Poultry Science Department

About the Department

Poultry Science Department is one of the outstanding departments of Mumbai Veterinary College which was earlier a constituent college of Konkan Krishi Vidyapeeth, Dapoli, and now is a constituent College of Maharashtra Animal and Fishery Sciences University, Nagpur, is a unique and prominent among the premier departments. This department has been engaged in education, research and extension in poultry science in Maharashtra State. It has been also on the forefront in catering to needs of farmers and the industry in the country for more than last five decades. Hatched in 1975, the department has continued to play a vital role in augmenting development, research and extension activities associated with all round progress of poultry industry in India. Now it has become a trend- setting department in technology through an emphasis on research. A glance at the milestones in the journey of five decades by the department reveals that our graduates are highly sought after by the industry, academic institute, research laboratories and government agencies, at home and abroad. Department of Poultry Science, due to its reputation has always attracted highly talented, motivated and committed students from all over the country and continues to command this enviable position in the state and the country, even after the separate existence of the Department was at stake due to VCI regulations. The Department has striven hard to continue its separate existence and maintain excellence in teaching, research and extension. The culture of authenticity and excellence has been very meticulously nurtured over the years through the co-operative efforts of the staff of department. 102 M. V. Sc. and six Ph. D. thesis have been completed since establishment of the Department of Poultry Science in 1975 and all of them are serving the poultry industry at key positions as well as higher administrative positions in Government. Several research agency schemes have been successfully completed by the department so far.

The Department of Poultry Science was established in the year 1975 by Late Dr. M. V. Kulkarni. Since inception, the postgraduate course leading to the degree of M.V.Sc. in Poultry Science was started and Dr. B. V. Rajmane was the first student who completed the M.V.Sc. degree course in 1977 under the guidance of Dr. Kulkarni. Dr. Rajmane lead the Department till 1995 in the capacity of In-charge and Associate Professor of Poultry Science and further till 1999 as Head, Animal Husbandry, Poultry Science, Extension etc.

The Ph. D. degree program in Poultry Science, partly by research and partly by course work was started in the year 1995. Dr. B. V. Rajmane completed his Ph.D. program by research in 1990 and Dr. A. S. Ranade in 2001. Dr. A. S. Ranade, completed his M. V. Sc. under the guidance of Dr. Rajmane in 1986 and joined as staff member in 1987. He further completed his Ph.D. in 2001. Dr A. S. Ranade lead the Department of Poultry Science as Professor and University Head of Poultry Science from 1999 to May 2023. Dr. D. N. Desai has completed her M. V. Sc. in 2000 and Ph. D. in 2019 under the guidance of Dr. A. S. Ranade and she joined the department in 2002. Dr. D. N. Desai is leading the Department of Poultry Science at Mumbai Veterinary College since May 2023. Dr. M. A. Gole is also working in the department as Professor of Poultry Science.

MSVE 2016 Syllabus of Poultry Science Department

Theory Syllabus

Unit – 6
Title : Poultry Production Management
Total Theory Lectures: 22

S. N.	Topic
1	Indian poultry industry – Brief outline of the different segments – poultry statistics Classification of poultry with respect to production characters, age and standards
2	Production characters of other avian species
3	Description of indigenous fowls and their value in rural farming. Specific strains developed for rural poultry production; their acceptability and importance in rural eco-system
4	Housing –Types of poultry houses – space requirements. Recent advances in housing systems and rearing systems.
5	Scavenging system of management – Low input technology – Backyard and semi-intensive units; their management and economic achievements.
6	Deep litter management – control of litter-borne diseases and recycling of litter.
7	Brooding management – Types of brooders – preparation of shed – Importance of environmental factors
8	Cage management – Different types; Advantages and disadvantages.
9	Management of growers
10	Management of layers.
11	Management of broilers
12	Management of breeders.
13	Stress management, Water management
14	Feeding management–Classification of nutrients
15	Nutrient requirements and feed formulations.
16	Feeding systems–Feed restrictions – phase feeding – Additives and supplements.
17	Breeding systems and methods of mating. Breeding for specific characters and for hybrid chicken production.
18	Selection and culling. Poultry judging. Egg structure – Physical and chemical composition.
19	Common poultry diseases : Bacterial and viral diseases, Coccidiosis
20	Common poultry diseases : Metabolic and Deficiency diseases
21	Bio-security and principles of disease prevention management.
22	Health care for common poultry diseases – vaccination. General principles of poultry medication.

Unit – 7
Title : Diversified Poultry Production And Hatchery Management
Total Theory Lectures: 12

S. N.	Topic
1	Principles of incubation, Hatchery management practices
2	Factors affecting fertility and hatchability
3	Selection and care of hatching eggs and Hatchery hygiene, Candling, sexing, grading, packing and disposal of hatchery waste.
4	Economics of hatchery business – Troubleshooting hatchery failures–Computer

	applications in hatchery management.
5	Poultry waste management, Pollution and environmental issues.
6	Organic and hill farming.
7	Mixed or integrated poultry farming, Vertical & horizontal integration in commercial poultry production – Contract farming.
8	Export import of poultry produce and marketing.
9	Management of Ducks.
10	Management of Japanese quails.
11	Management of Turkeys.
12	Management of Geese and Guniea fowls.

Practical Syllabus

Unit – 5
Title : Poultry Production Management
Total Practicals: 11

S. N.	Topic
1	Common breeds of poultry, different classes
2	Indian chickens and other avian species breeds.
3	Digestive and respiratory system of chicken., Male and female reproductive system– Egg structure, physical and chemical composition, Quality changes in egg during storage.
4	Economic traits of broilers. Economic traits of egg-type chicken and breeders. AI in poultry.
5	Housing and design of a poultry farm, Automization in poultry farms (EC house).
6	Poultry farm equipment and their classification.
7	Brooding arrangement in broiler farms.
8	Poultry feed ingredients and its quality assessment. Poultry feed preparations.
9	Calculation of different economic indices of broiler farm. Calculation of economic indices of layer farm.
10	Fundamentals in poultry Post-mortem examination for sample collection. Collection and dispatch of samples for PM examination.
11	Management during Summer, Winter and Rainy season.

Unit – 6
Title : Incubation And Hatchery Management
Total Practicals: 06

S. N.	Topic
1	Hatchery layout and design.
2	Project report for establishing a broiler farm.
3	Project report for establishing a layer farm.
4	Project report for establishing a breeder farm.
5	Visit to commercial poultry farms or hatchery or feed mill.
6	Visit to farms of other avian species.

