





UNIVERSITY OF SARGODHA
OFFICE OF THE REGISTRAR
(ACAD BRANCH)

NOTIFICATION

On the recommendations of Academic Council made in its 19th (4/2023) meeting held on 13.09.2023, the Syndicate in its 64th (4/2023) meeting held on 03.11.2023 has approved the revised curriculum of B.Sc (Hons.) in Animal Sciences for implementation w.e.f Fall 2023 (Annex-'A').


(WAQAR AHMAD)
Additional Registrar (General) 
Dated: 30.01.2025

No. SU/Acad/25/ 99

Distribution:

- Chairman, Department of Animal Sciences
- Controller of Examinations
- Director Academics

C.C:

- Dean, Faculty of Agriculture
- Principal, College of Agriculture
- Director, QEC
- Additional Registrar (Affiliation & Registration)
- Secretary to the Vice-Chancellor
- PA to Registrar
- Notification File

SCHEME OF STUDIES

B.Sc. (Hons.) in Animal Sciences

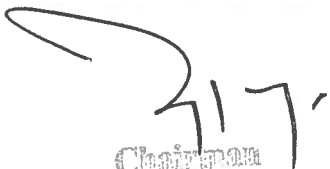
1. **Title of Degree Program:** B.Sc. (Hons.) in Animal Sciences
2. **Program Learning Objectives:** To equip the students with comprehensive knowledge and skills in the field of Animal Sciences.
3. **Program Structure:**

Duration	Minimum 4-Years (8-Semesters), Maximum 6-Years (12-Semesters)
Admission Requirements:	Eligibility: At least 50% marks in SSC & HSSC (Part-I / II) Pre-Medical / Pre-Engineering or Equivalent. Duration: 4 Years Semesters: 8
Degree Completion Requirements:	120-144 credit hours

4. General Education (Gen Ed) Requirements: (Mandatory/Core Courses):

The minimum requirement for Gen Ed is 30 credits hours and will be offered in first four semesters only.


Sr. No.	Semester	Course Code	Course Title	Credit Hours	Pre-requisite
1.	2	URCG-5112	Fables, Wisdom Literature, and Epic	2(2-0)	Nil
2.	4	URCG-5115	The Science of Global Challenges	3(2+1)	Nil
3.	2	URCG-5116	Science of Society-I	2(2-0)	Nil
4.	1	URCG-5118	Functional English	3(3-0)	Nil
5.	3	URCG-5119	Expository Writing	3(3-0)	Nil
6.	2	URCG-5120	Exploring Quantitative Skills	3(3-0)	Nil
7.	3	URCG-5121	Tools for Quantitative Reasoning	3(3-0)	Nil
8.	1	URCG-5105 URCG-5126	Islamic Studies (OR) Religious Education/Ethics	2(2-0)	Nil
9.	3	URCG-5122	Ideology and Constitution of Pakistan	2(2-0)	Nil
10.	1	URCG-5123	Applications of Information and Communication Technologies (ICT)	3(2-1)	Nil
11.	4	URCG-5124	Entrepreneurship	2(2-0)	Nil
12.	4	URCG-5128	Pakistan Studies	2(2-0)	Nil


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13.	4	URCG-5125	Civics and Community Engagement	2(2-0)	Nil
14.	2,4,6, 7	URCG-5111	Translation of the Holy Quran	NC	Nil
15.	2	URCG-5127	Seerat of the Holy Prophet (SAW)	1(1-0)	Nil
GE Courses Credit Hours Total				33	

5. Single Major Courses:


Sr. No.	Course Code	Course Title	Credit Hours	Prerequisite
1.	ANSC-5101	Introduction to Animal Husbandry	3(2-1)	Nil
2.	ANSC -5102	Fundamentals of Animal Nutrition	2(1-1)	Nil
3.	ANSC -5103	Fundamentals of Livestock Production	3(2-1)	Nil
4.	ANSC -5104	Principles of Animal Nutrition	3(2-1)	Nil
5.	ANSC -5105	Principles of Heredity	2(1-1)	
6.	ANSC -5106	Introduction to Veterinary Anatomy	3(2-1)	Nil
7.	ANSC -5107	Behaviour and Welfare of Farm Animals	3(2-1)	Nil
8.	ANSC -5108	Introduction to Veterinary Preventive Medicine	2(1-1)	Nil
9.	ANSC -5109	Introduction to Poultry Science	2(1-1)	Nil
10.	ANSC -5110	Principles of Animal Breeding	2(1-1)	Nil
11.	ANSC -5111	Management of Dairy Animals	2(1-1)	Nil
12.	ANSC -5112	Poultry Housing and Equipment	2(1-1)	Nil
13.	ANSC -5113	Principles of Poultry Nutrition	3(2-1)	Nil
14.	ANSC -6114	Basic Microbiology	3(2-1)	ANSC -5108
15.	ANSC -6115	Introduction to Animal Physiology	3(2-1)	ANSC -5106
16.	ANSC -6116	Animal Breeding Plans and Policies	3(2-1)	ANSC -5105
17.	ANSC -6117	Introductory Molecular Genetics	2(1-1)	ANSC -5105
18.	ANSC -6118	Metabolism of Primary Nutrients	2(2-0)	ANSC -5102
19.	ANSC -6119	Incubation Principles and Hatchery Management	2(1-1)	ANSC -5109
20.	ANSC -6120	Range Livestock Production	2(1-1)	ANSC-5103


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21.	ANSC -6121	Minerals and Vitamins in Nutrition	2(1-1)	ANSC -5102
22.	ANSC -6122	Poultry Hygiene and Disease Prevention	2(1-1)	ANSC -5109
23.	ANSC -6123	Introductory Population Genetics	2(1-1)	ANSC -5105
24.	ANSC -6124	Introduction to Farm Animal Health	3(2-1)	ANSC -5108
25.	ANSC -6125	Principles of Small Ruminant Production	2(1-1)	ANSC -5103
26.	ANSC -6126	Nutrient Requirements of Farm Animals	3(2-1)	ANSC -5104
27.	ANSC -6127	Rural Poultry Farming	3(2-1)	ANSC -5109
28.	ANSC -6128	Principles of Milk Production	2(1-1)	ANSC -5103
29.	ANSC -6129	Poultry Feeding Practices	3(2-1)	ANSC -5102
30.	ANSC -6130	Animal Breeding Practices	3(2-1)	ANSC -5105
31.	ANSC -6131	Poultry Farm Management	3(2-1)	ANSC -5109
32.	ANSC -6132	Selection for Economic Traits in Farm Animals	2(1-1)	ANSC -5111
33.	ANSC -6133	Feed Evaluation, Formulation and Processing Technology	3(2-1)	ANSC -5104
34.	ANSC -6134	Principles of Meat Production	3(2-1)	ANSC -5103
35.	ANSC -6135	Physiology of Reproduction	3(2-1)	ANSC -5106
Major Courses Credit Hours Total			88	

6. Interdisciplinary/Allied courses: minimum 12 credit hours:

1.	AGRO-5903	Introductory Agriculture	3(2-1)	Nil
2.	FSAT-5101	Introduction to Food Science and Technology	3(2-1)	Nil
3.	AEXT-5401	Introduction to Agricultural Extension and Rural Development	2(2-0)	Nil
4.	ZOOL-6141/ MATH-5128	Introduction to Biology-I (for Pre-Engineering students)/ Mathematics (for Pre-Medical students)	3(3+0)/3(3+0)	Nil
5.	STAT-5126	Statistics for Agricultural Sciences	3(3-0)	Nil
6.	AGRO-6912	Forage and Fodder Production	3(2-1)	Nil
Interdisciplinary Courses Credit Hours Total			17	


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7. Field experience/internship: Minimum 03 credit hours:

1.	ANSC-6136	Field experience / internship	3(0-3)	
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8. Capstone project: Minimum 03 credit hours:

1.	ANSC-6137	Capstone project	3(0-3)	
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Semester-I

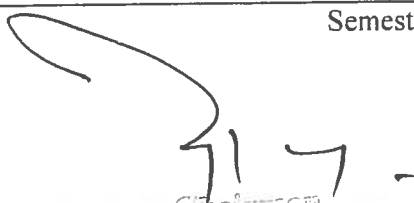
Category	Course Code	Course Title	Credit Hours	Pre-Requisite
GE-1	URCG-5118	Functional English	3(3-0)	Nil
GE-2	URCG-5105 URCG-5126	Islamic Studies (OR) Religious Education/Ethics	2(2-0)	Nil
GE-3	URCG-5123	Applications of Information and Communication Technologies (ICT)	3(2-1)	Nil
IDC-1	ZOOL-6141/ MATH-5128	Introduction to Biology-I (for Pre-Engineering students) / Mathematics (for Pre-Medical students)	3(3-0)/ 3(3-0)	Nil
Major-1	ANSC-5101	Introduction to Animal Husbandry	3(2-1)	Nil
Major-2	ANSC -5102	Fundamentals of Animal Nutrition	2(1-1)	Nil
Major-3	ANSC -5103	Fundamentals of Livestock Production	3(2-1)	Nil
Total Credit Hours			19 (15-4) ✓	

