

**UNIVERSITY GRANTS COMMISSION
CURRICULUM AND TRAINING DIVISION
SECTOR H-9, ISLAMABAD**

**CURRICULUM REVISION COMMITTEE MEETING
IN
POULTRY HUSBANDRY**

A meeting of the National Curriculum Revision Committee for Poultry Husbandry was held on June 7-9, 2001 at UGC, Regional Centre, Lahore. The Committee finalized the draft curriculum prepared in its preliminary meeting held in March, 2001. Following attended the meeting:

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| 1. | Prof. Dr. Mushtaq Ahmad Mian
Dean,
Faculty of Animal Husbandry and Vet. Sciences,
NWFP Agricultural University,
Peshawar. | Convener |
| 2. | Dr. Ahsan ul Haq
Professor and Chairman,
Deptt. Of Poultry Husbandry,
University of Agriculture,
Faisalabad. | Member |
| 3. | Dr. Noor Nabi Ansari,
Professor and Chairman,
Department of Poultry Husbandry,
Sindh Agriculture University, Tandojam | Member |
| 4. | Dr. Zahoor ud Din,
Assistant Professor,
Institute of Animal Sciences,
Faculty of Agriculture,
Gomal University, D.I. Khan | Member |
| 5. | Dr. Abdul Ghaffar,
S.S.O. Animal Sciences Institute,
NARC, Islamabad. | Member |
| 6. | Dr. Ashfaq Ahmad,
Asstt. Professor,
Deptt. Of Animal Husbandry,
College of Vet. Science,
Lahore | Member |

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| 7. | Dr. Mashooq Ali
Senior Research Officer,
Veterinary Research Institute,
Govt. of NWFP, Peshawar. | Member |
| 8. | Lt. Col. Qamar Riaz
Headquarter,
Lahore Log Area (Nominee of GHQ)
Lahore Cantt. | Member |
| 9. | Mr. Tanveer Ahmad
Lecturer,
Department of Animal Sciences,
University of Arid Agriculture,
Rawalpindi. | Member |
| 10. | Dr. M. Akhtar Qureshi
Assistant Professor,
University College of Agriculture,
Rawalakot, AJK. | Member/Secretary |

The meeting started with recitation from the Holy Quran by Dr. Ashfaq Ahmad.

The committee appreciated the contribution of Mr. Muhammad Amir Qaimkhani, Associate Professor of Livestock, Sindh Agriculture University, Tandojam who represented Prof. Noor Nabi Ansari in preliminary meeting.

Mr. Muhammad Javed Khan, Director Curriculum, UGC, welcomed the participants and briefed them of the obligations of the Commission for review, revision and development of curricula as per provisions of the Act of Parliament, 1976. He stated that the first draft of the curriculum for B.Sc.(Hons.) Animal Husbandry and M.Sc. (Hons.) Poultry Husbandry prepared in March, 2001 will be further reviewed in light of suggestions received from various agencies and comments given by the colleagues and fellow faculty members with whom the course contents developed in the first draft were shared by the individual committee members at respective departments. He stated that the finalized curriculum would be referred to the Universities before 30th June, 2001 for implementation/adoption.

The Director informed the members that the present exercise of curriculum revision is being undertaken with the financial assistance of Ministry of Science and Technology. He emphasized that the objective behind the whole exercise is to equip the students with up-to-date knowledge and latest packages of technology in order to enable them to apply their expertise for improving the production performance of poultry and increasing the availability of poultry meat and eggs to the consumer thus bringing about a positive change essentially required for the economic uplift of poultry farmers.

The Director informed the members of the committee regarding different academic programmes of the commission aimed at enhancing the academic capability of in-service university/college teachers. He stressed upon the inclusion of latest books in list of suggested readings so that new concepts and ideas are introduced in the academic program.

Prof. Dr. Altaf Ali G. Shaikh, Adviser (Curriculum and Training) who shared the ideas with members of the committee on 2nd and 3rd day informed of different developmental schemes launched by Commission, Ministry of Education and Ministry of Science and Technology for improvement of science education. He told that massive allocation of funds have been made by the Government for improving the facilities of laboratories, libraries and enhancing the quality of the academic staff to make the universities true centers of higher learning and research. He urged the senior committee members to work for enhancing the professional competence of their younger colleagues by registering them in Ph. D. programs in view of the fact the universities are drying out of highly qualified teachers.

The Committee unanimously appointed Prof. Dr. Mushtaq Ahmad Mian as its convener and Dr. M. Akhtar Qureshi as Secretary. The committee, after thoroughly deliberated upon the draft curriculum of Poultry Husbandry, in the scheme of studies for different degree programmes like B.Sc. (Hons) Animal Husbandry, DVM, B.Sc. (Hons) Agriculture, B.Sc. Home Economics and M.Sc.