Lecture schedule of PG and PhD, Department of Poultry Science

Lectures Schedules for PG

COURSE TITLE: POULTRY BREEDING AND GENETICS (Theory Classes-36)	
Course No.: PSC-601 Credit Hours:2+1=03	
Sr. No.	**Topic to be covered in the lectures**
1.	Genetic classification of Poultry – origin and breed characteristics of poultry
2.	Mendel's laws of inheritance related to poultry: Law of Dominance and Recessive, Law of Segregation (Purity of Gametes), Law of Independent Assortment
3.	Qualitative traits in Poultry breeding
4.	Quantitative traits in Poultry breeding
5.	Gene action/ gene interaction: Additive gene action, Non-additive gene action: Intra allelic interaction (complete dominance, incomplete dominance, co-dominance, and overdominance)
6.	Non-additive gene action: Inter allelic interaction/epistasis (Recessive epistasis, Dominance epistasis, Dominant-recessive epistasis, duplicate recessive epistasis, duplicate dominant epistasis & duplicate gene with interaction)
7.	Lethal genes and mutations in poultry
8.	Sex-linked, Sex limited, and Sex influenced traits
9.	Economic traits: Economics traits of layers, broilers, and breeders
10.	Partitioning of variance- component of variance, Phenotypic variance, Genotypic variance (additive dominance and epistatic), and Environmental variance
11.	Heritability- definition, narrow and broad sense heritability, salient features/ characteristics of heritability, uses of heritability, methods of estimation of heritability
12.	Quantitative inheritance
13.	Phenotype, Genotype, and environment interactions
	Systems of Breeding: Inbreeding- close inbreeding, line inbreeding, strain formation, genetic effect of inbreeding, and uses of inbreeding.
14.	Systems of Breeding: Outbreeding- cross-breeding, outcrossing, top crossing, line crossing, Strain crossing, grading up and species hybridization
15.	Systems of Breeding: Outbreeding- cross-breeding, outcrossing, top crossing, line crossing, Strain crossing, grading up and species hybridization
16.	Systems of Mating: Natural and artificial mating Natural mating- Pen mating, Flock mating, Stud mating Artificial -Artificial insemination
17.	Selection methods: Tandem, independent culling, selection index/ total score
18.	Selection methods: Osborne index, recurrent selection, reciprocal recurrent selection
19.	Selection criteria/ basis: individual selection, selection based on pedigree, selection based on collateral relatives, progeny testing
20.	Response to selection, intensity of selection, and selection differential
21.	Breeding program for developing egg-type, meat-type, and rural poultry strains
22.	Breeding and management of other species of Poultry
23.	Formation and Management of inbred pure lines, grandparent, and parent stock
24.	Formation and Management of inbred pure lines, grandparent, and parent stock
25.	Industrial poultry breeding
26.	Artificial insemination in chicken
27.	Autosexing: Barring and Non-barring, Silver plumage, and Golden plumage, Slow feathering and fast feathering, Sex-linked dwarfism

28.	Random Sample Test
29.	Use of molecular genetics in poultry breeding- markers (Restricted Fragment Length Polymorphism)
30.	Use of molecular genetics in poultry breeding- markers (Restricted Fragment Length Polymorphism)
31.	Use of molecular genetics in poultry breeding- markers (Restricted Fragment Length Polymorphism)
32.	Quantitative Trait Loci (QTL)
33.	Marker-assisted selection (MAS)
34.	Conservation of poultry genetic resources
35.	Random Bred Control Population
36.	Recent advances in layer and broiler breeding

COURSE TITLE: POULTRY BREEDING AND GENETICS (Practical Classes-18)	
Course No.: PSC-601 Credit Hours:2+1=03	
Sr. No.	**Topics to be covered in the practical's**
1.	Breeds of chicken
2.	Breeds of duck, turkey, and quail
3.	Commercial strains of layers and broilers
4.	Estimation of qualitative
5.	Estimation of quantitative traits in poultry
6.	Exercises on individual and family selection
7.	Constructing multi-traits selection index
8.	Constructing Osborne index
9.	Estimating heritability
10.	Breeding program for developing commercial hybrid layers
11.	Breeding program for developing commercial broilers and Japanese quail
12.	Breeding programs for rural poultry
13.	Semen collection, evaluation, Semen dilution, and insemination in chicken and turkey
14.	Breeding records
15.	Use of computers to maintain breeding records and for selection
16.	Estimation of effective population size, rate of inbreeding,
17.	Response to selection and genetic and phenotypic responses
18.	Pedigree hatching

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COURSETITLE: POULTRY NUTRITION AND FEEDING (Theory Classes-36)	
Course No.: PSC-602 Credit Hours:2+1=03	
Sr. No.	**Topic to be covered in the lectures**

1.	Digestive system and digestion of nutrients in poultry
2.	Metabolism and absorption of nutrients in poultry- Carbohydrates and fats
3.	Metabolism and absorption of nutrients in poultry- Proteins
4.	Metabolism and absorption of nutrients in poultry-Vitamins and Minerals
5.	Factors influencing feed consumption in birds
6.	Macro and micronutrients
7.	Proteins and amino acids
8.	Nutrient requirements of various species of poultry
9.	Nutrient requirements of various species of poultry
10.	Factors influencing nutrient requirements
11.	Partitioning of energy, Calorie: protein ratio
12.	Nutrient interrelationships
13.	Feed ingredients composition
14.	Feed storage techniques
15.	Milling and quality control
16.	Processing of feed
17.	Types and forms of feeds, feeding methods
18.	Commonly occurring anti-nutrients and toxicants in poultry feed ingredients
19.	Mycotoxins and their prevention
20.	Feeding chicks, growers, layers, broilers, and breeders
21.	Principles of computing feed, balanced feed
22.	Least cost feed formulations and programming
23.	Feeding in different seasons and stress conditions
24.	Feeding in different seasons and stress conditions
25.	Nutritional and metabolic disorders in poultry
26.	Systems of feeding- restricted, forced, controlled, and phase feeding
27.	Use of additives and non-additives- enzymes, probiotics, probiotics
28.	Use of additives and non-additives- antibiotics, herbs, and other performance enhancers
29.	Feeding of ducks
30.	Feeding of turkeys
31.	Feeding of Japanese quails
32.	Feeding of Guinea fowls
33.	Organic feed production, Functional and designer feed production
34.	SPF feed production
35.	Production of feeds free from drug residue, pesticide residue, and toxins
36.	Regulations for the import and export of feed and feed supplements

COURSE TITLE: POULTRY NUTRITION AND FEEDING (Practical Classes-18)	
Course No.: PSC-602 Credit Hours:2+1=03	
Sr. No.	**Topics to be covered in the practical's**
1.	Physical and sensory evaluation of feed ingredients
2.	Sampling techniques for ingredients and compounded feed
3.	Estimation of moisture
4.	Estimation of crude protein
5.	Estimation of crude fiber
6.	Estimation of ether extract
7.	Estimation of total ash and acid insoluble ash
8.	Estimation of nitrogen-free extract
9.	Computing various feed formulae based on commonly available feed ingredients
10.	Computer applications in feed formulations
11.	Estimation of Aflatoxins
12.	Estimation of calcium and phosphorus
13.	Estimation of phosphorus
14.	Estimation of sand, silica, and salt
15.	Mash, pellet, and crumble feed preparation
16.	Feeding procedures
17.	Visit to feed mill
18.	Hands-on training in feed analytical laboratory