Semester Total Credit Hours: 19

Semester-II

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
GE-4	URCG-5112	Fables, Wisdom Literature, and Epic	2(2-0)	Nil
GE-5	URCG-5116	Science of Society-I	2(2-0)	Nil
GE-6	URCG-5120	Exploring Quantitative Skills	3(3-0)	Nil
GE-7	URCG-5127	Seerat of the Holy Prophet (SAW)	1(1-0)	Nil
GE-14	URCG-5111	Translation of Holy Quran – I	NC	Nil
IDC-2	AGRO-5903	Introductory Agriculture	3(2-1)	Nil
IDC-3	FSAT-5101	Introduction to Food Science and Technology	3(2-1)	Nil
IDC-4	AEXT-5401	Introduction to Agricultural Extension and Rural Development	2(2-0)	Nil
Major-4	ANSC -5104	Principles of Animal Nutrition	3(2-1)	Nil
Major-5	ANSC -5105	Principles of Heredity	2(1-1)	Nil
Total Credit Hours			21 (17-4)	

Semester Total Credit Hours: 21


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Semester-III

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
GE-8	URCG-5119	Expository Writing	3(3-0)	Nil
GE-9	URCG-5121	Tools for Quantitative Reasoning	3(3-0)	Nil
GE-10	URCG-5122	Ideology and Constitution of Pakistan	2(2-0)	Nil
IDC-5	STAT-5126	Statistics for Agricultural Sciences	3(3-0)	Nil
Major-6	ANSC -5106	Introduction to Veterinary Anatomy	3(2-1)	Nil
Major-7	ANSC -5107	Behaviour and Welfare of Farm Animals	3(2-1)	Nil
Major-8	ANSC -5108	Introduction to Veterinary Preventive Medicine	2(1-1)	Nil
Major-9	ANSC -5109	Introduction to Poultry Science	2(1-1)	Nil
Total Credit Hours			21 (17-4)	

Semester Total Credit Hours: 21

Semester-IV

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
GE-11	URCG-5115	The Science of Global Challenges	3(2-1)	Nil
GE-12	URCG-5128	Pakistan Studies	2(2-0)	Nil
GE-13	URCG-5124	Entrepreneurship	2(2-0)	Nil
GE-14	URCG-5125	Civics and Community Engagement	2(2-0)	Nil
GE-15	URCG-5111	Translation of Holy Quran – II	NC	Nil
IDC-6	AGRO-6912	Forage and Fodder Production	3(2-1)	
Major-10	ANSC -5110	Principles of Animal Breeding	2(1-1)	Nil
Major-11	ANSC -5111	Management of Dairy Animals	2(1-1)	Nil
Major-12	ANSC -5112	Poultry Housing and Equipment	2(1-1)	Nil
Major-13	ANSC -5113	Principles of Poultry Nutrition	3(2-1)	Nil
Total Credit Hours			21 (14-7)	

Semester Total Credit Hours: 21

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SEMESTER-V

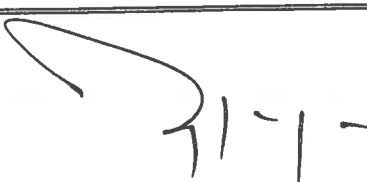
Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Major-14	ANSC -6114	Basic Microbiology	3(2-1)	ANSC -5108
Major-15	ANSC -6115	Introduction to Animal Physiology	3(2-1)	ANSC -5106
Major-16	ANSC -6116	Animal Breeding Plans and Policies	3(2-1)	ANSC -5105
Major-17	ANSC -6117	Introductory Molecular Genetics	2(1-1)	ANSC -5105
Major-18	ANSC -6118	Metabolism of Primary Nutrients	2(2-0)	ANSC -5102
Major-19	ANSC -6119	Incubation Principles and Hatchery Management	2(1-1)	ANSC -5109
Major-20	ANSC -6120	Range Livestock Production	2(1-1)	ANSC-5103
Major-21	ANSC -6121	Minerals and Vitamins in Nutrition	2(1-1)	ANSC -5102
Total Credit Hours			19 (12-7)	

Semester Total Credit Hours: 19

SEMESTER-VI

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Major-22	ANSC -6122	Poultry Hygiene and Disease Prevention	2(1-1)	ANSC -5109
Major-23	ANSC -6123	Introductory Population Genetics	2(1-1)	ANSC -5105
Major-24	ANSC -6124	Introduction to Farm Animal Health	3(2-1)	ANSC -5108
Major-25	ANSC -6125	Principles of Small Ruminant Production	2(1-1)	ANSC -5103
Major-26	ANSC -6126	Nutrient Requirements of Farm Animals	3(2-1)	ANSC -5104
Major-27	ANSC -6127	Rural Poultry Farming	3(2-1)	ANSC -5109
Major-28	ANSC -6128	Principles of Milk Production	2(1-1)	ANSC -5103
Major-29	ANSC -6129	Poultry Feeding Practices	3(2-1)	ANSC -5102
GE-14	URCG-5111	Translation of Holy Quran – III	NC	Nil
Total Credit Hours			20 (12-8)	

Semester Total Credit Hours: 20


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SEMESTER-VII


Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Major-30	ANSC -6130	Animal Breeding Practices	3(2-1)	ANSC -5105
Major-31	ANSC -6131	Poultry Farm Management	3(2-1)	ANSC -5109
Major-32	ANSC -6132	Selection for Economic Traits in Farm Animals	2(1-1)	ANSC -5111
Major-33	ANSC -6133	Feed Evaluation, Formulation and Processing Technology	3(2-1)	ANSC -5104
Major-34	ANSC -6134	Principles of Meat Production	3(2-1)	ANSC -5103
Major-35	ANSC -6135	Physiology of Reproduction	3(2-1)	ANSC -5106
GE-14	URCG-5111	Translation of Holy Quran – IV	NC	Nil
Total Credit Hours			17 (11-6)	

Semester Total Credit Hours: 17**SEMESTER-VIII**

Category	Course Code	Course Title	Credit Hours	Pre-Requisite
Compulsory	ANSC -6136	Research Project / Internship	3(0-3)	IDC and Major courses
Compulsory	ANSC -6137	Capstone Project	3(0-3)	IDC and Major courses
Total Credit Hours			6 (0-6)	

Semester Total Credit Hours: 06

Note: The scheme of studies of B.Sc. (Hons.) Animal Sciences has been prepared in accordance with the requirements/s of National Agriculture Education Accreditation Council (NAEAC), Higher Education Commission, Islamabad.



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COURSE CONTENTS

SEMESTER-I

ANSC-5101

Introduction to Animal Husbandry

3(2-1)

Animal husbandry is the branch of agriculture concerned with animals that are raised for meat, fibre, milk, eggs, or other products. Animal husbandry includes education and experience about the technology of breeding, feeding, producing, managing and marketing animals as well as animal products. This includes all husbandry facets of livestock species (cattle, sheep, goats, poultry, ostriches and horses) and the products derived from them (meat, milk & dairy products, wool, mohair, eggs, skin & leather and feathers) as well as relevant aspects of aquatic (fish, etc.) and wildlife species. It includes day-to-day care, selective breeding and the raising of livestock. The major types of animal husbandry practices include dairy, poultry, sheep, goat farming. This course will help the students to understand the importance of livestock in national economy. They will get a comprehensive knowledge about nutrition, management, breeding and genetic potential of local breeds of livestock. Students will be trained to handle and manage animals for different procedures at livestock farm.

Contents

Theory

1. Importance of livestock in economy of Pakistan
2. Zoological classification of farm animals
3. Livestock management
4. Introduction to breeding and genetics
5. Local breeds of livestock
6. Reproductive cycle in farm animals
7. Common feeds and their classification
8. Basic principles of feeding dry, pregnant and milking animals
9. Classes, breeds and varieties of poultry
10. Broiler and layer management

Practical

1. Demonstration and identification of various breeds of livestock
2. Demonstration of male and female reproductive organs
3. Body points of animals
4. Handling and restraining of animals
5. Grooming and cleaning of animals
6. Housing plans
7. Milk quality analyses; identification of
8. Feed samples; formulation of balanced ration for livestock
9. Poultry breeds
10. Visit to livestock shows/farms

Recommended Texts

1. Banerjee, G. C. (1998). *A Textbook of Animal Husbandry*. New Delhi, India.: Oxford and IBH Publ, Co.,
2. S. K. Kaushish (2010). *A Textbook of animal husbandry*. Kalyani Publishers

Suggested Books

1. Haq, A. & Akhtar M. (2004). *Poultry Farming*. H-9, Islamabad, Pakistan: Higher Education Commission of Pakistan.
2. Khan, B. B., Yaqoob M., Riaz M., Younas M. & Iqbal A. (2004). *Livestock Management Manual*. Department of Livestock Management, University of Agriculture, Faisalabad.