(Hons) Poultry Husbandry offered at various institutions and agreed on a single theme **that the ultimate objective of the meeting is to update and refurbish the syllabi contents with the sole aim to bring about a positive qualitative change.** The committee in order to realize the above aim reviewed and revised courses of study to be offered at major institutions as detailed below:

**SCHEME OF STUDIES
FOR
POULTRY HUSBANDRY**

<u>S.No.</u>	<u>Title of Course</u>	<u>Credit Hours</u>
PH-331	Introduction to Poultry Husbandry	3(2-2)
PH-332	Poultry Breeding and Reproduction	3(2-2)
PH-333	Poultry Production (For B.Sc.Home Economics)	4(3-2)
PH-431	Incubation and Hatchery Management	4(3-2)
PH-432	Poultry Housing and Equipment	4(3-2)
PH-433	Poultry Husbandry (For DVM and B.Sc.(Hons) Agric.)	4(3-2)
PH-531	Poultry Farm Management	4(3-2)
PH-532	Poultry Feeding Management	4(3-2)
PH-533	Farm Practices	2(0-4)
PH-631	Poultry Hygiene and Disease Prevention	4(3-2)
PH-632	Applied Poultry Management and Internship	5(0-10)

Theory

Salient characteristics of various classes, breeds and varieties of chickens; basic Mendalian concepts of inheritance; the mechanism of qualitative and quantitative inheritance; heritability of quantitative traits; objectives of poultry breeding for meat and egg production; systems of breeding and their significance; pure breed vs present day hybrid used for meat and egg production; the role of selection in genetic improvement; selection methods; culling and its significance; factors influencing egg size and composition; growth and sexual maturity; ovary, ovulation and oviposition; natural mating and artificial insemination in poultry.

Practical

Identification of different poultry breeds; observation and recording the typical/distinguishing characteristics of each breed; judging, selection and culling of poultry; record keeping of breeding flock; estimation of heritability from records; semen collection, processing and artificial insemination; visit to commercial flocks and poultry shows.

Books Recommended

1. Parkhurst, C.R. and G.J. Mountney. 1997. Poultry Meat and Egg Production. Chapman & Hall Inc., New York, USA.
2. Etches, R.J. 1996. Reproduction in Poultry. CAB International, UK.
3. Crawford, R.D. 1990. Poultry Breeding and Genetics. Elsevier Science Publishers, Amsterdam, The Netherlands.
4. North, M.O. and D.D. Bell. 1990. Commercial Chicken Production Manual. Chapman & Hall Inc., New York, USA.

Theory

Scope and importance of poultry farming; role of poultry farming in the production of high quality food; rural and commercial poultry production; classification of poultry breeds and their characteristics; selection, care and storage of hatching eggs; incubation methods and requirements; poultry housing and equipments; brooding and rearing of layer and broiler flocks; management practices in broiler and layer farms; poultry feeding practices; poultry hygiene and disease prevention; marketing of poultry and poultry products; economics of broiler and layer farming; composition of egg and poultry meat; poultry products as protective food of high biological value.

Practical

Handling of birds; body points of the fowl; demonstration of different breeds of poultry; identification of good layer; selection and storage of hatching eggs; handling of incubators and brooders; medication, vaccination and debeaking techniques.

Books Recommended

1. Jadhav, N. V. and M.F. Siddiqi. 1999. Handbook of Poultry Production and Management. Jaypee Brothers, Medical Publishers (P) Ltd. New Delhi, India.
2. Jadhav, N.V. 1998. Practical Mannual for Avian Production and Management. Jay Pee Brothers, Medical Publishers (P) Ltd., New Delhi, India.
3. Parkhurst, C.R. and G.J. Mountney. 1997. Poultry Meat and Egg Production. Chapman & Hall, Inc., New York, USA.
4. Hunton, P. (Editor). 1995. Poultry Production: Production System Approach. Elsevier Science Publishers, Amsterdam, The Netherlands.

PH-431 INCUBATION AND HATCHERY MANAGEMENT**4(3-2)****Theory**

History, development and scope of hatchery industry in Pakistan; principles of construction and designing of hatchery building; collection, handling and transport of hatching eggs; maintenance of quality in hatching eggs; selection, care and storage of hatching eggs; incubation methods; types of incubators; role of computer in modern hatchery operations; incubation requirements; embryonic development of chick; factors influencing fertility, hatchability and quality of chicks; taking off the hatch; hatchery sanitation and waste management; trouble shooting during incubation; incubation records.

Practical

Selection, candling and setting of hatching eggs; cleaning of hatching eggs; demonstration of parts of incubator; handling of incubator; sexing, grading, vaccination, packing and transportation of baby chicks; cleaning, disinfection and fumigation of hatchery and incubator; visit to commercial hatchery.