COURSE TITLE- COMMERCIAL BROILER AND LAYER MANAGEMENT (Theory Classes-36)	
Course No.: PSC-603Credit Hours: 2+1=03	
Sr. No.	**Topic to be covered in the lectures**
1.	Development of poultry industry in India & the world history, growth, and present scenario. word ranking, employment generation.
2.	Future prospects & constraints
3.	Location and layout of farms, systems of housing, cages, deep litter, slatted floor, environmentally controlled housing system. Types of roof & roofing materials etc.
4.	Poultry farm equipment for layers and broilers. Automation in poultry houses and its maintenance.
5.	Environmentally controlled housing system and their management
6.	Rearing systems for broilers and layers, all in all out, multiple batch system, deep litter, and cage system and its management
7.	Brooding management, litter management, and litter materials
8.	Lighting program for egg-type birds and their importance. Thermoreceptors and their role
9.	Water quality standards, Water sanitation
10.	Biosecurity and health management – locational, structural, operational biosecurity.
11.	Application of biosecurity measures
12.	Production indices for broilers and layers
13.	Integration in broilers and layer production

14.	Cages and modified cages for egg-type birds
15.	Feeding management in layers
16.	Medication, vaccination schedules, procedures for layers
17.	Brooder management
18.	Grower management
19.	Pre-layer and Cockrel management
20.	Layer Management
21.	Management of layers during peak egg production, maintaining the persistency in egg production. Clutch size, pause.
22.	Strategies to prolong egg production beyond 72 weeks of age
23.	Factors causing uneven growth and low egg production
24.	Monitoring egg productive curve and culling of unproductive birds
25.	Record keeping in layer production
26.	Management of layers during different seasons
27.	Molting. Methods of molting. Advantages and disadvantages
28.	Management of broilers during different seasons
29.	Mash, crumble, and pellet feeding in broilers
30.	Weekly growth rate, feed conversion, and livability in broilers
31.	Separate sex feeding
32.	Feeding broilers for optimum growth rate and feed efficiency
33.	Broiler farm record-keeping
34.	Broiler farm routine medication and vaccination schedule
35.	Transport of broilers and marketing
36.	Regulations and specifications for the production of export-quality broilers

COURSE TITLE- COMMERCIAL BROILER AND LAYER MANAGEMENT (Practical Classes-18)	
Course No.: PSC-603	Credit Hours: 2+1=03
Sr. No.	**Topics to be covered in the practical's**
1.	Layer farm layout- Design of different chick, grower, and layer houses, and their specifications.
2.	Selection and culling of layers.
3.	Debeaking, dubbing, deworming, delicing, vaccination, and other farm routines and operations.
4.	Farm sanitation and disinfection
5.	Waste disposal.
6.	Record keeping
7.	Visit to commercial layer farms including environmentally controlled houses.
8.	Calculating Hen Day egg production, Hen housed egg production and economic traits of poultry.
9.	Calculating the cost of production of eggs and meat and economics.
10.	Location and layout for a broiler farm – Broiler house design.
11.	Visit to commercial broiler farms including environmentally controlled houses.
12.	Broiler brooding management.
13.	Medication and vaccination
14.	Transportation of broilers and layers

15.	Farm routines for poultry.
16.	Calculating the cost of production of broilers.
17.	Feeding of broilers at different ages.
18.	Working out feed efficiency.

COURSE TITLE: BREEDER STOCK AND HATCHERY MANAGEMENT (Theory Classes -36)	
Course No.: PSC-604 Credit Hours: 2+1=03	
Sr. No.	**Topic to be covered in the lectures**
1.	Different types of commercial breeder flocks, Special care of breeder chicks
2.	Special care ofBreeder male and female management
3.	Feeding the breeder flocks: Separate sexfeeding, feed restriction in broiler breeders
4.	Feeding the breeder flocks: Separate sex feeding, feed restriction in broiler breeders
	Management for improving fertility
5.	Management for improving hatchability
6.	Management of parent farms
7.	Management of grandparent farms
8.	Management of pure lines
9.	Artificial Insemination
10.	Care and management of Hatching eggs
11.	Vaccination of layer and broiler parents
12.	Nutrient supplementation – Seasonal management of breeders
13.	Lighting management in breeder farms
14.	Flock testing and culling.
15.	Natural and Artificial incubation
16.	Stages of embryonic development
17.	Incubation principles
18.	Location of hatchery, Layout, and design of hatchery
19.	Hatchery equipment's
20.	Hatchery management - Ventilation and temperature control
21.	Preincubation storage, Fumigation, and sanitation
22.	Hatchery operations, routine and schedule – Egg candling -Packaging and transportation of hatching eggs and chicks
23.	Hatchery troubleshooting
24.	Factors affecting fertility and hatchability
25.	Biosecurity
26.	Hatchery waste disposal
27.	Control of vertically transmissible and hatchery-borne diseases
28.	Special incubator management during hot summer
29.	Hatch analysis.
30.	SPF egg production
31.	Import and export regulations
32.	Maintaining Salmonella free breeding flock
33.	Maintaining Mycoplasma free breeding flock
34.	Application of HACCP and Good Management Practices (GMP) in hatchery

	management for better chick quality
35.	Application of HACCP and Good Management Practices (GMP) in hatchery management for better chick quality
36.	Application of HACCP and Good Management Practices (GMP) in hatchery management for better chick quality

COURSE TITLE: BREEDER STOCK AND HATCHERY MANAGEMENT (Practical Classes-18)	
Course No.: PSC-604 Credit Hours: 2+1=03	
Sr.No.	**Topics to be covered in the practical's**
1.	Layout and blueprints for breeder farm
2.	Layout and blueprints for hatchery
3.	Incubator management
4.	Candling
5.	Hatchery sanitation, fumigation procedures, and hatchery hygiene
6.	Pedigree hatching
7.	Hatchery waste disposal and recycling
8.	Calculating the cost of production of hatching eggs and day-old-chicks
9.	Management of bangers
10.	Attending breeder farm routines and operation
11.	Flock testing and culling of reactors
12.	Analyzing hatchability results
13.	Use of computers in hatchery operations
14.	Economics of setting up of layer and broiler hatchery
15.	Economics of setting up of broiler hatchery
16.	Vaccinating day-old chicks
17.	Concept of *in-ovo* vaccination
18.	Visit to commercial breeder farm and hatchery

COURSE TITLE: POULTRY HEALTH AND BIOSECURITY (Theory Classes: 36)	
Course No.: PSC-605Credit Hours: 2+1=03	
Sr. No.	**Topic to be covered in the lectures**
1.	*Salmonella*
2.	*Pasteurella*
3.	*E. coli*
4.	Fowl Typhoid
5.	Mycoplasma
6.	Infectious *Coryza*
7.	*Gallibacterium, Clostridium*
8.	Newcastle Disease
9.	Infectious Bronchitis
10.	Infectious Laryngotracheitis

11.	Marek's Disease
12.	Fowl Pox
13.	Infectious Bursal Disease
14.	Egg Drop Syndrome-76
15.	Avian Encephalomyelitis
16.	Avian Influenza
17.	Duck Viral Hepatitis
18.	Chicken Infectious Anaemia
19.	Aspergillosis
20.	Mycotoxicosis
21.	Fatty liver hemorrhagic syndrome(FLHS)
22.	Gout
23.	Ascites
24.	Leg weakness
25.	Coccidiosis
26.	Ecto and endoparasitic infestation of poultry
27.	Ecto and endoparasitic infestation of poultry
28.	Ecto and endoparasitic infestation of poultry
29.	Diagnosis of various poultry diseases
30.	Diagnosis of various poultry diseases
31.	Vaccination
32.	Control, prevention, and treatment of various poultry diseases
33.	Control, Prevention, and Treatment of various poultry diseases
34.	Principles of biosecurity Locational, structural, and operational biosecurity in Poultry farms
35.	Water sanitation and control of water-borne diseases
36.	Quarantine of poultry, Farm sanitation, and disinfection procedures