This course tells about types, availability pattern and characteristics of feed resources of Pakistan. It also critically studies nutrient composition, utilization and significance of different feed stuffs used locally for feed manufacturing of livestock commercial poultry. This course gives an idea about effects of different feedstuffs on animal performance as well as use of non-conventional feed resources in animals. The main focus will be on the elementary principles of farm animal nutrition, including anatomy, nutritional digestion, absorption, metabolism, and a general overview of the nutrients necessary for animal growth and development. By the course's end, students will understand how an animal's digestive system and nutritional requirements influence the ingredients and makeup of feed. After taking this course, students will be able to know that what to feed to animals and what feeding strategies should be used to economically fulfill the nutrient requirements of animals in commercial and semi-intensive system of livestock production.

Contents

Theory

1. Feed resources, their classification and utilization
2. physical characteristics of common feeds
3. anti-nutritional factors in feed ingredients
4. voluntary feed intake; factors affecting nutrient intake in livestock and poultry
5. Water: its importance, factors affecting water needs in animal body; and effects of deprivation
6. Nutrition in relation to body maintenance; growth and production

Practical


1. Proximate analysis of feeds and feed ingredients:
2. Feed ingredients and feed storage practices under farm conditions
3. Introduction to different components of feed mills; conservation of forage

Recommended Texts

1. Pond, W.G. & Church, D.C. (2005). *Basic Animal Nutrition and Feeding*. India: Wiley
2. M.F Fuller (2004). *The encyclopedia of animal nutrition*: CABI Pub

Suggested Books

1. McDonald, P., Edwards, R.A., Greenhalgh, J.F.D. & Morgan, C.A. (2002). *Animal Nutrition*. UK.: Longman scientific and technical publisher.
2. Singh, P.K. (2014). *Forage Conservation Techniques*. India: NIPA.
3. Cheeke, P.R. (2004). *Applied Animal Nutrition, Feeds and Feeding*. Canada: Delmar Publisher.


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This is the course of under graduate level about livestock production. The livestock species play very important economic and socio-cultural roles for the wellbeing of rural households, such as food supply, source of income, asset saving, source of employment, soil fertility, livelihoods, transport, agricultural traction, agricultural diversification and sustainable agricultural production. The aim of this course is to identify and characterize the different roles that livestock and livestock species play in rural communities, highlighting the importance of animal production for the wellbeing and rural development, and relate the functions performed by livestock production with economic, social and cultural attributes of the communities. Livestock production is predominantly familiar being chickens, goats, cattle, horses, buffaloes and sheep the main species. Beyond the economic function, each livestock species also performs social and cultural functions. The animals raised with large-scale feedlots practice generate fewer pollutants than those raised in households. The shift towards industrial production of livestock and poultry is easier to manage from the environmental perspective, but adequate large-scale cultivation is encouraged. Regulation control, manure treatment and financial subsidies for the manure treatment and utilization are recommended to achieve the ecological agriculture.

Contents

Theory

1. Role of livestock; its importance and production trends
2. Livestock species and breeds, cattle, sheep, goats, camel, equine, fish and wildlife
3. Zoological classification of domestic animals
4. General management practices
5. farm housing and sanitation
6. livestock production systems
7. Livestock housing systems
8. Housing and management of dairy animal
9. milking herd, dry stock, and replacement calves
10. Milking parlor; types and designs and equipments
11. Housing and management of small ruminants (sheds and shelters)
12. Plans for economical housing under different climatic conditions
13. Transportation and welfare of animals.

Practical

1. Identification of breeds of farm animals
2. Body measurements for weight estimation
3. Preparing animals for shows, Score card, Record keeping
4. Exercises on measurements and facilities for housing, Visit to livestock farms and shows.

Recommended Texts

1. Banergee, G.C. (1998). *A text book of Animal Husbandry*. New Delhi, India: Oxford and IBH Publishing Co.
2. Robert E. Taylor (2011). *Scientific Farm Animal Production 7th Ed*: Prentice Hall PTR

Suggested Books

1. Shah, S.I. (1994). *Animal Husbandry*. , Islamabad, Pakistan: National Book Foundation.
2. Mackintosh, J.B. (1993). *Sheep production in Pakistan*. Islamabad: Agricultural Research Council

The course aims at providing understanding of a writer's goal of writing (i.e. clear, organized and effective content and to use that understanding and awareness for academic reading and writing. The objectives of the course are to make the students acquire and master the grammatical academic writingskills. The course would enable the students to develop argumentative writing techniques. The students would be able to logically add specific details on the topics such as facts, examples and statistical or numerical values. The course will also provide insight to convey the knowledge and ideas in an objective and persuasive manner. Furthermore, the course will also enhance the students' understanding of ethical considerations in writing academic assignments and topics including citation, plagiarism, formatting and referencing the sources as well as the technical aspects involved in referencing.

Contents

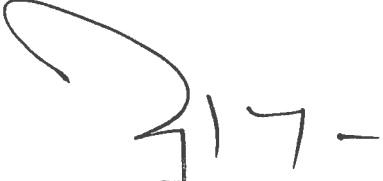
1. Developing Analytical Skills
2. Transitional devices (word, phrase and expressions)
3. Development of ideas in writing
4. Reading Comprehension
5. Precis Writing
6. Developing argument
7. Sentence structure: Accuracy, variation, appropriateness, and conciseness
8. Appropriate use of active and passive voice
9. Organization and Structure of a Paragraph
10. Organization and structure of Essay
11. Types of Essays

Recommended Texts

1. Bailey, S. (2011). *Academic writing: A handbook for international students* (3rd ed.). New York: Routledge.
2. Eastwood, J. (2011). *A Basic English grammar*. Oxford: Oxford University Press.
3. Swales, J. M., & Feak, C. B. (2012). *Academic writing for graduate students: Essential tasks and skills* (3rd ed.). Ann Arbor: The University of Michigan Press.
4. Swan, M. (2018). *Practical English usage* (8th ed.). Oxford: Oxford University Press.

Suggested Readings

1. Biber, D., Johansson, S., Leech, G., Conrad, S., Finegan, E., & Quirk, R. (1999). *Longman grammar of spoken and written English*. Harlow Essex: MIT Press.
2. Cresswell, G. (2004). *Writing for academic success*. London: SAGE.
3. Johnson-Sheehan, R. (2019). *Writing today*. Don Mills: Pearson.
4. Silvia, P. J. (2019). *How to write a lot: A practical guide to productive academic writing*. Washington: American Psychological Association
5. Thomson, A. J., & Martinet, A. V. (1986). *A Practical English Grammar*. Oxford: Oxford University Press


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Introductory/compulsory foundation course

Islamic Studies engages in the study of Islam as a textual tradition inscribed in the fundamental sources of Islam; Qur'aan and Hadith, history and particular cultural contexts. The area seeks to provide an introduction to and a specialization in Islam through a large variety of expressions (literary, poetic, social, and political) and through a variety of methods (literary criticism, hermeneutics, history, sociology, and anthropology). It offers opportunities to get fully introductory foundational basis of Islam in fields that include Qur'aanic studies, Hadith and Seerah of Prophet Muhammad (PBUH), Islamic philosophy, and Islamic law, culture and theology through the textual study of Qur'aan and Sunnah.

- To make students understand the relevance and pragmatic significance of Islam in their lives.
- To make learners comprehend the true spirit of Islam with reference to modern world.
- To generate a sense of Islamic principles as a code of living that guarantee the effective solutions to the current challenges of being.
- To provide Basic information about Islamic Studies
- To enhance understanding of the students regarding Islamic Civilization
- To improve Students skill to perform prayers and other worships
- To enhance the skill of the students for understanding the issues related to faith and religious life.

Contents

1. Introduction to Qur'aanic Studies

تعارف قرآن مجید

1) Basic Concepts of Qur'aan

قرآن مجید کا بنیادی تعارف

2) History of the compilation of Qur'aan

تاریخ جمع و تدوین قرآن مجید

3) Uloom-ul-Qur'aan

علوم القرآن

مطالعہ قرآن (تعارف قرآن مجید، منتخب آیات کا ترجمہ و تفسیر: سورۃ البقرہ آیات 1-5، 284-286؛ سورۃ الحجرات آیات 1-18؛ سورۃ الفرقان آیات 1-63؛ سورۃ المؤمنون آیات 1-11؛ سورۃ الاحزاب آیات 6، 21، 32، 33، 40، 56، 59؛ سورۃ الانعام آیات 151-153؛ سورۃ الصافات آیات 1-14؛ الحجر آیات 18-20؛ آل عمران آیات 190-192؛ النحل آیات 12-14؛ لقمن آیت 20، حم السجدہ آیت 53

2. Introduction to Hadith

تعارف حدیث

1) Legal Status of Hadith

حدیث کی قانونی حیثیت

2) History of the compilation of Hadith

تاریخ جمع و تدوین حدیث

3) Classifications of Hadith

حدیث کی اقسام


Chairman
Department of Islamic Studies
University of Sargodha

متن، حدیث: 1 درج ذیل موضوعات پر احادیث کا مطالعہ

- 1- اعمال کا اجریت پر منحصر ہے۔ 2- بہترین انسان قرآن کا طالب علم اور اس کا معلم ہے۔ 3- کتاب و سنت گراہی سے بچنے کا ذریعہ ہیں۔ 4- ارکان اسلام 5- اسلام، ایمان، احسان اور قیامت کی نشانیاں، 6- بچوں کو نماز کی تلقین 7- دین کا گہرا فہم اللہ کی خاص عنایت ہے۔ 8- حصول علم، تلاوت قرآن اور عمل کی اہمیت و اہمیت، 9- روزِ محشر میں ہونے والا محاسبہ، 10- حقوق اللہ کے ساتھ ساتھ حقوق العباد کا لحاظ رکھنا بھی لازم ہے 11- حسن خلق کی عظمت اور فحش و بد گوئی کی مذمت 12- دنیا و آخرت کی بھلائی کی ضامن چار چیزیں، 13- ہلاک کر دینے والی سات چیزیں، 14- بے عمل مبلغ کا عبرت ناک انجام 15- ہر شخص نگران ہے اور ہر شخص مسئول

