# CURRICULA LAY-OUT FOR B. Sc. A.H. (Hons.) DEGREE

<table>
<thead>
<tr>
<th>Semester - 1</th>
<th>Course No. &amp; Title</th>
<th>Credit hour</th>
<th>Contact Hour</th>
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<tbody>
<tr>
<td></td>
<td>AS 111 &amp; 112 Animal Science and Ecology</td>
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<tr>
<td></td>
<td>DS 111 &amp; 112 Fundamentals of Dairy Science</td>
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<td></td>
<td>PS 111 &amp; 112 Fundamentals of Poultry Science</td>
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<td></td>
<td>BCHEM 113 &amp; 114 Chemistry of Biomolecules</td>
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<td>VAH 115 &amp; 116 Anatomy</td>
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<td>VPHY 115 &amp; 116 Physiology</td>
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<td></td>
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<td>DS 121 &amp; 122 Market Milk</td>
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<td>Agron 123 &amp; 124 Forage Agronomy</td>
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<td>VPAR 123 &amp; 124 Introduction to Parasitology</td>
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<td>VMH 123 &amp; 124 Principles of Animal Hygiene</td>
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<td>BCHEM 125 Metabolism of Biomolecules</td>
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<td>AE 123 Livestock Production Economics</td>
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<td>ABG 211 &amp; 212 Fundamental Genetics</td>
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<td>AS 211 Integrated Livestock Farming and Environment</td>
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<td>AN 211 Fundamentals of Nutrition</td>
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<td>DS 211 &amp; 212 Dairy Chemistry</td>
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<td>PS 211 &amp; 212 Poultry Feeds and Feeding</td>
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<td>Stat 213 &amp; 214 Statistics</td>
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<td>RS 211 Rural Sociology</td>
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<td>CSM 214 Computer Application</td>
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<td>AN 221 &amp; 222 Ruminant Nutrition</td>
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<td>VMED 225 &amp; 226 Elementary Preventive</td>
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<td>ABG 311 &amp; 312 Animal Breeding Principles</td>
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<td>AS 311 &amp; 312 Animal by-products and waste management</td>
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<td>AN 311 &amp; 312 Non-Ruminant Nutrition</td>
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<td>AN 313 &amp; 314 Feeds &amp; Fodder Science</td>
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<td>DS 313 Planning and Management of Dairy Farm and Milk Processing Plant</td>
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<td>PS 311 &amp; 312 Duck and Specialized Fowl Production</td>
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<tr>
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<td>ABG 321 &amp; 322 Genetic Diversity and Breeding Practices</td>
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<td>AS 321 &amp; 322 Meat Science and Technology</td>
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<td>AN 321 &amp; 322 Feed Processing &amp; Conservation</td>
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<td>PS 321 &amp; 322 Poultry Farm Planning and Management</td>
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<td>ABG 411 &amp; 412 Reproduction of Farm Animals</td>
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<td>AS 411 &amp; 412 Goat and Sheep Production</td>
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<td>AN 411 &amp; 412 Feed Milling Industry</td>
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<td>AN 413 Nutrient Requirements for Livestock</td>
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<td>DS 411 &amp; 412 Dairy Technology – II</td>
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<td>PS 411 &amp; 412 Egg Production and Technology</td>
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<td>CM 419 Agribusiness</td>
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<td>ABG 421 &amp; 422 Artificial Insemination and Reproductive Biotechnology</td>
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<td>AS 421 &amp; 422 Beef Cattle Production</td>
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<td>AN 421 &amp; 422 Livestock Feeding</td>
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<td>DS 421 &amp; 422 Dairy Cattle Production</td>
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<td>PS 421 &amp; 422 Broiler Production and Technology</td>
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<td>Ag. Ext. 421 &amp; 422 Agricultural Extension Education</td>
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<tr>
<td>1-5</td>
<td>Bangladesh Agricultural University</td>
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<tr>
<td></td>
<td>• Department of Animal Breeding and Genetics</td>
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<tr>
<td></td>
<td>• Department of Animal Science</td>
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<td>• Department of Animal Nutrition</td>
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<td>• Department of Dairy Science</td>
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<td>• Department of Poultry Science</td>
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<td>6-22</td>
<td>Selected Organizations</td>
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SYLLABUS FOR B.SC. A.H. (Hons.) DEGREE

Level-1, Semester-1

Course No. & Title: AS 111 Animal Science and Ecology
Credit Hours: 2, Contact Hours: 2


Course No. & Title: AS 112 Animal Science and Ecology
Credit Hour: 1, Contact Hours: 2

Handling and restraining of livestock. Study of animal psychology and behaviour. Identification of body points of livestock. Demonstration of livestock farm houses, dentition and ageing of livestock, casting, shoeing, marking, washing, grooming, castration, methods of measuring weights, bedding and clothing, dehorning and disbudding of farm animals. Feeding systems and identification of livestock feedstuffs. Demonstration of routine livestock farm operations.