Books Recommended

1. Parkhurst, C.R. and G.J. Mountney. 1997. Poultry Meat and Egg Production. Chapman & Hall Inc., New York, USA.
2. Etches, R.J. 1996. Reproduction in Poultry. CAB International, UK.
3. Ensminger, M.E. 1992. Poultry Science, The Interstate Printers and Publishers Inc., Danville, Illinois, USA.
4. North, M.O. and D.D. Bell. 1990. Commercial Chicken Production Manual. Chapman & Hall Inc., New York, USA.

PH-432 POULTRY HOUSING AND EQUIPMENT**4(3-2)****Theory**

Importance of poultry housing and equipments; objectives of housing; requirements of housing from biological, engineering, economic and hygienic point of view; selection of site and location; poultry housing systems; types of

houses; construction of poultry farm at rural and commercial level; heating, cooling, insulation and ventilation systems; role of automation in poultry farming; orientation and design of poultry farm building in relation to environment; open-sided and environmentally controlled houses; housing conditions and poultry welfare; brooding, rearing and laying house equipments; light, gas and water related equipments; farm water supply and disposal systems.

Practical

Demonstration of housing and layout plans for poultry farms; demonstration of poultry farm equipments; poultry housing practices; cost estimation, specification and appraisals; visit to commercial poultry farms.

Books Recommended

1. Jadhav, N.V. 1998. Practical Manual for Avian Production and Management. Jaypee Brothers, Medical Publishers (P) Ltd., New Delhi, India.
2. Parkhurst, C.R. and G.J. Mounting. 1997. Poultry Meat and Egg Production. Chapman & Hall Inc., New York, USA.
3. Austic, R.E. and M.C. Nesheim. 1990. Poultry Production. Lea and Febiger, Philadelphia, USA.
4. North, M.O. and D.D. Bell. 1990. Commercial Chicken Production Manual. Chapman & Hall Inc., New York, USA.

PH-433

**POULTRY HUSBANDRY
(For DVM and B.Sc.(Hons) Agriculture)**

4(3-2)

Theory

Scope and importance of poultry farming; development of poultry industry in Pakistan; important classes, breeds and varieties of poultry and their characteristics; systems of breeding; selection of breeding stock; selection, care and storage of hatching eggs; incubation methods, types of incubators, incubation requirements; factors affecting fertility and hatchability; poultry housing and equipments; brooding of chicks; types of brooders, brooding requirements; rearing of growing chicks; management of laying flock; feeds and

feeding practices; poultry hygiene and disease prevention; induced moulting; marketing of poultry and poultry products.

Practical

Handling of birds; points of chicken; identification of different breeds of poultry; selection of hatching eggs; handling of incubators; brooding and rearing of chicks; medication, vaccination and debeaking; management of adult flock; identification of a good layer; demonstration of poultry house equipments; visits to commercial hatchery, poultry farms and poultry show.

Books Recommended

1. Jadhav, N. V. and M.F. Siddiqi. 1999. Handbook of Poultry Production and Management. Jaypee Brothers, Medical Publishers (P) Ltd. New Delhi, India.
2. Jadhav, N.V. 1998. Practical Mannual for Avian Production and Management. Jay Pee Brothers, Medical Publishers (P) Ltd., New Delhi, India.
3. Gillespie, J.R. 1997. Modern Livestock and Poultry Production. 5th Ed. Delmar Publisher, New York, USA.
4. Etches, R.J. 1996. Reproduction in Poultry. CAB International, U K.

PH-531

POULTRY FARM MANAGEMENT

4(3-2)

Theory

Characteristics of an ideal poultry farm manager; preparation of house before receiving the baby chicks; pre-brooding and brooding requirements; procurement of chicks; management of chicks during brooding period; controlling early chick mortality; raising of broilers; rearing of layer chicks; shifting and housing of pullets; cage vs floor management; layer and breeder management; causes of poor performance of layer and breeder flocks; litter management and waste disposal systems; integrating poultry with fish farming; light management of poultry; role of management in the efficiency of meat and egg production; management of flock during hot and cold climate; managerial problems; vices and their remedies; induced moulting and its economic benefits; trouble shooting in poultry farms; poultry welfare; cost benefit ratio of different poultry enterprises,

record keeping and its significance; marketing of poultry and poultry products; introduction to management of quails, ducks, geese, turkeys and fancy birds.

Practical

Practicing the preparation of poultry house by the students; demonstration of various types of brooders; practicing vaccination, medication, debeaking and toe punching techniques, identification of good layer; applying induced moulting techniques; managing flock during heat stress; use of computer in record keeping/analysis; visit to commercial broiler and layer farms.