3. Sirah of the Prophet (PBUH)

سیرت النبی ﷺ

1. Significance of Seerah Studies

مطالعہ سیرت کی ضرورت و اہمیت

2. Prophetic principles of Character building

تعمیر سیرت و شخصیت کا نبوی منہاج

اقامت دین کا نبوی طریق کار، اقامت دین بعد خلافت راشدہ، یثاق مدینہ، خطبہ حجۃ الوداع، اخلاقی تعلیمات، تشکیل اجتماعیت اور اسوہ حسنہ، قرآن مجید میں سیرت سرور عالم کا بیان، غزوات نبوی ﷺ کے مقاصد و حکمتیں

4. Islamic Culture & Civilization

اسلامی تہذیب و تمدن

1) Basic Concepts of Islamic Civilization

اسلامی تہذیب کا مفہوم

2) Historical evaluation of Islamic Civilization

اسلامی تہذیب کا تاریخی ارتقاء

3) Salient feature of Islamic Civilization

اسلامی تہذیب کی نمایاں خصوصیات

4) Islamic Civilization and Contemporary Issues

اسلامی تہذیب و تمدن اور معاصر مسائل

اسلامی تہذیب کے عوامل و عناصر، اسلامی تہذیب کے علمی، معاشرتی اور سماجی اثرات، تہذیبوں کے تصادم کے نظریے کا تنقیدی جائزہ، تہذیبی تصادم کے اثرات و نتائج، طبی، حیاتیاتی اور معاشرتی علوم میں مسلمانوں کا کردار، نامور مسلمان سائنسدان

Pre-Requisite: Nil

Recommended Books

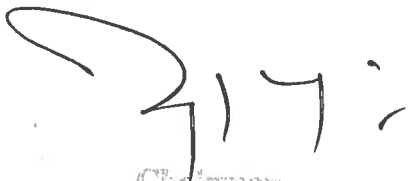
- 1) Hameed ullah Muhammad, —Emergence of Islam ,IRI, Islamabad
- 2) Hameed ullah Muhammad, —Muslim Conduct of State
- 3) Hameed ullah Muhammad, _Introduction to Islam
- 4) Ahmad Hasan, —Principles of Islamic Jurisprudence, Islamic Research Institute, International Islamic University, Islamabad (1993)
- 5) Dr. Muhammad Zia-ul-Haq, —Introduction to Al Sharia Al Islamia, Allama Iqbal Open University, Islamabad (2001)
- 6) Dr. Muhammad Shahbaz Manj, Teleemat-e- Islam

Chairman
Department of Islamic Studies
University of Gujrat

1. Meaning and Scope of Ethics.
2. Relation of Ethics with:
 - (a) Religion
 - (b) Science
 - (c) Law
3. Historical Development of Morality:
 - (a). Instinctive Moral Life.
 - (b). Customary Morality.(c). Reflective Morality.
4. Moral Theories:
 - (a). Hedonism (Mill) (b). Intuitionism (Butler)
 - (c). Kant's Moral Theory.
5. Moral Ethics and Society.
 - (a). Freedom and Responsibility.(b). Tolerance
 - (c). Justice
 - (d). Punishment (Theories of Punishment)
6. Moral Teachings of Major Religions:
 - a). Judaism
 - b). Christianity c). Islam
7. Professional Ethics:
 - a). Medical Ethics b). Ethics of Students
 - c). Ethics of Teachers d). Business Ethics

REFERENCE BOOKS:

1. William Lille. An Introduction to Ethics., London Methuen & Co. latest edition.
2. Titus, H.H. Ethics for Today. New York: American Book, latest edition.
3. Hill, Thomas. Ethics in Theory and Practice. N.Y. Thomas Y. Crowel, latest edition
4. Ameer Ali, S. The Ethics of Islam. Culcutta: Noor Library Publishers, latest edition
5. Donaldson, D.M. Studies in Muslim Ethics. London: latest edition. 6. Sayeed, S.M.A.(Tr.) Ta'aruf-e-Akhlaqiat. Karachi: BCC&T, Karachi University of


 Chairman
 Department of Arts & Sciences
 College of Agriculture
 University of Sargodha

The course introduces students to information and communication technologies and their application in the workplace. Objectives include basic understanding of computer software, hardware, and associated technologies. How computers can be used in the workplace, how communications systems can help boost productivity, and how the Internet technologies can influence the workplace. Students will get basic understanding of computer software, hardware, and associated technologies. They will also learn how computers are used in the workplace, how communications systems can help to boost productivity, and how the Internet technologies can influence the workplace.

Contents


1. Introduction, Overview of Information Technology.
2. Hardware: Computer Systems & Components, Storage Devices.
3. Software: Operating Systems, Programming and Application Software.
4. Databases and Information Systems Networks.
5. File Processing Versus Database Management Systems.
6. Data Communication and Networks.
7. Physical Transmission Media & Wireless Transmission Media.
8. Applications of smart phone and usage.
9. The Internet, Browsers and Search Engines.
10. Websites and their types.
11. Email Collaborative Computing and Social Networking.
12. E-Commerce.
13. IT Security and other issues.
14. Cyber Laws and Ethics of using Social media.
15. Use of Microsoft Office tools (Word, Power Point, Excel) or other similar tools depending on the operating system.
16. Other IT tools/software specific to field of study of the students if any.

Recommended Book

1. Discovering Computers 2022: Digital Technology, Data and Devices by Misty E. Vermaat, Susan L. Sebok; 17th edition.

Suggested Books

1. Computing Essentials 2021 by Timothy J. O'Leary and Linda I. O'Leary, McGraw Hill Higher Education; 26th edition.
- 2- Computers: Understanding Technology by Fuller, Floyd; Larson, Brian: edition 2018.


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This subject aims to yield students with a sense of practical relevance of biology to everyday life. This will make students comprehend life by understanding some of the molecular processes that occur in and around cells, to make students cognizant of biologic phenomenon (nature, body, etc.) on an evolutionary, ecological, behavioral, physiologic, tissue, cellular, and molecular level. In this subject students will examine how life is organized into hierarchical levels; how living organisms use and produce energy; how life grows, develops, and reproduces; how life responds to the environment to maintain internal stability; and how life evolves and adapts to the environment. Moreover, it will also enable them to investigate the biological molecules, homeostasis in vertebrates, and the influence of hormones on coordination and control systems of animal body. Upon completion of this subject students will be having an enhanced knowledge and appreciation of the basics of growth and development plans of animals and can develop cogent and critical arguments based on the course material.

Contents

1. Introduction: Nature and scope of biology, Branches of biology, Relationship between biology and psychology
2. Biological molecules: Carbohydrates, Proteins, Fats, Nucleic acids, Water
3. The cell: Structure and function of cell, Cell organelles, Different types of cells
4. Homeostasis: Osmoregulation, Structure and functions of Nephron, Thermoregulation
5. Coordination and control: Structure and physiology of Neuron, Introduction to central and peripheral nervous system, Hormones
6. Basics of growth and development: Embryonic and post embryonic development

Recommended Texts

1. Michael, J. and Lenardo. (2013). *Immune Homeostasis: Methods and protocol*. Humana press.
2. Campbell, M. and Christopher J. P. (2016). *Organismal homeostasis*. Momentum press.

Suggested Readings

1. Lisa A. U., Michael L. C., Steven A. W., Peter V. M., Jane B. R. and Neil A. C. (2016). *Campbell biology*. 11th Pearson
2. Cambell, N. A. Mitchell, I. G. and Reece, J. B. (2009). *Biology: Concepts and connections*. 6th edition San Francisco: Addison Wesley, Longman
3. Anna A. S., Richard B. P. (2019). *An Introduction to Conservation Biology* 2nd Edition. Sinauer Associates is an imprint of Oxford University Press



Chairperson
Department of Animal Sciences
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University of Sargodha

To prepare the students, not majoring in mathematics, with the essential tools of algebra to apply the concepts and the techniques in their respective disciplines. Mathematics, as a study of patterns, both practical and abstract, involves analytical thought, logical reasoning, problem solving skills, and precise communication. Because of its power and versatility, mathematics has often been called the "Queen of the Sciences." There is no field of scientific inquiry that does not express itself through the language of mathematics. An undergraduate degree in mathematics provides an excellent foundation for students who are interested in pursuing an advanced degree in mathematics or in a related specialized profession. Mathematics can also provide an excellent foundation for students considering professional degrees in such allied fields such as Law, Business Administration, or Medicine. The kinds of analytical and logical thinking skills that one develops while studying mathematics are precisely the skills that recruiters look for in potential employees. Jobs involving significant mathematical background also consistently rank near the top of the list in annual career surveys.