Course No. & Title: DS 111 Fundamentals of Dairy Science
Credit Hours: 3, Contact Hours: 3


Course No.& Title: DS 112 Fundamentals of Dairy Science
Credit Hours: 1, Contact Hours: 2


Course No. & Title: PS 111 Fundamentals of Poultry Science
Credit Hours: 2, Contact Hours: 2


Course No. & Title: PS 112 Fundamentals of Poultry Science
Credit Hour: 1, Contact Hour: 1

Holding and handling of poultry birds. Introduction to external body parts of chicken. Identification and classification of feathers. Demonstration on with different types of comb in chicken. Identification of different breeds and varieties of chicken.
Demonstration on modern layer and broiler strains of chicken. Identification of different parts of digestive system, skeletal system and reproductive system of poultry. Identification and uses of markings. Identification of the eggs of different poultry species. Identification and uses of different poultry equipment. Acquaintance with different kinds of poultry house and poultry rearing systems.

**Course No. & Title: BCHEM 113 Chemistry of Biomolecules**  
**Credit hours: 3, Contact hours: 3**


**Course No. & Title: BCHEM 114 Chemistry of Biomolecules**  
**Credit hours: 1, Contact hours: 2**


**Course No. & Title: VAH 115 Anatomy**  
**Credit hours: 2, Contact hours: 2**

Introduction, definition and divisions of systematic anatomy. Definition and classification of skeleton and bones of Domestic animals. Introductory anatomy of the organs of Digestive system, Respiratory system and Male & Female genital system of domestic animals. Endocrine system of domestic animals.

**Course No. & Title: VAH 116 Anatomy**  
**Credit hour: 1, Contact hours: 2**

Identification of important bones of domestic animals. Brief demonstration and identification of the organs of Digestive, Respiratory and Genital system (Male & Female) of domestic animals.

**Course No. & Title: VPHY 115 Physiology**  
**Credit hours: 2, Contact hours: 2**

Course No. & Title: VPHY 116 Physiology  
Credit hour: 1, Contact hours: 2


Level-1, Semester-2

Course No. & Title: AS 121 Zoo and Wildlife Management  
Credit Hours: 2, Contact Hours: 2

Importance of zoo, wildlife conservation and bio-diversity. Habitation and causes of extinction of wild animals and birds. Classification of zoo animals, birds and laboratory animals. Psychology and behavior of common zoo and wild animals. Management of wild animals and birds in the zoo and wilderness: Housing and feeding systems. Physiological and environmental factors related to breeding and reproduction. Management of wild animals and birds in Safari Park under natural habitation. Introduction to zoological gardens and natural habitats for wild animals and birds. Common diseases of zoo and wild animals and birds and their prevention. Planning to establish zoo and its administrative management. Visit to different zoo’s, safari and natural habitats.

Course No. & Title: DS 121 Market Milk  
Credit Hours: 3, Contact Hours: 3


Course No. & Title: DS 122 Market Milk  
Credit Hour: 1, Contact Hours: 2


Course No. & Title: PS 121 Rural Poultry Production  
Credit Hours: 3, Contact Hours: 3


Course No. & Title: Agron 123 Forage Agronomy
Credit Hours: 2, Contact Hours: 2


Production Technology of Fodder Crops: Origin and distribution, botanical description, climate and soil requirements, cultivation practices of the crops used as animal feed and fodder such as maize, sorghum, triticale, rice; cowpea, soybean, grass pea, black gram bar seen, alfalfa, sun hemp, dhaincha; german grass, napier, para, guinea and pangola grasses. Pasture and Pasture Management: Concept, classification and importance of pasture. Pasture establishment, management of pasture and pasture herbage utilization. Feasibility of pasturing in Bangladesh.