Books Recommended

1. Sainsbury, D. 1999. Poultry Health and Management; chickens, turkeys, ducks, geese and quails. Blackwell Scientific Publications, London, UK.
2. Hunton, P. (Editor). 1995. Poultry Production: Production System Approach. Elsevier Science Publisher, Amsterdam, The Netherlands.
3. Ensminger, M.E. 1992. Poultry Science. The Interstate Printers and Publishers Inc., Danville, Illinois, USA.
4. North, M.O. and D.D. Bell. 1990. Commercial Chicken Production Manual. Chapman & Hall Inc., New York, USA.

PH-532

POULTRY FEEDING MANAGEMENT

4(3-2)

Theory

Principles of poultry vs livestock feeding; feeding systems; complete feed; different forms of feed; mash, pellets and crumbles; basic components of a poultry ration; phase feeding; typical examples of broiler, layer and breeder rations; factors affecting pullet development; attaining optimal weight and sexual maturity; feed additives used in poultry rations; factors affecting feed consumption and utilization; feed conversion ratio and its significance; feed restriction, its importance and methods; feeding management of broilers, layers and breeders under different climatic conditions; water requirements, its quality and significance; feed and water space requirements; measures to avoid feed

wastage; toxic factors in poultry feeds; storage of commercial poultry feeds to maintain quality.

Practical

Identification, classification and characterization of common feed ingredients; evaluation of different types of poultry feeds on the basis of macro and microscopic examination; feed formulation and practical feeding of broiler, layer and breeder flocks; home feed mixing and feeding of rural poultry; visit to a commercial feed mill.

Books Recommended

1. Dagher, N.J. 1995. Poultry Production in Hot Climates. CAB International, UK.
2. Lesson, S. and J.D. Summers. 1991. Commercial Poultry Nutrition. University Books, Guleph, Ontario, Canada.
3. North, M.O. and D.D. Bell, 1990. Commercial Chicken Production Manual. Chapman & Hall, Inc., New York. USA.
4. Scott, M.L., M.C. Nesheim and R.J. Young. 1982. Nutrition of the Chicken. M.L. Scott and Associates, Ithaca, New York.

PH-533

FARM PRACTICES

2(0-4)

Evaluation of hatching eggs from external and internal characteristics; maintenance of hatching egg quality; acquaintance with routine hatchery practices; trouble shooting and how to overcome; economic appraisal of hatchery business; taking biosecurity measures in hatchery operation; preparation of brooding house; shifting of baby chicks to the brooding house; steps to control early chick mortality; practical brooding and rearing of poultry birds; remedial measures for controlling common vices; vaccination and medication practices; selection and culling of birds; maintenance of poultry farm registers; grading and processing of poultry and poultry products; economic appraisal of broiler, layer

and breeding flocks; poultry waste management; cleanliness and disinfections of farm buildings.

Books Recommended

1. Jadhav, N.V. 1998. Practical Manual for Avian Production and Management. Jay Pee Brothers, Medical Publishers (P) Ltd., New Delhi, India.
2. North, M.O. and D.D. Bell, 1990. Commercial Chicken Production Manual. Van Nostrand Reinhold Co., New York, U.S.A.

PH-631 POULTRY HYGIENE AND DISEASE PREVENTION 4(3-2)

Theory

Importance of disease prevention and poultry hygiene; bio-security measures; common terms related to poultry diseases; cleaning and disinfections of poultry house and equipments; disinfectants and their application; fumigation and its importance; introduction to bacterial, viral, parasitic and mycotic diseases and prophylactic measures for control; nutritional disorders and their prevention; significance of clean drinking water in relation to diseases; controlling transmission of egg borne diseases; brief introduction to immunology and principles of vaccination.

Practical

Demonstration of healthy vs diseased birds and recognition of salient features; poultry carcass inspection; post mortem techniques and examination of major lesions; blood, organs and carcass specimen collection for dispatch to the diagnostic laboratory; vaccination schedule, procedures and technique for important poultry diseases; deworming, dipping, dusting and spraying of birds; use of disinfectants and fumigants; common practices for bio-security measures; demonstration about disposal pit and incinerator.

Books Recommended

1. Haq, A. and T. Ahmad. 2001. Poultry Hygiene and Disease Prevention. Pak Book Empire, Lahore, Pakistan.
2. James, W. E. 1999. Handbook on Poultry Diseases. American Soybean Association, New Delhi, India.
3. Herenda, D.C. and D.A. Franco. 1996. Poultry Diseases and Meat Hygiene, A Color Atlas. Iowa State University Press, Ames, Iowa, USA.
4. Jordan, F.T.W. (Editor). 1996. Poultry Diseases. English Language Book Society, London.

PH-632 APPLIED POULTRY MANAGEMENT AND INTERNSHIP 5(0-10)

The students in the last semester will be kept fully involved in the practical and applied aspects of poultry management in different poultry enterprises. The class will be divided into groups of convenient number and allotted to different activities by rotation. The university poultry farm will be one important station where each group will be given practical training under the guidance of faculty members. The other stations will include commercial enterprises like poultry feed mill, breeder farm, layer farm, broiler farm, hatchery and broiler processing plant. The students will be required to participate in the routine daily work of the station in order to develop the necessary skills and practical understanding. At the end of the semester separate report for each station will be required to be submitted by the students for evaluation by the respective teacher and counted for the final grade.