COURSE TITLE: POULTRY HEALTH AND BIOSECURITY (Practical Classes: 18)	
Course No.: PSC-605 Credit Hours: 2+1=03	
Sr. No.	**Topics to be covered in the practical's**
1.	Ante-mortem examination of birds
2.	Post-mortem examination of birds
3.	Sample collection
4.	Dispatch of samples
5.	Processing of samples
6.	Detection of pathogens/ viral agents
7.	Detection of pathogens/ bacteriological,
8.	Detection of mycological agents
9.	Detection of parasitological agents
10.	Different sanitizers and their uses.
11.	Different disinfectants and their uses.
12.	Care and contraindications of using different products.
13.	Personal hygiene and isolation

14.	Different vaccines
15.	Routes of administration of vaccines
16.	Methods of medication
17.	Water quality analysis
18.	Field visit to poultry diagnostic lab

COURSE TITLE: MANAGEMENT OF OTHER AVIAN SPECIES (Theory Classes -54)	
Course No.: PSC-606 Credit Hours: 3+1=04	
Sr. No.	**Topics to be covered in the lectures**
1.	Importance of Turkey, Duck, Goose, Guinea fowl, Japanese quail, Emu and Ostrich
2.	Breeds and varieties of Duc and Goose
3.	Breeds and varieties of Guinea fowland Japanese quail
4.	Breeds and varieties of Emu and Ostrich
5.	Incubation periods and incubation procedure for different poultry species
6.	Fumigation and sanitation of Hatchery
7.	Bio-security and its importance in the rearing of other poultry birds
8.	Factors affecting fertility and hatchability
9.	Production standards - for other poultry birds
10.	Different Systems of rearing for other poultry birds
11.	Equipment for other poultry birds under different rearing systems
12.	Rearing systems of Turkey
13.	Rearing systems of Duck, Goose,
14.	Rearing systems of Guinea fowl,
15.	Rearing systems of Guinea fowl, and Japanese quail
16.	Rearing systems of Emu and Ostrich
17.	Management and rearing of Turkey,
18.	Management and rearing of duck and gees
19.	Management and rearing of Guinea fowl
20.	Management and rearing of Japanese quail
21.	Management and rearing of emu
22.	Management and rearing of ostrich
23.	Feeding standards of turkeys and their feeding and watering management
24.	Feeding standards of duck and geese and their feeding and watering management
25.	Feeding standards of Guinea fowl and their feeding and watering management
26.	Feeding standards of Japanese quail and their feeding and watering management
27.	Feeding standards of Emu and their feeding and watering management
28.	Feeding standards of ostrich and their feeding and watering management
29.	Breeding programs for egg production in different species.
30.	Breeding programs meat production in different species.
31.	Commercial rearing of turkey, J. quail, Guinea Fowl, and geese
32.	Importance and perspective of pet bird rearing in India
31.	Management and rearing of Pigeon
32.	Management and rearing budgerigar
33.	Management and rearing of parakeets

34.	Management and rearing of love birds
35.	Management and rearing macaws
36.	Management and rearing doves
37.	Management and rearing of parrots
38.	Housing for pet birds, their habitat, feeding, and breeding under captivity.
39.	Common diseases affecting pet birds and their control –
40.	Breeding of exotic birds in captivity and rearing their young ones
41.	Conservation of rare species
42.	Utilities of these birds and products processing
43.	Marketing of various species of birds
44.	Regulations for the import and export of different species of poultry
45.	Common bacterial diseases affecting other avian species and their control
46.	Common viral diseases affecting other avian species and their control
47.	Common parasitic diseases affecting other avian species and their control
48.	Regulations for the import and export of different species of poultry
49.	Exotic diseases of alternate poultry birds
50.	Preventive measures for exotic diseases through the import of live birds.
51.	Project report for farm set up for different species
52.	Concept and definition and present status of organic poultry farming in India
53.	Challenges in adapting the organic poultry farming
54.	Certification, guidelines, and Government policies for organic poultry production

COURSE TITLE: MANAGEMENT OF OTHER AVIAN SPECIES (Practical Classes -18)	
Course No.: PSC-606 Credit Hours: 3+1=04	
Sr. No.	**Topics to be covered in the practical's**
1.	Layout and design of housing and cages for other avian species
2.	Management and rearing of J. quails
3.	Management and rearing of Turkeys
4.	Management and rearing of Ducks
5.	Management and rearing of Geese
6.	Management and rearing of Budgerigar
7.	Management and rearing of Guinea fowl
8.	Management and rearing of Pigeon
9.	Management and rearing of Emus
10.	Management and rearing of Ostrich
11.	Designing of Aviary
12.	Equipment required for different types of bird
13.	Incubation of hatching eggs and young ones of different species of birds
14.	Sexing of pet birds
15.	Preparation of project reports different species of birds
16.	Work out of the cost of production of eggs and chicks
17.	Visit to commercial Japanese quail and Turkey farms
18.	Visit to commercial duck farms and rearing practices followed under field conditions

COURSE TITLE: POULTRY PRODUCTS TECHNOLOGY (Theory Classes –36)	
Course No: PSC-607 Credit Hours: 2+1=03	
Sr. No.	**Topic to be covered in the lectures**
1.	Physical and chemical composition of egg
2.	Nutritive value of egg
3.	Effect of different cooking methods on the nutritive value of egg
4.	Physical and chemical composition of poultry meat
5.	Nutritive value of poultry meat
6.	Effect of Different Cooking Methods on the nutritive value of poultry meat
7.	Grading of eggs by different standards
8.	Grading of poultry meat by different standards
9.	Egg quality deterioration
10.	Factor affecting egg quality
11.	Handling, packaging, and transport of whole eggs
12.	Packaging materials for eggs
13.	Marketing of eggs
14.	Factors affecting meat yield
15.	Handling, packaging, and marketing of poultry meat
16.	Quality control of poultry meat
17.	Preservation of egg
18.	Preservation of poultry meat
19.	Functional and value-added egg products
20.	Functional and value-added poultry meat products
21.	Functional and value-added poultry meat products
22.	Further processing of eggs
23.	Further processing of poultry meat
24.	Various egg and poultry meat fast foods
25.	Sanitary and phytosanitary measures to ensure food safety
26.	Pre- and post-oviposition value addition to eggs
27.	Post-processing value addition to poultry meat for export
28.	Microbial safety of poultry products
29.	Import and export of poultry products
30.	Further processing of poultry for export
31.	Implementation of GMP and HACCP procedures for food safety
32.	Codex regulations for poultry products safety
33.	Traceability and branding of poultry products
34.	FSSAI regulations for egg and their products
35.	FSSAI regulations for poultry meat and its products
36.	Myths about egg and poultry meat products

COURSE TITLE: POULTRY PRODUCTS TECHNOLOGY (Practical Classes:18)	
Course No.: PSC-607 Credit Hours: 2+1=03	
Sr. No.	**Topics to be covered**