Contents

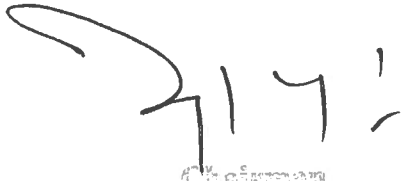
1. Real Numbers
2. Relations and Functions
3. Inequalities
4. Quadratic Functions and Complex Numbers
5. Linear Equations and Quadratic Equations: Formation of Linear equation
6. Solving Linear equation involving one variable
7. Solution of Quadratic equation by factorization method
8. Solution of quadratic equation by square completion methods
9. Solution of quadratic equation by quadratic formula
10. Application of quadratic equation
11. Sequence and Series
12. Types of Sequences; A. P, A. M., G. P., H. P
13. Trigonometric Functions, Trigonometric Applications
14. Graph of Functions and Modelling
15. Limits and Continuity
16. Derivatives, Integration
17. Probability and Binomial Theorem.

Recommended Texts

1. Gantert, A. X. (2009). *Algebra 2 and trigonometry*. New York: AMCOS School Publication INC.
2. Kaufmann, J. E. (1994). *College algebra and trigonometry* (3th ed.). Boston: PWS-Kent Pub. Co.

Suggested Readings

1. Swokowski, E. W. (1993). *Fundamentals of algebra and trigonometry* (8th ed.). Boston: PWS-Kent Pub. Co.
 2. Nauman, K. (2019). *Basic mathematics-I: algebra and trigonometry* (2nd ed.). Lahore: Al-Hassan Pub.
 3. Anton, H. (1999). *Calculus: A new horizon* (6th ed.). New York: John Wiley.
- Stewart, J. (2012). *Calculus* (7th ed.). Belmont: Brooks/Cole.


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SEMESTER-II

ANSC-5104

Principles of Animal Nutrition

3(2-1)

This is the course of under graduate level about animal nutrition. This course provides the student with the scientific principles of animal nutrition and feeding, furthering knowledge of the chemical composition and physical properties of feeds, digestion processes, nutrient metabolism, feed evaluation systems, nutrient requirements, and intake control and estimation mechanisms. It includes a series of practical activities to analyze feeds and make a nutritional evaluation as well as to estimate intake and nutrient requirements. The aim of the course is to acquaint students with basic concepts of nutrition and animal nutrition. This course focuses mainly on the chemical basis of nutrition and biochemical and physiological processes that are involved in nourishment of body. It elaborates how food and its components are utilized and why nutrients are essential for life. This course tells about functions of essential nutrients like proteins, fat, carbohydrates, vitamins and minerals. It also studies details of inter-conversion of nutrients and hormonal regulation of different biochemical processes. After taking this course students will be able to deeply understand basal body metabolism which is required for life and ways to estimate nutrient requirements.

Contents

Theory

1. Importance of nutrition in livestock and poultry production
2. history, scope and development of science of nutrition
3. basic concepts in animal nutrition
4. classification of nutrients and their functions
5. soil plant animal relationship
6. digestive systems
7. digestion and absorption of nutrients in different classes of livestock and poultry
8. flow of nutrients in animal body

Practical

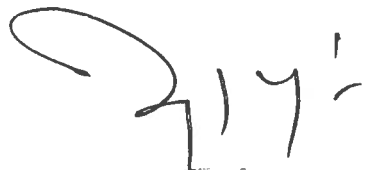
1. Identification of feed ingredients through visual and microscopic methods;
2. Parts of digestive system in ruminant and monogastric animals;
3. Collection of feed ingredients samples and their preparation

Recommended Texts

1. McDonald, P., Edwards, R.A., Greenhalgh, J.F.D. & Morgan, C.A. (2002). *Animal Nutrition*. UK: Longman scientific and technical publisher.
2. Pond, W.G. & Church, D.C. 2005. *Basic Animal Nutrition and Feeding*. India.: Wiley.

Suggested books

1. Khan, M.L. (2001). *Poultry Feeds and Nutrition*. Urdu Bazar, Lahore.: Kitabistan Pub. Co.
2. Cheeke, P.R. (2004). *Applied Animal Nutrition, Feeds and Feeding*. Canada: Delmar Publisher.



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University of Sargodha

This is an introductory course which enables the students to understand the basics of food science and technology. Students will explore and gain an understanding into the history of Food Science and the factors that have shaped Food Science in Pakistan, the organizations involved in Food manufacturing, food regulatory processes, Food composition, its classification depending on sources, consumption pattern and basic analysis of food components. The course is the study of the physical, biological, and chemical makeup of food; the causes of food deterioration; and the concepts underlying food processing. Food scientists and technologists apply scientific disciplines including chemistry, engineering, microbiology, and nutrition to the study of food to improve the safety, nutrition, wholesomeness and availability of food. Depending on their area of specialization, food scientists may develop ways to process, preserve, package, and/or store food according to industry and government specifications and regulations. It could involve enhancing the taste, making it last longer, making sure it's safe to eat, or even boosting its nutritional content.

Contents

Theory

- 1 Introduction to food science, food technology, relationship with other disciplines
- 2 Career opportunities. Significance of food science and technology
- 3 Food industry: history, developments, important food industries in Pakistan
- 4 Food sources: plants, animals and marine
- 5 Food constituents and their functions: water, carbohydrates, lipids, proteins, vitamins, minerals.
- 6 Classification of foods on the basis of perishability and pH
- 7 Food spoilage agents: enzymes, microorganisms, pests, physical factors
- 8 Principles of food preservation: prevention or delay of autolysis, microorganisms and pests

Practical

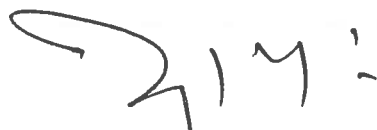
- 1 Use of basic food laboratory equipment.
- 2 Estimation of Moisture, Fat, Protein, Carbohydrates, Fiber and Ash content in food samples.
- 3 Determination of soluble solids, total solids, pH, Acidity, total sugars, Specific gravity and Refractive index.

Recommended Texts

- 1 Awan, J. A. (2018). *Food science and technology*. Faisalabad-Pakistan: Unitech Communications.
- 2 Robert, L. S., Ramirez, A. O., Clarke, A. D. (2015). *Introducing Food Science* (2nd ed.) CRC Press.

Suggested Readings

- 1 Stewart, G. F., & Amerine, M. A. (2012). *Introduction to food science and technology*. Elsevier.
- 2 Potter, N. N., & Hotchkiss, J. H. (2012). *Food science*. Springer Science & Business Media.



The main purpose of this course is to give brief introduction of Agricultural Extension education at undergraduate level. The students must know the history and philosophy of agricultural education in the development of present era agricultural system across the world. The following such as concepts of Extension education and rural development, principles of effective extension work, concepts of program planning, research, program evaluation and their importance in agricultural extension and rural development work, Role of communication and ICTs in extension work and development activities in rural areas for the growth of the masses are important to disseminate among undergraduate students so that students will prepare themselves to learn more advance ideas in agricultural education and research.

Contents

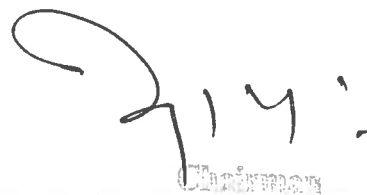
1. Agricultural extension; its definition, objectives and importance,
2. Types of education, Brief history/recent trends in agricultural extension,
3. Organizational setup of agricultural extension in Pakistan, Rural development, its definition/concept, objectives, importance and indicators,
4. Elements of rural development process.
5. Rural development through agricultural extension work in Pakistan, Characteristics and problems of Pakistani farmers,
6. Current issues and problems of rural development and extension work in Pakistan. Roles and duties of extension workers at various organizational levels,
7. Extension programs and activities since 1947 to date in Pakistan, role of communication and ICT in Extension and Rural Development work,
8. Principles of effective extension work. Adoption and diffusion of agricultural innovations, Agricultural Technology and its application for Pakistani farmers,
9. Extension, research and farmer's linkages, Basic concept of planning, monitoring and evaluation in Agricultural Extension.

Recommended Texts

1. Ray, G.L. (2006). *Extension Communication and Management*. New Dehli:Kalyani Publishers.
2. Ison, R. & Russell, D. (2004). *Agricultural Extension and Rural Development: Breaking out of Knowledge Transfer Traditions*. Cambridge: University Press.

Suggested Readings

1. Bashir, E. (2005). *Extension Methods* (2nd ed.). Islamabad: National Book Foundation.
2. Narasaiah, M.L. (2003). *Approaches to Rural Development*. New Delhi (India) :Discovery Publishing House.
3. Leeuwis, C. & Van den Ban, A. (2004). *Communication for rural Innovation: Rethinking Agricultural Extension* (3rd ed.) Wiley-Blackwell.