**SCHEME OF STUDIES
FOR
M.Sc.(HONS)POULTRY HUSBANDRY**

<u>S.No.</u>	<u>Title of Course</u>	<u>Credit Hours</u>
PH-701	Poultry Breeding	4(3-2)
PH-702	Hatchery Operation and Management	4(3-2)
PH-703	Poultry Housing and Environment	4(3-2)
PH-704	Poultry Feeding	4(3-2)
PH-705	Layer Production	4(3-2)
PH-706	Production of Table Poultry	4(3-2)
PH-707	Poultry Health and Hygiene	4(3-2)
PH-708	Poultry Products	4(3-2)
PH-709	Avian Physiology	4(3-2)
PH-710	Avian Embryology	4(3-2)
PH-711	Advanced Poultry Production	4(3-2)
PH-712	Recent Advances in Poultry Science	3(2-2)
PH-719	Special Problem	1(0-2)
PH-720	Seminar	1(1-0)

**DETAILS OF COURSES
FOR
M.Sc.(HONS) POULTRY HUSBANDRY**

PH-701

POULTRY BREEDING

4(3-2)

Theory

Origin and evolution of domestic chicken; heredity and heritability; gene function and genetic code; inheritance of qualitative characters; sex linkage and sex determination in poultry; inheritance of quantitative characters; genotype-environment interaction; genetic resistance to diseases; improvement of breeding stock through selective breeding; breeding systems; selection and selection pressure; evolution of synthetic breeds for egg & meat production; new aspects of poultry breeding and reproductive techniques.

Practical

Selection and culling of breeding stock; artificial insemination in poultry; trap nesting; autosexing of day old chicks; determining the results of cross breeding by gene symbols; computerized record keeping; visits to breeding farms.

Books Recommended

1. Jadhav, N. V. and M.F. Siddiqi. 1999. Handbook of Poultry Production and Management. Jaypee Brothers, Medical Publishers (P) Ltd. New Delhi, India.
2. Parkhurst, C.R. and G.J. Mountney. 1997. Poultry Meat and Egg Production. Van Nostrand Reinhold Co., New York, U.S.A.
3. Weller, J.I. 1994. Economic Aspects of Animal Breeding. Chapman and Hall. UK.
4. North, M.O. and D.D. Bell, 1990. Commercial Chicken Production Manual. Van Nostrand Reinhold Co., New York, U.S.A.
5. Crawford, R.D. 1990. Poultry Breeding and Genetics. Elsevier Science Publishers, Amsterdam, Netherlands.

Theory

Hatchery industry; present status and future scope of commercial hatcheries in the world; determining the size and location of hatchery; different hatchery building designs and construction; hatchery equipment; incubation principles and practices; computerized hatchery operations; high altitude incubation; maintaining hatching egg quality; factors affecting hatchability; embryonic development and critical periods; position of the embryo; sexing, grading, vaccination and other hatchery operations; packing and dispatch of baby chicks; hatchery waste disposal; hatchery hygiene; factors affecting the cost of producing baby chicks.

Practical

Maintenance and operation of incubators; locating and rectifying faults in incubation; selection, grading and setting of eggs; fumigation procedures and techniques; cleaning and disinfection of incubator and hatchery; practice in sexing, grading, vaccination, packing and dispatch of baby chicks; calculating economics of producing hatching eggs and baby chicks with the help of computer; visits to commercial hatcheries.

Books Recommended

1. Gillespie, J.R. 1997. Modern Livestock and Poultry Production. 5th Ed. Delmar Publisher, New York, USA.
2. Etches, R.J. 1996. Reproduction in Poultry. CAB International, U.K.
3. Tullet, S.G. 1995. Avian incubation. Poultry Science Symposium No.22. Butterworth, London, U.K.
4. North, M.O. and D.D. Bell, 1990. Commercial Chicken Production Manual. Van Nostrand Reinhold Co., New York, U.S.A.

Theory

Physiological factors and environment; environmental conditions favorable for poultry; heat production, heat loss, moisture production and moisture build up in the house; concentration of harmful gases; insulation of poultry house; air movement and systems of ventilation; influence of macro and micro climate on performance; operation of open sided and environmentally controlled poultry houses; evaporative cooling; poultry house design; recommended standards of poultry housing; use of symbols and equations for environmental calculations; properties of light and its effect on production performance; lighting systems.

Practical

Measuring heat and moisture production; calculations of heating and light costs in poultry house; calculation of ventilation needs; air intake computation; housing practices, visits to modern commercial poultry houses.