1.	Measuring external egg quality
2.	Measuring internal egg quality
3.	Measurement of poultry meat quality
4.	Preservation of table eggs
5.	Grading of eggs
6.	Processing of chicken (Dressing)
7.	Grading of poultry meat
8.	Further processing of poultry meat
9.	Preservation of poultry meat
10.	Preparation of various egg products
11.	Preparation of various poultry meat products
12.	Preparation of egg fast foods
13.	Preparation of poultry meat fast foods
14.	Preservation, packaging, and transport of egg
15.	Preservation, packaging, and transport of poultry meat products
16.	Quality control of value-added poultry products
17.	Measures of microbial safety of poultry products for export
18.	Visit to a poultry processing plant

COURSE TITLE: POULTRY ECONOMICS, PROJECT FORMULATION AND MARKETING (Theory Classes – 36)	
Course No.: PSC-608 Credit Hours: 2+1=03	
Sr. No.	**Topic to be covered in the lectures**
1.	Glossary of terms used in poultry economics and projects
2.	Measures of performance efficiency in the broiler, layer, and breeder
3.	Measures of performance efficiency in the layer
4.	Measures of performance efficiency in the breeder
5.	Measures of performance efficiency in other poultry species
6.	Measures of performance efficiency in hatcheries and other poultry-related operations
7.	Production standards and goals for layers and broiler
8.	Production standards and goals for broiler
9.	Production standards and goals for breeders
10.	Future trends in broiler production
11.	Future trends in egg production
12.	Marketing channels
13.	Present trends in consumption
14.	Various poultry enterprises., planning poultry enterprise
15.	Minimum viable units
16.	Bank norms for poultry projects
17.	Poultry Insurance
18.	Methods to improve production efficiency
19.	Methods to reduce the production cost
20.	Components of project reports
21.	Technical aspects of the project report

22.	Financial aspects of the project report
23.	Preparing projects and return on investment
24.	Contract broiler farming
25.	Role of NECC in egg marketing
26.	Role of BroMark and other marketing agencies
27.	Market managerial skills and Human resource development
28.	Integration in Poultry production
29.	Marketing and Marketing channels for eggs and meat
30.	Calculating the cost of production of egg
31.	Calculating the cost of production of broiler
32.	Calculating the cost of production of day-old chick
33.	Calculating the cost of production of feed
34.	New regulations on cage rearing of layers.
35.	Traceability and branding of poultry products.
36.	Export norms for poultry products

COURSE TITLE: POULTRY ECONOMICS, PROJECT FORMULATION AND MARKETING (Practical Classes-18)	
Course No.: PSC-608 Credit Hours: 2+1=03	
Sr. No.	**Title of Practical**
1.	Preparation of Balance sheet, break-even points,
2.	Calculating Cost: Benefit Ratio
3.	Farm economic indices
4.	Calculating the cost of production of egg
5.	Calculating the cost of production of broiler
6.	Calculating the cost of production of day-old chick
7.	Calculating the cost of production of feed
8.	Technical aspects of the project report
9.	Financial Aspects of Project report
10.	Techno-economic parameters of commercial broilers
11.	Techno-economic parameters of commercial layers
12.	Techno-economic parameters of breeders
13.	Project report for broilers
14.	Project report for layers
15.	Project report for quails
16.	Contract broiler farming
17.	Bank norms for poultry projects
18.	Preparation of feasibility and viability reports

COURSE TITLE: PHYSIOLOGY OF POULTRY PRODUCTION (Theory Classes-18)	
Course No.: PSC-609 Credit Hours:1+1=02	
Sr.No.	**Topic to be covered in the lectures**
1.	Study of the skeletal system of poultry
2.	Comb pattern and plumage

3.	Study of physiology of poultry digestive system- Digestion, metabolism, and absorption of feed and water
4.	Role of enzymes
5.	Study of the circulatory system
6.	Study of the respiratory system
7.	Physiology of growth
8.	Study of poultry Nervous system and its function
9.	Study of Excretory system
10.	Study of Male Reproductive System - Semen production-semen characteristics- Semen extenders
11.	Study of Male Reproductive System - Semen production-semen characteristics- Semen extenders
12.	Study of the female reproductive system- Ovulation and Oviposition – Clutch and Pause
13.	Study of the female reproductive system- Ovulation and Oviposition – Clutch and Pause
14.	Egg formation- Egg laying pattern-photo periodic responses
15.	Role of endocrine glands and their functions
16.	Neuroendocrine control of egg production
17.	Thermoregulatory mechanism - Stress due to adverse environmental factors
18.	Acid-base balance in poultry

COURSE TITLE: PHYSIOLOGY OF POULTRY PRODUCTION (Practical Classes-18)	
Course No.: PSC-609 Credit Hours: 1+1=02	
Sr. No.	**Topics to be covered in the practical's**
1.	Demonstration on the skeletal system of poultry
2.	Demonstration on Comb pattern and plumage
3.	Demonstration on poultry digestive system
4.	Demonstration on poultry excretory system
5.	Demonstration on poultry circulatory system
6.	Demonstration ofthe respiratory system
7.	Demonstration on the male reproductive system
8.	Demonstration on the female reproductive system
9.	Structure of feather, types of feathers, and parts of feather
10.	Identification of endocrine glands
11.	Demonstration of hormone estimation in poultry production and reproduction
12.	Demonstration of hormone estimation in poultry production and reproduction
13.	Hematology of poultry species
14.	Hematology of poultry species
15.	Serum evaluation -SGOT, SGPT, free fatty acids
16.	Morphology of Poultry spermatozoa
17.	Demonstration of artificial insemination in poultry
18.	Effect of light on the performance of birds

COURSE TITLE: COMMERCIAL POULTRY NUTRITION (Theory Classes-18)
Course No.: PSC-610 Credit Hours: 1+1=02

Sr.No.	**Topic to be covered in the lectures**
1.	Breed-specific nutrient requirements- strain-specific nutrient requirements in broilers
2.	Breed-specific nutrient requirements- strain-specific nutrient requirements in layers
3.	Breed-specific nutrient requirements- strain-specific nutrient requirements in Breeders
4.	Factors influencing the digestibility of nutrients Reasons to assist the birds in digestion
5.	Gut health management
6.	Commercial use of feed ingredients by the industry – their drawbacks
7.	Use of different feed additives and supplements: Enzymes, prebiotics, probiotics, postbiotics,
8.	Use of different feed additives and supplements: Enzymes, prebiotics, probiotics, postbiotics
9.	Phyto biotics
10.	Use of nucleotides, acidifiers, emulsifiers, essential oils, etc in poultry diets.
11.	Trace minerals: organic and inorganic
12.	Nanoparticles
13.	Pre-digested proteins
14.	Unconventional feed ingredients: Merits and demerits Measures to counteract the demerits responsible use of them for reducing the cost of production
15.	Unconventional feed ingredients: Merits and demerits Measures to counteract the demerits responsible use of them for reducing the cost of production
16.	Least cost feed formulation
17.	Phase feeding for broilers and layers
18.	Juvenile nutrition

