. Estimation of BOD. Estimation of COD. Estimation of nitrates. Estimation of phosphates. Estimation of pollutant elements. Estimation of heavy / toxic elements. Estimation of lead / mercury. Visit to industrial sewage disposal unit.

D. COMPULSORY NON-CREDIT COURSES

PGS 501 LIBRARY AND INFORMATION SERVICES (0+1)

Practical

Introduction to library and its services; Role of libraries in education, research and technology transfer; Classification systems and organization of library; Sources of information- Primary Sources, Secondary Sources and Tertiary Sources; Intricacies of abstracting and indexing services (Science Citation Index, Biological Abstracts, Chemical Abstracts, CABI Abstracts, etc.); Tracing information from reference sources; Literature survey; Citation techniques/Preparation of bibliography; Use of CD-ROM Databases, Online Public Access Catalogue and other computerized library services; Use of Internet including search engines and its resources; e-resources access methods.

PGS 502 TECHNICAL WRITING AND COMMUNICATIONS SKILLS (0+1)

Practical

Various forms of scientific writings- theses, technical papers, reviews, manuals, etc; Various parts of thesis and research communications (title page, authorship contents page, preface, introduction, review of literature, material and methods, experimental results and discussion); Writing of abstracts, summaries, citations etc.; commonly used abbreviations in the theses and research communications; illustrations, photographs and drawings with suitable captions; pagination, numbering of tables and illustrations; Writing of numbers and dates in scientific write-ups; Editing and proof-reading; Writing of a review article.

Grammar (Tenses, parts of speech, clauses, punctuation marks); Error analysis (Common errors); Concord; Collocation; Phonetic symbols and transcription; Accentual

pattern: Weak forms in connected speech: Participation in group discussion: Facing an interview; presentation of scientific papers.

PGS 503 INTELLECTUAL PROPERTY RIGHTS AND ITS MANAGEMENT (1+0)

Theory

Historical perspectives and need for the introduction of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement; Intellectual Property and Intellectual Property Rights (IPR), benefits of securing IPRs; Indian Legislations for the protection of various types of Intellectual Properties; Fundamentals of patents, copyrights, geographical indications, designs and layout, trade secrets and traditional knowledge, trademarks, protection of plant varieties and farmers' rights and biodiversity protection; Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection; National Biodiversity protection initiatives; Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture; Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement.

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