Books Recommended

1. Moberg, G.P. and J.A. Mench. 2000. Biology of Animal Stress: Basic Principles and Implications for Animal Welfare. CAB International, UK.
2. Parkhurst, C.R. and G.J. Mountney.1997. Poultry Meat and Egg Production. Van Nostrand Reinhold Co., New York, U.S.A.
3. Austic, R.E. and M.C. Nesheim. 1990. Poultry Production. Lea and Febiger, Philadelphia, U.S.A.
4. North, M.O. and D.D. Bell, 1990. Commercial Chicken Production Manual. Van Nostrand Reinhold Co., New York, U.S.A.

Theory

Objectives of poultry feeding; nutrient requirements of poultry; role of feed in the development and growth of poultry industry; poultry feeding problems; different types of poultry rations for various age groups; requirements for maintenance

and production; feeding methods; effects of feed on hatchability, quality of eggs and meat; feed additives and growth promoters; toxic substances in poultry feed; impact of changes in feeding and management; factors affecting feed consumption and utilization; feed restriction, its advantages and limitations; economics of poultry feeding.

Practical

Demonstration of feeding birds on manual and automatic systems; recording feed consumption under different feeding schedules; least cost poultry feed formulation with the help of computer; demonstration of feeding equipments and feeding practices. Determination of feed efficiency through feeding trial.

Books Recommended

1. Dagher, N.J. 1995. Poultry Production in Hot Climates. CAB International, U.K.
2. NRC. 1994. Nutrient Requirements of Poultry. National Academy of Sciences. USA.
3. Ensminger, M.E. 1992. Poultry Science. The Interstate Printers and Publishers Inc., Danville, Illinois, U.S.A.
4. Lesson, S. and J.D. Summers. 1991. Commercial Poultry Nutrition. University Books, Guleph, Ontario, Canada.
5. Scott, M.L., M.C. Nesheim and R.J. Young. 1982. Nutrition of the Chicken. M.L. Scott and Associates, Ithaca, New York.

PH-705

LAYER PRODUCTION

4(3-2)

Theory

Scope and development of commercial layer farming in Pakistan; feeding and management during brooding and rearing periods; moving pullets to the laying house; cage vs floor operation; trouble shooting in laying house; feeding and management of commercial layers and breeders; light and feed manipulation to attain sexual maturity at optimum age and at appropriate body weight; forced moulting and recycling of laying flock; photoperiodism and light management; external and internal characteristics of egg; Factors effecting egg production and

quality; selection and culling procedures; production standards; cannibalism and its control; principles of hygiene and disease prevention; waste management and manure disposal, clean out procedure; general management problems and their solutions; record keeping;

Practical

Sanitary practices on the farm; selection and culling of birds; vaccination, debeaking, dubbing and toe clipping; estimation of egg production ability on phenotypic basis; egg grading on the basis of external and internal characteristics; visits to different commercial poultry farms.

Books Recommended

1. Jadhav, N. V. and M.F. Siddiqi. 1999. Handbook of Poultry Production and Management. Jaypee Brothers, Medical Publishers (P) Ltd. New Delhi, India.
2. Ensminger, M.E. 1992. Poultry Science. The Interstate Printers and Publishers Inc., Danville, Illinois, U.S.A.
3. North, M.O. and D.D. Bell, 1990. Commercial Chicken Production Manual. Van Nostrand Reinhold Co., New York, U.S.A.
4. Austic, R.E. and M.C. Nesheim. 1990. Poultry Production. Lea and Febiger, Philadelphia, U.S.A.

PH-706

PRODUCTION OF TABLE POULTRY

4(3-2)

Theory

Scope and importance of poultry for table purpose; growth of broiler Industry, present status and future trends of broiler production in Pakistan; characteristics of important breeds for meat production; housing requirements of broiler; feeding and management practices during brooding and rearing of broilers; factors affecting quality of meat; achieving faster growth and efficient feed utilization; roaster production; raising ducks, geese, turkeys and quails for meat production; integrated broiler farming; processing and marketing of table birds; biosecurity and disease prevention.

Practical

Typical characteristics of poultry birds for meat production; selection and grading of live birds; processing techniques; carcass measurements and evaluation; caponization; calculating economics of broiler units; determination of body weight gain, feed consumption and feed conversion ratio in broilers; vaccination schedule and practical vaccination for common diseases; least cost feed formulation with the help of computer.

Books Recommended

1. Richardson, R.I. and G.C. Mead. 1999. Poultry Meat Science: Poultry Meat Science Symposium Series (Vol. 25). CAB International, UK.
2. Parkhurst, C.R. and G.J. Mountney. 1997. Poultry Meat and Egg Production. Van Nostrand Reinhold Co., New York, U.S.A.
3. Sainsbury, D. 1992. Poultry Health and Management: Chickens, Turkeys, ducks, geese and quails. Blackwell Scientific Publications, London, U.K.
4. North, M.O. and D.D. Bell, 1990. Commercial Chicken Production Manual. Van Nostrand Reinhold Co., New York, U.S.A.