Course No. & Title: Agron 124 Forage Agronomy
Credit Hour: 1, Contact Hours: 2


Course No. & Title: VPAR 123 Introduction to Parasitology
Credit Hours: 2, Contact Hour: 1


Course No. & Title: VPAR 124 Introduction to Parasitology
Credit hour: 1, Contact Hours: 2

Methods of collection, Preservation and shipment of parasitological specimens. Identification of common parasites of livestock and poultry.

Course No. & Title: VMH 123 Principles of Animal Hygiene
Credit Hour: 2, Contact Hour: 1


Course No. & Title: VMH 124 Principles of Animal Hygiene
Credit hour: 1, Contact Hours: 2

Course No. & Title: Bioch 125 Metabolism of Biomolecules
Credit Hours: 2, Contact Hours: 2


Course No. & Title: AE 123 Livestock Production Economics
Credit hours: 3, Contact Hours: 3


Level-2, Semester-1

Course No. & Title: ABG 211 Fundamental Genetics
Credit Hour: 3, Contact Hours: 3

Introduction: Genetical terminology, concept, branches and application of genetics, different types of gene action. Mendelian genetics: Gregor Johan Mendel, his contribution in genetics, Mendel’s laws, modification of Mendelian ratios. Linkage, crossing over and chromosome mapping: Linkage and its significance; kinds of linkage and crossing over; cytological basis of crossing over; interference and coincidence; gene mapping. Sex determination and sex related inheritance: Sex-linked, sex-influenced and sex-limited traits in farm animals. Immunogenetics: Immune response, Humoral and cell mediated antibody; antigen, antibody diversity, histocompatibility complex. Multiple alleles: Coat colour inheritance in rabbit, blood groups and blood protein polymorphisms in animals. Cytogenetics: Animal cell-its organelles and function, Chromosomes and karyotypes of farm animals, gametogenesis and fertilization in farm animals, Variation in chromosomal structure and number, Significance of chromosomal aberration. Biochemical basis of inheritance: DNA and RNA; proof of DNA as a genetic material; structure, replication, RNA types and functions. Extra-nuclear inheritance: Plasmids and mitochondrial DNA. Mutation: Definition, classification and causes; phenotypic and genotypic effect of mutation.

Course No. & Title: ABG 212 Fundamental Genetics
Credit Hour: 1, Contact Hours: 2

Materials used for genetic study and their handling. Karyotyping of domestic animals by cell culture techniques. Study of cell division. Study of multiple alleles in animals and human (blood proteins and enzymes, blood groups). Solving problems on Mendelian genetics, chi square ($\chi^2$) test, probability and linkage in farm animals.

Course No. & Title: AS 211 Integrated Livestock Farming and Environment
Credit Hours: 2, Contact Hours: 2

Concept, characteristics and objectives of farming systems. Importance and contribution of livestock in integrated farming systems. Plant-animal interactions for sustainable crop-livestock farming systems. Concept and practices of agro-forestry

**Course No. & Title: AN 211 Fundamentals of Nutrition**  
**Credit Hours: 2, Contact Hours: 2**

Introduction: Nutrition, gradual expansion, branches and relationships with other disciplines.  

**Course No. & Title: DS 211 Dairy Chemistry**  
**Credit Hours: 3, Contact Hours: 3**


**Course No. & Title: DS 212 Dairy Chemistry**  
**Credit Hour: 1, Contact Hours: 2**


**Course No. & Title: PS 211 Poultry Feeds and Feeding**  
**Credit Hours: 3, Contact Hours: 3**

Course No. & Title: PS 212 Poultry Feeds and Feeding  
Credit Hours: 1, Contact Hours: 2


Course No. & Title: Stat 213 Statistics  
Credit hours: 3, Contact hours: 3

Population and sample. Hypothesis, null and alternative hypotheses, type I error, type II error, level of significance. Basic steps for testing hypothesis. Statistical tests: a population mean is equal to a specified value, equality of two population means (independent & correlated), significance of correlation and regression coefficients, independence of attributes. Experimental design: Basic concepts and principles. Completely randomized, randomized block, Latin square and cross-over designs. Covariance analysis in completely randomized and randomized block designs.

Course No. & Title: Stat. 214 Statistics  
Credit hour: 1, Contact hours: 2

Statistical tests: A population mean is equal to a specified value, equality of two population means (for both independent & correlated samples), a population proportion is equal to a specified value, equality of population proportions, independence of attributes, significance of correlation and regression coefficients. Analysis of variance for completely randomized, randomized block, Latin square and cross-over designs. Covariance analysis in completely randomized and randomized block designs.