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College of Agriculture
University of Sargodha

General Education Cluster: Quantitative Reasoning

URCG-5120

Exploring Quantitative Skills

3(3-0)

This is an introductory-level undergraduate course that focuses on the fundamentals related to the quantitative concepts and analysis. The course is designed to familiarize students with the basic concepts of mathematics and statistics and to develop students' abilities to analyze and interpret quantitative information. Through a combination of theoretical concepts and practical exercises, this course will also enable students cultivate their quantitative literacy and problem solving skills while effectively expanding their academic horizon and breadth of knowledge of their specific major / field of study.

Course Learning Outcomes

By the end of this course, students shall have:

1. Fundamental numerical literacy to enable them work with numbers, understand their meaning and present data accurately;
2. Understanding of fundamental mathematical and statistical concepts;
3. Basic ability to interpret data presented in various formats including but not limited to tables, graphs, charts, and equations etc.

Contents

1. Numerical Literacy:
 - i. Numbers system and basic arithmetic operations;
 - ii. Units and their conversions, dimensions, area, perimeter and volume;
 - iii. Rates, ratios, proportions and percentages;
 - iv. Types and sources of data;
 - v. Measurement scales;
 - vi. Tabular and graphical presentation of data;
 - vii. Quantitative reasoning exercises using number knowledge.
2. Fundamental mathematical concepts:
 - i. Basics of geometry (lines, angles, circles, polygons etc.);
 - ii. Sets and their operations;
 - iii. Relations, functions, and their graphs;
 - iv. Exponents, factoring and simplifying algebraic expressions;
 - v. Algebraic and graphical solutions of linear and quadratic equations and inequalities;
 - vi. Quantitative reasoning exercises using fundamental mathematical concepts.
3. Fundamental Statistical Concepts:
 - i. Population and sample;
 - ii. Measures of central tendency, dispersion and data interpretation;
 - iii. Rules of counting (multiplicative, permutation and combination);
 - iv. Basic probability theory;
 - v. Introduction to random variables and their probability distributions;
 - vi. Quantitative reasoning exercises using fundamental statistical concepts.

Recommended Texts

1. Sevilla, A., & Somers, K. (2012). *Quantitative reasoning: tools for today's informed citizen*. New Jersey, John Wiley & Sons.
2. Burzynski, D., & Ellis, W. (2008). *Fundamentals of mathematics*. USA, Saunders College Publishing.

Suggested Readings

1. Zaslow, E. (2020). *Quantitative reasoning: thinking in numbers*. Cambridge, Cambridge University Press.
2. de Mesquita, E. B., & Fowler, A. (2021). *Thinking clearly with data: A guide to quantitative reasoning and analysis*. New Jersey, Princeton University Press.
3. Bennett, J., & Briggs, W. (2019). *Using & understanding mathematics: a quantitative reasoning approach*. Pearson.
4. Rosen, K. H., & Krithivasan, K. (2012). *Discrete mathematics and its applications* (Vol. 6). New York: McGraw-Hill.
5. Chatfield, C. (2018). *Statistics for technology: a course in applied statistics*. Routledge.
6. Lock, R. H., Lock, P. F., Morgan, K. L., Lock, E. F., & Lock, D. F. (2020). *Statistics: Unlocking the power of data*. New Jersey, John Wiley & Sons.

This course will introduce students with the subject matter of social science, its scope, nature and ways of looking at social phenomenon. It will make the participants acquaintance with the foundations of modern society, state, law, knowledge and selfhood. While retaining a focus on Pakistani state and society, students will encounter theoretical concepts and methods from numerous social science disciplines, including sociology, politics, economics anthropology and psychology and make them learn to think theoretically by drawing on examples and case studies from our own social context. Students will be introduced to the works of prominent social theorists from both western and non-western contexts. Instruction will include the use of written texts, audio-visual aids and field visits. **Learning Outcomes:**

The course has following outcomes: It will

- Introduce student with the nature of human social behavior and foundations of human group life
- Analyze the reciprocal relationship between individuals and society.
- Make student aware with the nature of societies existing in modern world
- Make students familiar with the philosophy of knowledge of social sciences
- Introduce students with the works of prominent theories explain human group behavior
- Help students to understand the foundations of society including culture, socialization, politics and economy
- Introduce students with various dimensions of social inequalities with reference to gender, race, ethnicity and religion
- Make them aware about the understanding of various themes pertains to social science in local context
- Help them recognize the difference between objective identification of empirical facts, and subjective formulation of opinionated arguments

Course Outlines:

1. Introduction to Social Sciences

- Social world, Human Social behavior, Foundations of society
- Evolution of Social sciences
- Philosophy of Science
- Scope and nature of social sciences
- Modernity and social sciences
- Branches of social science: Sociology, Anthropology, Political Science, Economics

Society and Community, Historical evolution of Society

- Types of Societies
- Foraging society, Horticultural society, Pastoralist society
- Agrarian societies, Industrial society, Postindustrial society

2. Philosophy of Knowledge in social Science and social inquiry

- Understanding social phenomenon
- Alternative ways of knowing
- Science as a source to explore social reality
- Objectivity, Value-Free research
- Positivism vs Interpretivism
- Qualitative vs Quantitative

3. Culture and Society

- Idea of Culture, Assumptions of Culture

- Types, Components, Civilization and culture
 - Individual and culture. Cultural Ethnocentrism, Cultural Relativism
 - Outlook of Pakistani culture
 - Global Flows of culture, Homogeneity, Heterogeneity
- 4. Social Stratification and Social inequality**
- Dimensions of inequality, Social class
 - Gender, Race, Religion, Ethnicity, Caste
 - Patterns of social stratification in Pakistan
 - Class, caste system in agrarian society
 - Ascription vs Achievement, Meritocracy
 - Global stratification in modern world, Global patterns of inequality
- 5. Personality, Self and Socialization**
- Concept of self, Personality
 - Nature vs Nurture, Biological vs Social
 - Development of Personality
 - Socialization as a process, Agents of socialization
 - Socialization and self/group identity
- 6. Gender and Power**
- Understanding Gender
 - Social construction of Patriarchy
 - Feminism in Historical context, Gender Debates
 - Gender and Development
 - Gender issues in Pakistani society, Women Participation in politics, economy and education
 - Toward a gender sensitive society, Gender mainstreaming
- Pakistan: State, Society, Economy and Polity**
- Colonialism, colonial legacy, National identity
 - Transformation in Pakistani society: Traditionalism vs Modernism
 - Economy, Informality of Economy, Modern economy and Pakistan
 - Political Economy, Sociology of Economy

Recommended Textbooks and Reading Materials:

1. Giddens, A. (2018). Sociology (11th ed.). UK: Polity Press.
2. Henslin, J. M. (2018). Essentials of Sociology: A Down-to-Earth Approach.(18th Edition) Pearson Publisher.
3. Macionis, J. J. (2016). Sociology (16th ed.). New Jersey: Prentice-Hall.
4. Qadeer, M. (2006) Pakistan - Social and Cultural Transformation in a Muslim Nation.
5. Smelser, N.J. and Swedburg, R., The Handbook of Economic Sociology, Chapter 1 'Introducing Economic Sociology', Princeton University Press, Princeton.
6. Systems of Stratification | Boundless Sociology (no date). Available at: <https://courses.lumenlearning.com/boundless-sociology/chapter/systems-of-stratification/>
7. Jalal, A. (ed.) (1995) 'The colonial legacy in India and Pakistan', in Democracy and Authoritarianism in South Asia: A Comparative and Historical Perspective. Cambridge: Cambridge University Press (Contemporary South Asia)
8. Zaidi, S. A. (2015) Issues in Pakistan's Economy: A Political Economy Perspective. Oxford University Press. Chapter 26
9. Akhtar, A. S. (2017) The Politics of Common Sense: State, Society and Culture in Pakistan. Cambridge: Cambridge University Press.
10. Smelser, N.J. and Swedburg, R., The Handbook of Economic Sociology, Chapter 1 'Introducing Economic Sociology', Princeton University Press, Princeton.

This is the course of under graduate level about the principles involved in heredity. The aim of the course is to understand the basic concepts in the field of genetics. The learning objective of the course is to understand how the behavior of chromosomes during Meiosis can explain Mendel's Laws of Equal Segregation and Independent Assortment. Their key features of chromosomal behavior in meiosis that causes the alleles to be segregated. Genetics is the study of how heritable traits are transmitted from parents to offspring. Humans have long observed that traits tend to be similar in families. It wasn't until the mid-nineteenth century that larger implications of genetic inheritance began to be studied scientifically. Genetic is the fascinating subject of biological science which offers a lot of scope for the welfare of mankind. This course covers the sequence in which the discoveries in the science of genetics were made commencing with the Mendelian genetics. Lead into the fact that the study of heredity is called genetics. Pass out chromosome sticks and the nucleus cut from construction paper. Review meiosis and ask what the sticks and labels are representative of based on our study of meiosis. Use the chromosome models to lead into the concepts of: chromosome pairs, genes, dominant trait, recessive trait, heterozygous, genotype and phenotype. This course will help the students to understand about basic knowledge of Mendelian genetics.