PH-707

POULTRY HEALTH AND HYGIENE

4(3-2)

Theory

Significance of health and hygiene in poultry production; managerial factors in disease prevention; sources of infection and control measures; impact of housing, feeding and drinking water on the health of poultry; disease resistant strains; viral, bacterial, parasitic and mycotic diseases of poultry and their control; practices involved in preventing vertically and horizontally transmitted diseases; nutritional deficiency diseases and remedial measures; and their prevention; the role of environment in disease incidence; security measures and specific pathogen free (SPF) flocks; practices for controlling stress factors; principles of immunology and immunization.

Practical

Cleaning and disinfection of poultry premises; disposal of dead birds and hatchery debris; vaccination schedules and techniques; diagnostic procedures and postmortem techniques; collection and dispatch of material to the diagnostic laboratory; visit to the diagnostic laboratory.

Books Recommended

1. Haq, A. and T. Ahmad. 2001. Poultry Hygiene and Disease Prevention. Pak Book Empire, Lahore, Pakistan.
2. Sainsbury, D. 1999. Poultry Health and Management: Chickens, turkeys, ducks, geese and quails. Blackwell Scientific Publications, London, U.K.
3. James, W.E. 1999. Handbook of Poultry Diseases. American Soybean Association, India.
4. Calnek, B.W., Barnes, H.J., Beard, C.W. and L. R. McDougald. 1997. Diseases of Poultry. Iowa State University Press, Ames, Iowa, U.S.A.

PH-708

POULTRY PRODUCTS

4(3-2)

Theory

The egg, its structure and composition; factors influencing the quality of egg; grades of shell eggs; care, storage and preservation of eggs; keeping quality of eggs; nutritive value of the egg; composition of poultry meat; grading of ready to cook poultry; poultry inspection; factors affecting the quality of poultry meat; processing, packing, refrigeration, storage and canning poultry; curing and preservation of poultry meat; processed poultry products; microbiology of eggs and poultry meat; toxic and drug residues in poultry products; inedible products of poultry; marketing of poultry products.

Practical

Grading of eggs; determining egg quality; preservation of eggs; grading dressed carcass; poultry processing; sanitation of processing plant; organoleptic evaluation of poultry products; microbial counts; salmonella test in poultry products.

Books Recommended

1. Sams, A.R. 2000. Poultry Meat Processing. Lewis Publ. Inc., USA.
2. Mountney, G.J. and C.R. Parkhurst. 1995. Poultry Products Technology. The Avi Publishing Co. Inc., Westport Connecticut, U.S.A.
3. Stadelman, W.J. and O.J. Cotterill. 1995. Egg Science and Technology Haworth Press, New York, U.S.A.
4. Mead, G.C. 1991. Processing of Poultry. Elsevier Science Publishers Ltd., London, U.K.

PH-709

AVIAN PHYSIOLOGY

4(3-2)

Theory

Physiology of the digestive tract; feed intake and its control; digestion, absorption and metabolism of carbohydrates, fats and proteins; basal metabolic rate; metabolic role of vitamins and minerals; cardiovascular system; the blood; haemodynamics; main groups of blood cells and their functions; urinary, respiratory and nervous systems; endocrines, hormones and their role in body functions; male and female reproductive systems, formation of egg, oviposition and laying habits; thermoregulatory mechanism.

Practical

Blood collection and haematological studies, dissection for study of various systems of the body; dissection for various physiological stages in the development of ova and counting of ova in mature ovary.

Books Recommended

1. Jadhav, N. V. and M.F. Siddiqi. 1999. Handbook of Poultry Production and Management. Jaypee Brothers, Medical Publishers (P) Ltd. New Dalhi, India.
2. Sturkie, P.D. (Latest edition). Avian Physiology. Springer-Verlag. New York, U.S.A.
3. Swenson, M.J. and W.O. Reece. 1993. Dukes Physiology of Domestic Animals. 11th ed. Panima publishers, India.
4. Freeman, B.M. 1984. Physiology and Biochemistry of Domestic Fowl. Vol. 1-5. Academic Press Inc. Ltd., London, U.K.

PH-710

AVIAN EMBRYOLOGY

4(3-2)

Theory

Nature and scope of embryology; gametes and gametogenesis; fertilization, formation of zygote; embryonic development during preoviposital and postoviposital periods; stages of embryonic development during incubation; the process of cleavage; primary germ layers; formation of the primitive streak; cell differentiations; appearance of the somites; development of body structure and differentiation of various organs; extraembryonic membranes and their functions; embryonic communication; critical periods during embryonic development; classification of embryo positions; physical act of hatching.