COURSE TITLE: COMMERCIAL POULTRY NUTRITION(Practical Classes-18)	
Course No.: PSC-610 Credit Hours: 1+1=02	
Sr. No.	**Topics to be covered in the practical's**
1.	Estimation of Moisture with NIRS
2.	Estimation of Crude Protein with NIRS
3.	Estimation of Crude Fiber with NIR
4.	Estimation of Ether Extract with NIR
5.	Estimation of Nitrogen Free Extract with NIR
6.	Estimation of Calcium with NIRS
7.	Estimation of Phosphorus with NIRS
8.	Estimation of Amino Acid with HPLC
9.	Estimation of Aflatoxins with HPLC
10.	Estimation of Aflatoxins with HPLC
11.	Force-feeding in poultry
12.	Challenge feeding in poultry
13.	Factors preventing the birds from optimum feeding- Particle size, feed milling technologies
14.	Seasonal variations in feeding practices
15.	Seasonal variations in feeding practices
16.	*In-ovo* feeding
17.	visit to the commercial poultry nutrition lab
18.	visit to the feed mill

COURSE TITLE: POULTRY WELFARE AND WASTE MANAGEMENT (Theory Classes-36)	
Course No.: PSC-611Credit Hours: 2+0=02	
Sr. No.	**Topic to be covered in the lectures**
1.	Poultry Welfare – Concept and definition, factors involved in poultry welfare, hatchery, commercial poultry, and slaughterhouses including transport
2.	Poultry Welfare – Concept and definition, factors involved in poultry welfare, hatchery, commercial poultry, and slaughterhouses including transport
3.	Different freedoms to the birds
4.	Behavior of birds for understanding welfare
5.	Commercial poultry production and welfare challenges
6.	Housing systems in relation to the welfare
7.	Poultry Welfare and comparison with productivity
8.	Feed restriction – Qualitative and Quantitative
9.	Debeaking and toe trimming– Cannibalism and its effects, managing birds with intact beaks
10.	Debeaking and toe trimming– Cannibalism and its effects, managing birds with intact beaks
11.	Welfare cages – Community cages, Aviaries, Enhanced cages, etc.
12.	Assessing the welfare of layers
	Assessing the welfare of broilers
13.	Welfare at hatchery
14.	Welfare at slaughterhouses
15.	Economics of application of use welfare measures
16.	Welfare in relation to the country's requirement
17.	Waste generated from poultry farms
18.	Waste generated from poultry hatcheries
19.	Waste generated from poultry slaughterhouses
20.	Hazards of waste for humans and the environment
21.	Spread of diseases to humans, animals, and poultry
22.	Fly problems and control measures
23.	Rodent problems and control measures
24.	Leaching of toxic substances in groundwater
25.	Emission of gases – various stages of poultry production
26.	Dust and smell problems due to poultry
27.	Methods of disposal of carcasses – burial, burning, incineration, etc.
28.	Mitigating hazardous effects of waste, waste as a resource
29.	Composting of manure and dead birds
30.	Generation of biogas, usage of slurry
31.	Rendering plant products for feeding other species
32.	Wastewater recycling – effluents from washing sheds, slaughterhouse wastewater, etc.
33.	Utilization of slaughterhouse waste - poultry byproduct meal
34.	Methods of recycling feathers
35.	Biodiesel from dead birds
36.	Preparation of bio-fuel pellets

Lectures Schedules for Ph.D. degree programme

COURSE TITLE: APPLIED POULTRY NUTRITION (Theory Classes-36)	
Course No.: PSC-701	CreditsHours:2+1=03
Sr. No.	**Topic to be covered in the lectures**
1.	Developments in nutrient requirements for egg-type chicken
2.	Developments in nutrient requirements for meat-type chicken
3.	Concepts in various poultry feeding procedures
4.	Methods of feeding for optimal production
5.	Factors influencing nutrient requirements in poultry
6.	Factors influencing the feed intake in poultry
7.	Factors influencing the feed efficiency in poultry
8.	Nutritional deficiencies
9.	Nutritional deficiencies
10.	Protein and energy utilization
11.	Protein and energy utilization
12.	Digestibility of nutrients
13.	Ileal digestibility of amino acids
14.	Vitamin, minerals, and their interactions in poultry ration
15.	Vitamin, minerals, and their interactions in poultry ration
16.	Vitamin, minerals, and their interactions in poultry ration
17.	*In ovo* nutrition for optimal growth rate and feed efficiency
18.	Juvenile nutrition for optimal growth rate and feed efficiency
19.	Care in grower and pre-layer feeding
20.	Nutrition and feeding of layers during peak egg production
21.	Nutrition and feeding of breeders during peak egg production
22.	Nutritional requirements for higher egg production
23.	Nutritional requirements for broiler meat production
24.	Nutritional requirements for fertility and hatchability
25.	Nutritional requirements for special purposes
26.	Feeding of broilers for uniform growth, Feeding of broilers for feed efficiency
27.	Feeding to enhance egg quality and nutrients
28.	Nutritive feed additives in feed production
29.	Non-nutritive feed additives in feed production
30.	Organic feed Functional and designer feed
31.	Advances in feed milling technology
32.	Specialty feed production to produce microbial-safe foods
33.	Specialty feed production to produce SPF eggs
34.	Specialty feed production to produce organic foods
35.	HACCP implementation in feed quality control
36.	Production of feed free from antibiotics, mycotoxins, and pesticide residues

COURSE TITLE: APPLIED POULTRY NUTRITION (Practical Classes-18)	
Course No.: PSC-701	Credit Hours:2+1=03
Sr. No.	**Topics to be covered in the practical's**
1.	Computation of specific foods
2.	Computation of functional foods
3.	Estimation of available carbohydrate/ metabolizable energy in feed
4.	Estimation of Aflatoxin in feed
5.	Estimation of anti-nutritional factors- tannins in feed
6.	Estimation of anti-nutritional factors- hydrocyanic acid in feed
7.	Estimation of other toxins in feed
8.	Evaluation of various feeds for their quality
9.	Field methods of feed quality control
10.	Feed microscopy
11.	Estimation of carotenes
12.	Estimation of cholesterol
13.	Estimation of peroxides
14.	Quality control of functional poultry feeds
15.	Maintaining feed quality from production to consumption
16.	Near Infra-red technology of feed evaluation
17.	Other advanced technologies of feed evaluation
18.	Other advanced technologies of feed evaluation

COURSE TITLE: RECENT TRENDS IN COMMERCIAL POULTRY PRODUCTION (Theory Classes-36)	
Course No.: PSC-702	Credit Hours: 2+1=03
Sr. No.	**Topic to be covered in the lectures**
1.	Global trends in poultry production
2.	Advances in broiler production in India
3.	Concepts in egg production
4.	Latest concepts in breeder management - broiler
5.	Latest concepts in breeder management - layer
6.	Advances in hatchery operations for higher hatchability
7.	Advances in hatchery operations for chick quality
8.	Use of artificial intelligence in poultry production.
9.	Optimal microclimatic conditions in poultry houses and cages for higher production
10.	Management of poultry in environmentally controlled houses
11.	Management of poultry under adverse climatic conditions – part I
12.	Management of poultry under adverse climatic conditions- part -II
13.	Advances in the management of other species of poultry – J. quail and Duck
14.	Advances in the management of other species of poultry – Turkey and Emu/ ostrich
15.	Behavioral patterns of poultry in different growing systems.
16.	Advanced management techniques for egg production