Course No. & Title: RS 211 Rural Sociology  
Credit hours: 2, Contact hours: 2


Course No. & Title: CSM 214 Computer Application  
Credit hours: 2, Contact hours: 4

Computer science and computer fundamentals, hardware and software, data and information, information coding, number systems and their internal representation, program and algorithm. Computer operations in DOS and Windows environment; familiarity with the use of applications software: text processing, electronic sheet, presentation materials preparation, statistical analysis. Introduction to terminal use on C/C++ programming.


Level-2, Semester-2

Course No. & Title: ABG 221 Molecular Genetics
Credit Hours: 2, Contact Hours: 2

Introduction: Concept and application of molecular genetics. Chemical basis of inheritance: DNA as a genetic material; composition and structure of DNA and RNA; Genomic and non-genomic DNA; Different types of DNA and RNA; Plasmid. DNA replication: General feature, DNA replication in prokaryotes and eukaryotes. Genetic Code: Properties, codons, synonym codons.


Course No. & Title: ABG 222 Molecular Genetics
Credit Hour: 1, Contact Hours: 2


Course No. & Title: AS 221 Buffalo Production and Draught Animal Management
Credit hour: 2, Contact hours: 2


Course No. & Title: AS 222 Buffalo Production and Draught Animal Management
Credit hour: 1, Contact hours: 2

Approaching and handling of buffaloes and draught animals. Judging and selection of buffaloes and draught animals. Methods of feed processing and formulation of balance ration for buffaloes. Different management practices: Castration, ageing, marking, bedding, restraining, cleaning, record keeping and sanitation. Training of draught animals for ploughing, carting and threshing and the use of machineries. Estimation of draught output and energy expenditure. Planning and designing of small scale and commercial buffalo farm. Visit to small scale and commercial buffalo farm.

Course No. & Title: DS 221 Dairy Microbiology
Credit Hours: 3, Contact Hours: 3


Course No. & Title: DS 222 Dairy Microbiology
Credit Hour: 1, Contact Hours: 2

Course No. & Title: AN 221 Ruminant Nutrition  
Credit Hours: 3, Contact Hours: 3

Rumen physiology and ecology: Development of ruminant stomach, rumen environment, rumen microorganisms, their classification and nutrition. Nutrition and environment: Critical temperature, thermoneutral zone, regulation of body temperature, effect of ambient temperature on digestion and metabolism of nutrients.


Course No. & Title: AN 222 Ruminant Nutrition  
Credit Hour: 1, Contact Hours: 2


Course No. & Title: PS 221 Hatchery Operation and Management  
Credit Hours: 3, Contact Hours: 3


Course No. & Title: PS 222 Hatchery Operation and Management  
Credit Hour: 1, Contact Hours: 2


Course No. & Title: VMED 225 Elementary Preventive Veterinary Medicine  
Credit hours: 3, Contact hours: 3


Course No. & Title: VMED 226 Elementary Preventive Veterinary Medicine  
Credit hour: 1, Contact hours: 2

Collection of data on animal health and production. Farm visits for assessments of feeding, housing and management of livestock in relation to health and production. Assessment of immunization schedule under farm and rural condition. Financial support is essential to conduct practical classes in the different animal farms and rural areas.
Level-3, Semester-1

Course No. & Title: ABG 311 Animal Breeding Principles
Credit Hours: 3, Contact Hours: 3

Introduction: Concept of Animal Breeding, its development and application; breed, strain, line and type; breed association. Genetic constitution of population: Gene and genotype frequencies; Hardy-Weinberg law, factors changing genetic properties and gene frequency. Phenotypic variation: Traits of economic importance, Values and means, discrete and continuous variation, normal distribution, components of phenotypic and genetic variation, genotype- environment interaction, average effect of genes. Population parameters: Heritability, repeatability and genetic correlation, methods of estimation and their uses. Breeding value: Concept, estimation and uses, best linear unbiased prediction (BLUP), most probable producing ability (MPPA) and transmitting ability. Selection: Natural and artificial selection, selection objectives and criteria, aids to selection, progeny testing, sib testing, methods of selection for more than one traits. Response to selection: Selection programme for livestock improvement, prediction and estimation of selection response, implication to livestock improvement and selection limit.