Practical

Observing various stages during embryonic development; observations during critical stages of embryo development; heart beat and circulatory system; examining malpositions of embryo, dead embryos and dead in shells; determination of hatchability.

Books Recommended

1. Lewer, S.H. 2000. Wright's Encyclopedia of poultry Science. Biotech books, India.
2. Parkhurst, C.R. and G.J. Mountney.1997. Poultry Meat and Egg Production. Van Nostrand Reinhold Co., New York, U.S.A.
3. Etches. R.J. 1996. Reproduction in Poultry. CAB International, Wallingford, Oxon, U.K.
4. North, M.O. and D.D. well. 1990. Commercial Chicken Production Manual. Van Nostrand Reinhold Co., New York. U.S.A.

PH-711

ADVANCED POULTRY PRODUCTION

4(3-2)

Theory

Development of poultry industry; financial requirements and opportunities, benefits and limitations of poultry production; structure of egg and meat industry;

problems in poultry production and their solution; cost of production, returns and profitability in broilers, layers and breeders; planning for efficient poultry production; budgeting of poultry enterprises; economic appraisal of the farm business; appraisal of recent research and development work in poultry production.

Practical

Preparation of flock record check sheet; presentation of laying test results; calculating the economics of layers, broilers, breeders and hatchery units with the help of computer; preparing the feasibility reports; visits to commercial hatchery, broiler, layer and breeder farms.

Books Recommended

1. Jadhav, N. V. and M.F. Siddiqi. 1999. Handbook of Poultry Production and Management. Jaypee Brothers, Medical Publishers (P) Ltd. New Delhi, India.
2. Anonymous. 1998. Pakistan Poultry Industry Yearbook. Pakistan Poultry Association, Pakistan.
3. Weller, J.I. 1994. Economic Aspects of Animal Breeding. Chapman and Hall. UK.
4. North, M.O. and D.D. Bell, 1990. Commercial Chicken Production Manual. Van Nostrand Reinhold Co., New York, U.S.A.

PH-712 RECENT ADVANCES IN POULTRY SCIENCE

3(2-2)

Theory

Development and present status of poultry industry in Pakistan and abroad; review of various topics on poultry science; modern breeding plans and development of synthetic birds for meat and egg production; managing hatchery for optimum performance; recent advances in poultry housing; utility of agro-industrial byproducts as poultry feed; poultry manure handling and its utilization; newly emerging diseases, their prevention and control measures; feeding plans for improving feed efficiency; management problems and their solutions in layer and broiler flocks; modern trends in marketing of poultry and poultry products; economics and accounting systems in poultry raising.

RECOMMENDATIONS

The committee thoroughly examined, revised & made necessary amendment/improvements in the existing curricula for the B.Sc.(Hons) Animal Husbandry, B.Sc. (Hons) Agriculture, DVM, B.Sc. Home Economics and M.Sc.(Hons) Poultry Husbandry degree programmes.

The comments and observations of experts from teaching and research institutions of different provinces in Pakistan were given due consideration while preparing the final draft of the curriculum for graduate and post graduate studies in the subject of Poultry Husbandry. The committee is of the opinion that maximum benefit from the revised curriculum can only be obtained when the required facilities are provided to the teachers and students for imparting upto date knowledge and practical skills necessary to adopt modern packages of technology. The committee unanimously agreed to submit the following recommendations for early adoption:

1. UGC may provide the necessary funds to the concerned Universities for the purchase of books/journals and equipments included in the revised programme.
2. Uniform curriculum should be followed for the same degree programme offered at different institutions.
3. The minimum duration of M. Sc. (Hons) degree programme, declared equivalent to M. Phil by U.G.C., should not be less than two years.
4. Funds for the purchase of latest books, periodicals, overhead projectors and other A. V. Aids be provided to the institutions to facilitate implementation of the revised curriculum in true spirit.

5. Computers should be provided to Poultry Science Departments and internet facilities be made available to enable the students to develop practical skills in the use of computer packages. Movie camera should be provided to the concerned departments for preparation of videos in their own field at local level.
6. In-service training opportunities be provided in computer courses as well as professional subjects in the field of Poultry Science in order to improve the quality of teaching and research in the universities.
7. Funds for procurement of videos (local/foreign) and computer CDs in different poultry science subjects including nutrition, breeding, management, housing, processing, marketing and diseases be provided for use as teaching aid.
8. Degree programmes in AH/Vet. Sciences particularly at postgraduate level offered by general universities should be brought at par with professional universities as for as requirements of admission criteria; pre-requisite courses, curriculum and duration of degree are concerned.
9. Special funds should be allocated for the newly proposed internship programme which has been added to upgrade the professional skills of the graduates.
10. To encourage the outstanding teachers, the institution of best teacher award in each discipline be effectively streamlined so that really deserving teachers on the basis of a uniform assessment criteria are nominated by the universities for national awards.