17.	Advanced management techniques for meat production
18.	Advances in lighting management,
19.	Advances in feeding management,
20.	Litter management
21.	Manure management
22.	Factors influencing egg production in different species of poultry –
23.	Factors influencing growth rate and egg production –
24.	Automation in poultry production - broilers
25.	Automation in poultry production - layers
26.	Regulations for cage-free egg production
27.	organic chicken production –
28.	Functional feeds for functional foods –
29.	Production of HACCP, GMP-certified table eggs,
30.	Meat, chicks, hatching eggs, and other value-added products for export.
31.	Meat, chicks, hatching eggs, and other value-added products for export.
32.	Advances in Biosecurity,
33.	Advances in welfare
34.	Advances in waste management
35.	Role of integration in poultry production - broilers
36.	Role of integration in poultry production- layers

TITLE: APPLIED POULTRY NUTRITION (Practical Classes-18)	
Course No.: PSC-702 Credit Hours: 2+1=3	
Sr. No.	**Topics to be covered in the practical's**
1.	Performance study in the commercial layer farms by Interpretation of the farm records
2.	Performance study in the commercial broiler, farms by Interpretation of the farm records
3.	Performance study in the commercial Japanese quail, farms by Interpretation of the farm records
4.	Performance study in the commercial duck, farms by Interpretation of the farm records
5.	Performance study in the commercial, turkey farms by Interpretation of the farm records
6.	Management routines of different species of poultry – broiler
7.	Management routines of different species of poultry – layer
8.	Management routines of different species of poultry –ducks
9.	Management routines of different species of poultry – Japanese quail and turkey
10.	Calculating the cost of production – layer,
11.	Calculating the cost of production –broiler,
12.	Calculating the cost of production – Japanese quail,
13.	Calculating the cost of production – duck
14.	Calculating the cost of production – turkey
15.	Estimation of microclimatic conditions and comparing the productive traits–
16.	Modern poultry house design for optimal efficiency and cost reduction.
17.	Modern poultry cage design for optimal efficiency and cost reduction
18.	Field visit

COURSE TITLE:DEVELOPMENTS IN POULTRY PROCESSING AND PRODUCTS TECHNOLOGY (Theory Classes-36)	
Course No.: PSC-703Credit Hours: 2+1=3	
Sr.No.	**Topic to be covered in the lectures**
1.	Global trends in egg and poultry processing
2.	Indian scenario of the poultry processingindustry
3.	Structure, composition, and nutritive value of eggs,
	Factors affecting egg quality
4.	Structure, composition, and nutritive value of chicken meat,
	Factors affecting chicken meat quality
5.	Nutrients and non-nutrient components in regular and value-added poultry products
6.	Various measures of egg quality control
7.	Various measures of meat quality control
8.	Advances in value addition to poultry egg products
9.	Advances in value addition to poultry meat products
10.	Concepts in the preservation of egg
11.	Concepts in the preservation of poultry meat
12.	Newer concepts in meat canning and dehydration
13.	Newer concepts in meat curing and irradiation
14.	Tenderization of meat, methods of tenderization
15.	Factors affecting tenderness, methods of measuring tenderness
16.	Eating quality and sensory evaluation of meat
17.	Different packaging methods for egg
18.	Different packaging methods for chicken meat
19.	Modified atmosphere packaging
20.	Other processed products
21.	Room temperature preservation of poultry fast foods by multi-hurdle technology
22.	Further processing to produce ready-to-eat egg products
23.	Further processing to produce ready-to-eat meat products
24.	Production of Egg powder (whole egg powder, albumen powder, yolk powder)
25.	Desugarization and pasteurization of eggs
26.	Functional properties of eggs,
27.	Industrial uses of eggs
28.	Marketing trends in poultry meat and eggs
29.	Marketing trends in poultry eggs
30.	Improving the product quality to meet CODEX and European standards
31.	Codex and European standards for egg and their products
32.	Codex and European standards for meat and their products
33.	Production of immunoglobulin and lecithin
34.	Production of lysozyme
35.	Production of sialic acid and other pharmaceutical products from eggs
36.	Sanitary and phytosanitary measures for food safety

COURSE TITLE:DEVELOPMENTS IN POULTRY PROCESSING AND PRODUCTS TECHNOLOGY (Practical Class-18)	
COURSE No.: PSC- 703	Credit Hours:2+1=03
Sr.No.	**Topics to be covered in the practical's**
1.	Preparation of value-added products suitable for preservation at room temperature
2.	Preparation of Barbecue
3.	Preparation of Tandoori
4.	Preparation of local-specific poultry meat products- Meatballs
5.	Preparation of local-specific poultry meat products patties
6.	Preparation of local-specific poultry egg products
7.	Grading of eggs
8.	Grading of meat
9.	Estimation of egg quality
10.	Estimation of meat quality
11.	Preservation of egg
12.	Preservation of meat
13.	Testing drug residues in poultry products
14.	Testing pesticide residues in poultry products
15.	Testing mycotoxins in poultry products
16.	Testing antibiotic residues in poultry products
17.	Measurement of the microbial quality of poultry foods.
18.	Export of meat products from our country, prospects and challenges

COURSE TITLE: EMERGING AND RE-EMERGING DISEASES OF POULTRYAND HEALTH MANAGEMENT (Theory Classes-36)	
Course No.: PSC-704 Credit Hours: 2+1=03	
Sr.No	**Topics to be covered in the lectures**
1.	Concepts of disease prevention in poultry
2.	Emerging avian diseases
3.	Re-emerging avian diseases
4.	Factors influencing immune suppression/ immunity
5.	Enhancing immunity in poultry.
6.	Diseases and health management in pet birds
7.	Exotic diseases of domesticated and pet birds
8.	Water sanitation
9.	Hatchery sanitation procedures
10.	Control of vertically transmissible diseases,
11.	Hatchery borne diseases
12.	Non-infectious diseases in poultry and their control (Part-I)
13.	Non-infectious diseases in poultry and their control (Part-II)
14.	Metabolic diseases in poultry and their control(Part-I)
15.	Metabolic diseases in poultry and their control(Part-II)

16.	Parasitic diseases in poultry and their control(Part-I)
17.	Parasitic diseases in poultry and their control(Part-II)
18.	Parasitic diseases in poultry and their control(Part-III)
19.	Mycotoxins and their control.
20.	Poultry diseases of zoonotic importance
21.	Stress alleviation
22.	Prevention and control of bacterial in poultry
23.	Prevention and control of viral diseases in poultry
24.	Biosecurity measures to prevent bacterial and viral diseases
25.	Control measures of problematic re-emerging diseases of poultry like Ranikhet and Marek's.
26.	Control measures for problematic re-emerging Avian influenza disease of poultry
27.	Control measures of problematic re-emerging diseases of poultry like Infectious bursal disease and Infectious Bronchitis
28.	Control measures of problematic re-emerging diseases of poultry like Infectious laryngotracheitis
29.	Monitoring of flock health – Salmonella, Mycoplasma and Avian leucosis and Other viral and bacterial diseases of poultry
30.	Antibiotic resistance
31.	Latest vaccines and vaccinology in poultry production
32.	Flock management for specific pathogen-free egg production
33.	Maintaining the HACCP standards in poultry farms and Developments in the EXIM policies for flock health
34.	Concept of compartmentalization and zoning as per terrestrial code
35.	Geographical information system in disease control.
36.	Role of wild and aquatic birds in the transmission of diseases to domesticated poultry