Course No. & Title: ABG 312 Animal Breeding Principles
Credit Hours: 1, Contact Hours: 2


Course No. & Title: ABG 313 Poultry Breeding
Credit Hour: 1, Contact Hours: 1


Course No. & Title: AS 311 Animal By-products and Waste Management
Credit Hours: 3, Contact Hours: 3


Course No. & Title: AS 312 Animal By-products and Waste Management
Credit Hours: 1, Contact Hours: 2

Course No. & Title: AN 311 Non-ruminant Nutrition  
Credit Hours: 2, Contact Hours: 2


Course No. & Title: AN 312 Non-ruminant Nutrition  
Credit Hour: 1, Contact Hours: 2


Course No. & Title: AN 313 Feeds and Fodder Science  
Credit Hours: 3, Contact Hours: 3


Course No. & Title: AN 314 Feeds and Fodder Science  
Credit Hour: 1, Contact Hours: 2


Course No. & Title: DS 313 Planning and Management of Dairy Farm and Milk Processing Plant  
Credit Hours: 2, Contact Hours: 2


Course No. & Title: PS 311 Ducks and Specialized Fowl Production  
Credit Hours: 3, Contact Hours: 3


Course No. & Title: PS 312 Ducks and Specialized Fowl Production
Credit Hour: 1, Contact Hours: 3


Level-3, Semester-2

Course No. & Title: ABG 321 Genetic Diversity and Breeding Practices
Credit Hours: 3, Contact Hours: 3

Animal Diversity: Biodiversity in animal agriculture, genetic diversity, and average heterozygosity, animal genetic resources (FAnGR), status of genetic resources-extinct, critical, endangered, and at risk. Causes for loss of genetic resources, conservation of genetic diversity and improvement of FAnGR and their wild relatives. Inbreeding: Genetic and phenotypic effects, inbreeding coefficient, inbreeding depression, purebred breeding, close breeding and line breeding. Out breeding: Out crossing, crossbreeding, line crossing, grading up, species hybridization, heterosis and its application. Specialized breeding: Selection and breeding policies and plans for the improvement of cattle, buffalo, goat, sheep and poultry for specific purposes, sire reference scheme, Community based livestock breeding system, nucleus breeding system (NBS) and breeding for disease resistance and threshold traits. Breeding small population: Systems of breeding for captive and pet animals, conservation and management of endangered animal species.

Course No. & Title: ABG 322 Genetic Diversity and Breeding Practices
Credit Hours: 1, Contact Hours: 2


Course No. & Title: AS 321 Meat Science and Technology
Credit Hours: 3, Contact Hours: 3


Course No. & Title: AS 322 Meat Science and Technology
Credit Hour: 1, Contact Hours: 2


Course No. & Title: AN 321 Feed Processing and Conservation
Credit Hours: 2, Contact Hours: 2
Importance of processing and conservation of feeds & fodder. Introduction to processing- Reasons for processing cereals and protein concentrates. Processing cereal grains- dry processes, and wet processes. Effect of processing on physical and chemical properties of cereal grains. Effect of processing cereal grains for beef cattle, dairy cattle and sheep and goat.


Course No. & Title: AN 322 Feed Processing & Conservation
Credit Hour: 1, Contact Hours: 2


Course No. & Title: DS 321 Course Dairy Technology - I
Credit Hours: 3, Contact Hours: 3

Introduction to Dairy Technology:

Course No. & Title: DS 322 Dairy Technology - I
Credit Hour: 1, Contact Hours: 2


Course No. & Title: PS 321 Poultry Farm Planning and Management
Credit Hours: 3, Contact Hours: 3

Planning and Management: General considerations in planning and management of poultry farm. Environmental aspect of planning and management. Farm Planning: Planning for modern poultry hatcheries, commercial broiler and layer farms, parent stock farms, duck, quail and integrated farms and processing plants. Farm Management: Equipment and machineries, personnel, routine work and products marketing, disposal of dead birds and farm manure. Cost-benefit Analysis: Cost-benefit analysis of different poultry farms.

Course No. & Title: PS 322 Poultry Farm Planning and Management
Credit Hour: 1, Contact Hours: 2

Farm Planning: Layout and financial statement of parent stock farms, modern hatcheries, commercial broiler and layer farms, duck, quail, integrated farms and processing plants. Biosecurity in planning and designing poultry farms. Farm Management: Personnel, routine work, machineries, financial management and marketing. Field trips: Visits to poultry farms and smallholders’ production units.