Contents

Theory

1. Genetics: historical development and scope.
2. Genetic basis of inheritance: cell and cell division
3. Physical basis of inheritance
4. Gametogenesis, Mendelism: basic terminology
5. Mendel's laws, monohybrid and polyhybrid crosses
6. Allelic and non-allelic interactions and examples
7. Probability: concept and laws of probability, Chi-square test and its applications
8. Modified segregation ratios, Multiple allelomorphism
9. Genetics of sex: sex determining mechanisms
10. sex linkage and its variation
11. Polygenic inheritance, Pleiotropy
12. Linkage, crossing over and chromosomal mapping, Extranuclear inheritance
13. Multiple allele and its inheritance, Genetic counselling

Practical


1. Microscopic studies on animal cells undergoing mitosis and meiosis.
2. Numerical problems on topics discussed in theory.

Recommended Texts

1. Kor Oldenbroek en Liesbeth van der Waaij, (2014). *Animal breeding and genetics for BSc students*. Netherland: Wageningen university
2. Khan, F. H. & Singh, A. (2002). *Principles of Genetics and Animal Breeding*. India: Jaypee Brothers Medical Publishers (P) Ltd.

Suggested Books

1. Susan, L. E. (2001). *Theory and Problems of Genetics; Schaum's Outline Of Genetics*. USA: McGraw-Hill publisher.


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2. Weaver, R. F. & Hedrick, P. W. (1997). *Genetics*. Iowa, USA: WM. C. Publishers.

Handwritten signature or initials, possibly "P. W. Hedrick".

Department of Animal Science
College of Agriculture
University of Saskatchewan

The main aim of this course is to provide the basic knowledge and background about Pakistan's Agriculture. Basic Agriculture is a graduate-level course which gives the students a basic knowledge of agriculture, its different branches, allied disciplines, salient features of Pakistan's agriculture including climate, land resources etc. as well as the problems of Pakistan agriculture. There will be detailed discussion about the various agro-ecological zones of Pakistan. Basic knowledge about agricultural inputs such as seed, fertilizer, irrigation etc. will be communicated. Crop growth related problems like weeds, insect pests will be elaborated. The knowledge of post-harvest technology will also be shared with the students.

Contents

Theory

- 1 Agriculture, history, importance, branches and allied sciences.
- 2 Salient features of Pakistan's agriculture.
- 3 Climate, land and water resources.
- 4 Agro ecological zones of Pakistan. Farming systems.
- 5 Tillage: objectives and types. Seed: types and quality.
- 6 Crop nutrients, manures and fertilizers, sources and methods of application.
- 7 Irrigation: systems, types and management. Crop protection measures.
- 8 Crop rotation. Harvesting, processing, storage and marketing of farm produce.
- 9 Agro-based industries.
- 10 Environmental pollution and health hazards.

Practical

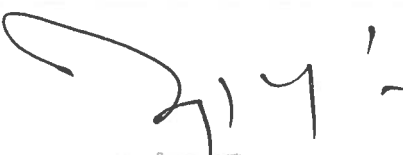
- 1 Land measuring units.
- 2 Demonstration of hand tools and tillage implements.
- 3 Identification of meteorological instruments.
- 4 Identification of crop plants, weeds and seeds.
- 5 Identification of organic and inorganic fertilizers.
- 6 Calculation of nutrient-cum-fertilizer unit value.
- 7 Demonstration of various irrigation methods.
- 8 Field visits.

Recommended Texts

- 1 Bashir, E. and Bantel, R. (2001). *Soil Science*. , Islamabad: National Book Foundation.
- 2 Brady, N.C. and Weil, R.R. (2009). *Elements of the Nature and Properties of Soils*. (3rd Ed) Upper Saddle River, NJ, USA : Pearson Education.

Suggested Readings

- 1 Hillel, D. (2008). *Soil in the Environment: Crucible of Terrestrial Life*. Burlington, MA, USA: Elsevier Inc.,
- 2 Singer, M. J. & Munns, D. N. (2002). *Soils- An Introduction* (5th ed). Upper Saddle River, NJ, USA: Prentice-Hall, Inc.
- 3 Das, D.K. (2011). *Introductory Soil Science* (3rd ed). New Delhi, India : Kalyani Publ.


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University of Sindh

URCG-5111

Translation of the Holy Quran - I

Non-Credit

Topic	Details
Semester/Level	In some discipline 1 st semester and in some discipline 2 nd Semester/ ADP Program 1 st Year
Objectives	<ul style="list-style-type: none"> To familiarize the students to keys and fundamentals of recitation of the holy Quran. To develop the skill of the students of recitation the last revelation. Students will learn the basic Arabic grammar in a practical way. To develop an eagerness among the students to explore the last divine Book.
Course Contents:	<ul style="list-style-type: none"> تیسواں پارہ - ناظرہ مع تجوید بنیادی عربی گرامر اسم اور اسکے متعلقات : اسم فاعل ، مفعول ، تفضیل ، مبالغہ فعل اور اسکی اقسام : ماضی ، مضارع ، امر ، نہی حرف اور اسکی اقسام : حروف علت ، حروف جارہ ، مشبہ بالفعل
Memorization:	تیسویں پارے کی آخری بیس سورتیں (حفظ مع ترجمہ)

The course will enable students to explore human experiences, cultivate an appreciation of the past, enrich their capacity to participate in the life of their times, and enable an engagement with other cultures and civilizations, both ancient and modern. But independently of any specific application, the study of these subjects teaches understanding and delight in the highest achievements of humanity. The three components of the course, including fables, wisdom literature and epic, will enable the learners to explore and understand the classic tradition in literature. Development of personal virtue, a deep Sufi ethic and an unwavering concern for the permanent over the fleeting and the ephemeral are some of the key themes explored in the contents that will develop an intimate connection between literature and life.

Contents

1. Fables
 - The Fables of Bidpai
 - The Lion and the Bull
 - The Ring-dove
 - The Owls and the Crows

Selected poem from Bang-i-Dara
2. Gulistan-e- Sa'di
 - Ten hikāyāt from John T. Platts, *The Gulistan*
3. Epic
 - THE SHĀHNĀMA OF FIRDAUSI

Recommended Texts

1. John T. P. (1876). *The Gulistan; or, Rose Garden of Shaikh Muslihu'd- Dīn Sa'dī of Shīrāz*. London: Wm. II. Allen.
2. Chishti, Y.S. (1991). *Sharah-i bāng-i darā*. Lāhaur: Maktaba-i ta'mīr-i insāniyat

Suggested Readings

1. Thackston, W. (2000). *A Millennium of Classical Persian Poetry*. Maryland: Ibex Publishers.
2. Wood, R. (2013). *Kalila and Dimna: Fables of Conflict and Intrigue*. United Kingdom: Medina Publishing, Limited.

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مطالعہ میراث النبی صلی اللہ علیہ وسلم Seerat of the Holy Prophet

Course Code :

URCG-5127

Title	Description
Semester	
Nature of Course	
No. of C.Hrs.	1(1-0)
Total Teaching weeks	18
Objectives of the Course	<p>۱۔ طلبہ کو مطالعہ میراث النبی صلی اللہ علیہ وسلم کی ضرورت و اہمیت سے آگاہ کرنا</p> <p>۲۔ غیر فضیلت میں مطالعہ میراث النبی صلی اللہ علیہ وسلم کے کردار کو راجح کرنا</p> <p>۳۔ بیعت نبوی کے موقع پر اقامت عالم کی عمومی صورت حال سے آگاہ کرنا</p> <p>۴۔ رسول اکرم صلی اللہ علیہ وسلم کی اسی اور دینی زندگی کا اس طرح مطالعہ کرانا کہ طلبہ ان واقعات سے تاریخ کا استفادہ کر سکیں</p> <p>۵۔ طلبہ کو محمد نبوی کی معاشرت، سیاست، معیشت سے آگاہ کرنا</p>

Course Description

S.No.	Title	Description
1	حضور صلی اللہ علیہ وسلم کے ابتدائی حالات و زندگی	۱۔ حضور صلی اللہ علیہ وسلم کا خاندانی حسب و نسب ۲۔ پیدائش اور ابتدائی تربیت ۳۔ لوہین اور حجازی کے حالات و زندگی
2	بیعت نبوی کے وقت و جگہ کے حالات (۱)	۱۔ بیعت نبوی کے وقت اہم تہذیبیں ۲۔ عرب، مصر، حبشہ، یونانی، ساسانی
3	بیعت نبوی	۱۔ ان کی آمد میں دعوت اسلام
4	بیعت نبوی	۱۔ ان کی آمد میں دعوت اسلام
5	حصان النبی	آپ بکلو پیٹا براس
6	حصان النبی	بشیت استاد و احکم
7	حصان النبی	بشیت جابر
8	حصان النبی	بشیت سرور اور سیاست
9	حصان النبی	ذاتی خاص اور عالمگیر اثرات

نمبر	نام کتاب	نوع کتاب
10	مباحث اثنی	ناموس رسالت
11	اسوخت اور عصر حاضر	غیر مسلموں سے تعلقات
12	اسوخت اور عصر حاضر	اسوخت کی روشنی میں گھریلو زندگی
13	اسوخت اور عصر حاضر	مستشرقین اور مطالعہ ہیرت
15	اسوخت اور عصر حاضر	وطن سے محبت اور ہیرت
16	اسوخت اور عصر حاضر	مستشرقین کے اعتراضات اور ان کے جوابات