COURSE TITLE: EMERGING AND RE-EMERGING DISEASES OF POULTRY AND HEALTH MANAGEMENT (Practical Classes-18)	
Course No.: PSC-704 Credit Hours: 2+1=03	
Sr.No.	**Topics to be covered in the practical's**
1.	Studying the Immune status of birds
2.	Egg inoculation techniques in laboratory diagnosis
3.	Differential diagnosis of various poultry diseases by post-mortem
4.	Differential diagnosis of various poultry diseases by laboratory techniques
5.	Molecular diagnosis of diseases
6.	Antibiotic sensitivity test
7.	Designing vaccination schedules for different poultry species
8.	Disinfection and sanitation
9.	Ectoparasite control
10.	Medication procedures.
11.	HA testing
12.	HI testing
13.	Monitoring of antibody response – RD
14.	Mareks disease and IBD

15.	Collection, preservation, and dispatch of material for poultry diseases
16.	Bacterial isolation and identification
17.	General procedures for diagnosis of viral diseases
18.	General procedures for diagnosis of viral diseases

COURSE TITLE: APPLIED POULTRY BREEDING (Theory Classes-18)	
Course No.: PSC-705 Credit Hours: 1+1=02	
Sr. No.	**Topics to be covered in the lectures**
1.	Gene and genotypic frequency
2.	Sex-linked, limited, and influenced traits-Autosexing
3.	Qualitative and quantitative traits and their inheritance in Poultry
4.	Quantitative traits and its inheritance in poultry
5.	Methods of selection – family selection – selection for multi characteristics and construction of selection indices
6.	Reciprocal recurrent selection – Recurrent selection, Marker assisted selection
7.	Random bred control populations - Selection limit - Osborne's Index, construction of selection index for multiple traits
8.	Use of molecular genetics in poultry breeding
9.	Use of molecular genetics in poultry breeding
10.	Exploitation of additive and non-additive gene action for commercial poultry production
11.	Heterosis – Exploitation of hybrid vigor for commercial production of layers and broilers
12.	Formation of synthetic lines and development of strains inpoultry
13.	Comparative efficiency of different selection methods in poultry
14.	Modern methods in commercial layer and broiler breeding
15.	Performance testing –Pure line-breeding
16.	Inbreeding and hybridization - Diallele mating
17.	Pedigree hatching
18.	Genotype × Environment interaction

COURSE TITLE: APPLIED POULTRY BREEDING (Practical Classes-18)	
Course No.:PSC-705Credit Hours: 1+1=02	
Sr. No.	**Topics to be covered in the practical's**
1.	Construction of selection index
2.	Construction of selection index
3.	Analysis of breeding data collected from breeding records
4.	Analysis of breeding data collected from breeding records
5.	Estimation of qualitative inheritance
6.	Estimation of qualitative inheritance
7.	Estimation of quantitative inheritance

8.	Estimation of quantitative inheritance
9.	Estimation of variance
10.	Heritability and standard error of heritability by different methods
11.	Heritability and standard error of heritability by different methods
12.	Repeatability
13.	Analysis of heritability for different traits
14.	Analysis of heritability for different traits
15.	Estimation of inbreeding coefficient
16.	Estimation of inbreeding coefficient
17.	Artificial insemination in poultry
18.	Artificial insemination in poultry

COURSE TITLE: POULTRY ECONOMICS, MARKETING AND INTEGRATION (Theory Classes -36)	
Course No.: PSC-706	Credit Hours: 2+1=03
Sr. No.	**Topic to be covered in the lectures**
1.	Present practices and future trends in the production of egg
2.	Present practices and future trends in the production of poultry meat
3.	Present trends in consumption
4.	Demand and supply
5.	Seasonal variations in production and consumption
6.	Marketing channels
7.	Marketing channels
8.	Procedures of marketing for eggs
9.	Procedures for marketing poultry meat
10.	Market Intelligence
11.	Advertising of poultry products
12.	Branding of poultry products
13.	Developments of egg sales outlets
14.	Various poultry enterprises
15.	Various poultry enterprises
16.	Choice of production size of business
17.	Input and output analysis
18.	Calculating the cost of various inputs
19.	Calculating the cost of production
20.	Break-even point analysis
21.	Price determination
22.	Role of NECC in egg marketing
23.	Role of BroMark
24.	Role of other marketing agencies
25.	Least demand and supply indices of performance
26.	Performance targets and achievements
27.	Poultry Marketing management
28.	Poultry Business management
29.	Market managerial skills and Human resource development

30.	Basic terms used in poultry marketing and project reports
31.	Cost and financial management
32.	Future trends in broiler production
33.	Future trends in egg production
34.	Factors influencing the profit margin in poultry enterprises
35.	Role of integration in the Poultry business
36.	Different types of integration

COURSE TITLE: POULTRY ECONOMICS, MARKETING AND INTEGRATION (Practical Classes -18)	
Course No.: PSC-706 Credit Hours: 2+1=03	
Sr. No.	**Topics to be covered in the practical's**
1.	Study of marketing channels of egg
2.	Study of marketing channels of meat
3.	Calculating the cost of production of egg
4.	Calculating the cost of production of broiler
5.	Calculating the cost of production of day-old chick
6.	Calculating the cost of production of feed
7.	Calculating marketing costs
8.	Technical aspects of the project report
9.	Financial Aspects of Project report
10.	Techno-economic parameters of commercial broilers
11.	Techno-economic parameters of commercial layers
12.	Techno-economic parameters of breeders
13.	Project report for broilers
14.	Project report for layers
15.	Project report for quails
16.	Contract broiler farming
17.	Use of social media in popularizing poultry and poultry products
18.	Study of successful business models in the poultry sector

COURSE TITLE: DIVERSIFIED POULTRY PRODUCTION (Practical Classes -18)	
Course No.: PSC-707 Credit Hours: 2+1=03	
Sr.No.	**Topics to be covered in the practical's**
1.	Layout and design of housing for other species of poultry
2.	Layout and design of housing for other species of poultry
3.	Visit to commercial Japanese quail farms
4.	Visit to commercial turkey farms
5.	Visit to commercial duck farms
6.	Incubation and care of hatching eggs and young ones
7.	Rearing practices followed for duck-by-duck farmers under field conditions
8.	Rearing practices followed for quails and turkeys by poultry farmers under field conditions
9.	Nutrient requirement of Japanese quail (broiler and layer)

10.	Nutrient requirement of turkey (broiler and layer)
11.	Nutrient requirement of duck (broiler and layer)
12.	Designing of aviaries for pet birds
13.	Different types of feed prepared for pet birds
14.	Vaccination and medication for diversified poultry species
15.	Preparing project reports for Turkey and calculating the cost of production
16.	Preparing project reports for Japanese quail and calculating the cost of production
17.	Preparing project reports for Duck and calculating the cost of production
18.	Preparing project reports for guinea fowl and calculating the cost of production