Course No. & Title: VMH 323 Poultry Disease Management
Credit Hours: 2, Contact Hours: 2
Factors influencing health and diseases of poultry, practices of hatchery and flock hygiene, disposal of wastes, litters and carcasses spread of infectious agents of important poultry disease. General measures for the prevention and control of common poultry diseases, isolation, quarantine, disinfection and immunization practices, bio-security, Influence of stress and stressors on poultry health.

**Course No. & Title: VMH 324 Poultry Disease Management**  
**Credit Hour: 1, Contact Hours: 2**

Hatchery and flock hygiene management, disposal of wastes, litters and carcasses, General measure for the prevention and control of common poultry disease, isolation, quarantine, disinfection and immunization practices.

**Level-4, Semester-1**

**Course No. & Title: ABG 411 Reproduction of Farm Animals**  
**Credit Hours: 3, Contact Hours: 3**


**Course No. & Title: ABG 412 Reproduction of Farm Animals**  
**Credit Hours: 1, Contact Hours: 2**


**Course No. & Title: AS 411 Goat and Sheep Production**  
**Credit Hours: 3, Contact Hours: 3**

Geographical distribution and world production systems of goat and sheep. Importance of goat and sheep, their functional roles in poverty alleviation in Bangladesh. Classification and description of goat and sheep breeds according to their uses. Thermoregulation and biodimatology of goat and sheep and adaptation to different environment. Housing of goat and sheep, their requirements and types with specifications. Management of goat and sheep for reproductive purposes. Feeding systems of goat and sheep for growth, meat, milk and wool production. Growth pattern and meat production of goat and sheep. Systems of measuring efficiency of production. Management practices of goat and sheep flock. Farming systems, biological and economic efficiency. Common diseases and parasites of goat and sheep, their prevention and impact on productivity. Planning and evaluation of small scale and commercial goat and sheep farm. Prospects and potentialities for increased goat and sheep production.

**Course No. & Title: AS 412 Goat and Sheep Production**  
**Credit Hour: 1, Contact Hours: 2**
Approach, handling and care of goats and sheep of different age and physiological conditions. Methods and procedures of judging of goat and sheep for meat, milk and wool production. Housing: Types of housing, equipment and facilities for housing of goat and sheep. Management practices in goat and sheep farm. Formulation of balanced ration and feeding schedule at different productive stages. Record keeping in goat and sheep. Studies of rural goat and sheep production system: Case studies through participatory rural appraisal (PRA). Planning and designing of small and commercial goat and sheep farm. Visit to goat and sheep farm.

Course No.& Title: AN 411 Feed Milling Industry
Credit Hours: 2, Contact Hours: 2


Course No. & Title: AN 412 Feed Milling Industry
Credit Hour: 1, Contact Hours: 2

Layout of a typical feed milling industry. Handling and operation of grinder, mixer, pellet die, roller shell etc., Feed drying and grinding, on-farm hand mixing. Compound feed manufacturing. Visit to feed mills.

Course No. & Title: AN 413 Nutrient Requirements for Livestock
Credit Hours: 2. Contact Hours: 2

Energy requirements: Energy systems for ruminants and non-ruminants. Energy requirements for maintenance, growth, lactation, reproduction, wool growth and work of different species of ruminants and non-ruminants. Efficiency of utilisation of metabolisable energy. Protein requirements: Methods of estimation of protein requirements. Protein systems for animals. Protein requirements of animals for maintenance, and productive purposes. Mineral requirements of farm animals: General approach of assessing the requirements Methods of estimation of requirements. Estimation of requirements for calcium, phosphorus, magnesium and important trace elements for cattle, buffaloes, sheep, goats, horse and rabbits. Vitamin requirements for farm animals: Requirements for maintenance, growth, lactation and pregnancy, Interrelationship of vitamins and minerals. Water and its requirements: Sources of water. factors affecting water intake of farm animals. Estimation of water requirements for ruminants and non-ruminants.

Course No. & Title: DS 411 Dairy Technology - II
Credit Hours: 3, Contact Hours: 3

Course No. & Title: DS 412 Course Dairy Technology -II
Credit Hour: 1, Contact Hours: 2

Cheese making: Dhaka cheese, Cottage cheese, Cheddar cheese, Brick cheese and Swiss cheese. Manufacturing of Dahi, Yoghurt, Cultured milk and Cultured butter milk (matha).

Course No. & Title: PS 411 Egg Production and Technology
Credit Hours: 3, Contact Hours: 3


Course No. & Title: PS 412 Egg Production and Technology
Credit Hour: 1, Contact Hours: 2


Course No. & Title: CM 419 Agribusiness
Credit Hours: 2, Contact Hours: 2


Level-4, Semester-2

Course No. & Title: ABG 421 Artificial Insemination and Reproductive Biotechnology
Credit Hours: 3, Contact Hours: 3

Reproductive biotechnology: Concept, scope and its application in animal industry. Reproductive manipulations: Background Estrus synchronization, Multiple Ovulation and Embryo Transfer (MOET). In vitro maturation (IVM) and in vitro fertilization (IVF) of mammalian oocyte, in vitro culture, (IVC) of embryos and their transfer in surrogate mother. Ultrasound guided transvaginal ‘ovum pick-up’ (OPU) technique, sex control techniques in farm animals. Frozen semen production technology. Cryopreservation: Principles of cryobiology, Cryopreservation of semen, oocyte and embryos. Principle of Cloning: Historical
perspective; basic biological processes; Methods and application of cloning in different species. Embryo cloning: Concepts and consequences. Embryo slicing and their application in modern animal production, embryonic stem cells culture.

**Course No. & Title: ABG 422 Artificial Insemination and Reproductive Biotechnology**  
Credit Hours: 1, Contact Hours: 2


**Course No. & Title: AS 421 Beef Cattle Production**  
Credit hours: 2, Contact hours: 2


**Course No. & Title: AS 422 Beef Cattle Production**  
Credit hours: 1, Contact hours: 2


**Course No. & Title: AN 421 Livestock Feeding**  
Credit Hours: 3, Contact Hours: 3


**Course No. & Title: AN 422 Livestock Feeding**  
Credit hour: 1, Contact Hours: 2

Formulation of ration for large and small ruminants for different productive purposes. Computer programming for ration formulation. Feed evaluation systems. Feeding trial with farm animals for determination of digestibility, nutritive values of feedstuffs and performance of animals. *In vitro* fermentation of feedstuffs using Menke’s gas production technique and Tilley and Terrie method. Rumen degradability study of feedstuffs using nylon bag technique.

**Course No. & Title: DS 421 Dairy Cattle production**  
Credit Hours: 3, Contact Hours: 3


Course No. & Title: DS 422 Dairy Cattle production
Credit Hour: 1, Contact Hours: 2


Course No. & Title: PS 421 Broiler Production and Technology
Credit Hours: 3, Contact Hours: 3


Course No. & Title: PS 422 Broiler Production and Technology
Credit Hour: 1, Contact Hours: 2


Course No. & Title: Ag. Ex. 421 Agricultural Extension Education
Credit hours: 3, Contact Hours: 3

Introduction: Concept of extension education; Philosophies, Principles, Scope and Phases of extension work; History of livestock extension in Bangladesh; Importance and present condition of livestock in Bangladesh. Learning Process: Meaning of learning; Elements of learning situation, Laws of learning and their implications in extension work. Extension Teaching methods: Meaning and Classification of extension teaching, Steps in extension teaching; Advantages and Limitations of extension teaching methods. Communication: Meaning, types, process, importance and functions of communication in extension work; Key elements in the communication process and their characteristics; Communication models: Berlo Model and Leagans Model; Feedback: characteristics and role; Problems in getting feedback. Diffusion Process: Concepts of
innovation and diffusion; Elements of diffusion process; Attributes and consequences of innovations; Types of innovation and innovation-decision process; Innovativeness; Adopter categories based on innovativeness; Characteristics of different types of adopters. Organization: Concept of organisation and extension organisation; Features of an extension organisation; Qualifications and duties/functions of an extension administrators, specialists, supervisors and extension workers. Leadership: Concept of leadership; Importance of leadership in extension work; types of leadership; Qualities of a good leader; Duties and responsibilities of local and professional leaders; Opinion leaders and their importance in extension work. Extension Programme Planning and Evaluation: Concept, Importance, Principles and Steps of extension programme planning for livestock development; Concepts and Steps of monitoring and evaluation of programmes/projects related to livestock extension work.

**Course No. & Title: Ag. Ex. 422 Agricultural Extension Education**  
**Credit hour: 1, Contact Hours: 2**

Assignment:  
i. Identification of different technologies along with their origin, target group and salient features.  
ii. Submission of Extension Field Trip Report.