نصابی کتب

نمبر	نام کتاب	نوع کتاب
1	اسیر و شہید	ابن ہشام
2	سیر النبی صلی اللہ علیہ وسلم	مولانا علی اصمائی صمدی
3	رحمۃ اللعالمین	قاضی محمد سلیمان مسعود پوری
4	تاریخ صلی اللہ علیہ وسلم	مولانا سیدنا حسن علی ندوی
5	مہر نبوی کا نظام حکومت	ڈاکٹر یحییٰ مظهر مدنی
6	الاسان کالم	ڈاکٹر خالد ملوی

حوالہ جاتی کتب

نمبر	نام کتاب	نوع کتاب
1	سیرت سرور عالم صلی اللہ علیہ وسلم	سید ابوالاعلیٰ مودودی
2	تاریخ الخلفاء	مولانا سلی الرحمن مہدی پوری
3	قیام النبی صلی اللہ علیہ وسلم	پروفیسر محمد کرم شاہ نانا پوری
4	السيرة النبوية المصيبة	ڈاکٹر آرمینڈا پراچری
5	اصحاح	مولانا سید ابوالاعلیٰ مودودی

Department of Animal Husbandry
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SEMESTER-III

ANSC-5106

Introduction to Veterinary Anatomy

3(2-1)

The course aims to introduce students with basic anatomy of farm animals. Veterinary anatomy is the study of the internal biological structures and systems of animals, including the respiratory, cardiovascular, reproductive and neurological systems. Undergraduate programs in veterinary technology and animal science often include animal anatomy classes. The anatomy of animals has long fascinated people; with mural paintings depicting the superficial anatomy of animals, dating back to the Paleolithic era. Anatomy and physiology are unarguably fundamental aspects of medical education and can be taught in many ways including dissection, 'self-directed learning' and 'problem based learning'. Recent developments in technology have allowed digital anatomical models to be implemented into university curricula, allowing wider access to the study of anatomy for the contemporary student. This course will help the students to identify different anatomical structures of livestock. They will be able to differentiate animal species based on internal structures. Approach of students towards therapeutic treatments for different anomalies will become easy due to proper understanding of anatomical positions of different organs.

Contents

Theory

1. Anatomical terminology, classification and functions of skeleton
2. muscular and nervous system; skeletal muscles and their functions; muscle contraction; levers
3. neurons: receptors; the reflex arc
4. digestive system: the mouth, teeth, tongue, salivary glands, pharynx, esophagus, ruminant and non-ruminant, stomach, intestines, pancreas, liver and spleen; the peritoneum
5. respiratory system: the nostrils, nasal cavity, pharynx, larynx and trachea; pleura and lungs
6. urinary system: the kidneys, ureters, urinary bladder and urethra
7. genital system: male genital organs including scrotum, testes, spermatic cord, vesiculae seminalis, prostate, uterus masculinus, bulbourethra glands and the penis
8. female genital organs including ovaries, fallopian tubes, uterus, vagina, vulva and mammary glands
9. endocrine glands: hypophysis cerebri, epiphysis cerebri, thyroid, parathyroid, adrenal, pancreas, ovaries and testes
10. angiology study of heart pericardium and major arteries and veins; superficial lymph glands
11. anesthesiology: study of sense organs and the common integuments

Practical


1. Identification of various bones, ligaments, tendons and their attachment to the bones
2. Form, structure and topographical study of various organs located in the thoracic, abdominal and pelvic cavities of different domestic animals

Recommended Texts

1. Frandson, R. D. (1975). *Anatomy and Physiology of Farm Animals*. USA: Lea and Febiger, Philadelphia.
2. Sisson, A. & Grossman J. D. (1972). *Anatomy of Domestic Animals*. USA: W.B. Saunders Co., Philadelphia.

Suggested Books

1. Ankers R.M. & Denbow D.M. (2008). *Anatomy and Physiology of Domestic Animals*. UK: Blackwell Publishing Ltd.
2. Molgaard. (1999). *Veterinarian Anatomy and Physiology*. USA: Delmar Publishers.


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University of Baghdad

This is the course of under graduate level about welfare of farm animals. Globally, livestock production is the largest user of agricultural land and livestock. Humans farm animals to provide food and animal products to satisfy the 7.4 billion people alive in the world and to cater for a change in dietary preference to one in which greater quantities of meat and dairy products are consumed. Although humans have been farming animals for a very long time there is still much to learn about farmed animals' needs, and how best to develop practical and economic environments and production systems that not only minimize welfare challenges, but also provide a good quality of life. While considerable progress has been made in improving farm animal welfare over the past few decades (such as better-quality veterinary care, enhanced nutrition, and a greater understanding of animal behavior and genetics), there are still some long-standing welfare issues facing today's farmed animals that have proved difficult to deal with.

Contents

Theory

1. Basic terminology of behavior and welfare
2. development of behavior, basic concepts; why to study behavior
3. behavioral profiles of farm animals (dairy animals, small ruminants, equines and camels); types of animals behavior; communication; hormones and behavior
4. behavior in relation to training, handling, feeding, transport and slaughter of animals
5. animal well-being (the ultimate goal); rights of animals (legal and moral)
6. Eliminating all sorts of stress.

Practical

1. Methods of assessing behavior; demonstration about five freedoms
2. observing territoriality, social behavior including courtship, mate guarding, mate choice and play behavior; determining flight and fight zones in various species
3. Observing aggressive, sexual and eliminative behavior and observing cases of undue stress on account of beating, exposure to severe hot and cold weather, carelessness in feeding, overcrowding, overloading, underfeeding and overworking by lame, emaciated and diseased animals, then writing report based on these observations.

Recommended Texts

1. Katherine a. haupt (2018). *Domestic animal behavior for veterinarians and animal scientist*: Wiley
2. Banergee, G.C. (1998). *A textbook of Animal Husbandry*. New Delhi, India: Oxford and IBH Publishing Co.

Suggested Books

1. Blackshaw, J.K. (2003). *Notes on some topics of applied animal behavior*. Australia: School of vet. Sci., University of Queensland.
2. Goodenough, J. (1993). *Perspectives of animal behavior*. New York.: John Wiley and Sons.
3. Prasad, S (2004). *Animal behavior*. New Delhi, India: CBS publishers and Distributors.



Chairman
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The course provides the students theoretical and practical knowledge about veterinary medicine, and imparts skills to diagnose and prevent important livestock diseases in Pakistan. Medicine is the art and science of healing. Preventive healthcare, or prophylaxis, consists of measures taken for disease prevention. Veterinary medicine is the branch of medicine that deals with the prevention, control, diagnosis and treatment of disease, disorder and injury in animals and along with this, it also deals with animal rearing, husbandry, breeding, research on nutrition and product development. The scope of veterinary medicine is wide, covering all animal species, both domesticated and wild, with a wide range of conditions, which can affect different species; however, this course deals with the domestic animals only. Preventive veterinary medicine is a field of veterinary medicine that focuses on the detection and dissemination of information to prevent, control, or eradicate diseases that may affect both animals and humans. This course introduces the students with basic concept of preventive medicine. The students will study about concept of modern disease diagnostic techniques.

Contents

Theory

1. Concept of disease and health in animal and human medicine.
2. Importance of animal diseases in national economy, signs of health and disease.
3. Types of animal diseases on the basis of etiology.
4. Stress and immune system, body defense against diseases.
5. Principles of treatment of diseases, prevention, control and eradication of diseases.
6. Etiology, epidemiology, pathogenesis, diagnosis, treatment, prevention, control and eradication (where relevant) of important diseases/disorders of livestock
7. Macro and micro element deficiencies and imbalances relevant in Pakistan.
8. Disinfection, biosecurity and metaphalixis.
9. Zoonosis, WTO Accord in relation to the animal diseases prevalent in Pakistan.
10. Drug residues, veterinary medicine in relation to human health.

Practical

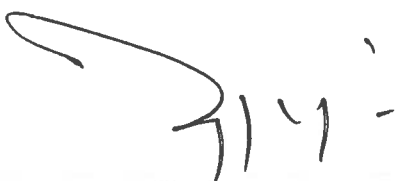
1. Behavior of different animal species as it relates to the practice of veterinary medicine. Demonstration of methods of restraining of different animal species.
2. Recording the cardinal parameters of health (Body temperature, pulse and respiration).
3. Demonstration of disease diagnostic methods
4. Methods of drug administration in animals (oral and parenteral).
5. Demonstration of veterinary first aid procedures

Recommended Texts

1. Har pal Singh, Amresh Kumar, P. C. Chauduri (1990). *Veterinary clinical guide*: Kalyani Publishers
2. D.C Blood, O. M. Radostits, J. A. Henderson (2010). *Veterinary Medicine*: University of Minnesota.

Suggested Books

1. Chakrabarti, A., (2000). *A Textbook of Preventive Veterinary Medicine*. New Delhi, India : CBS & IBH Publications.
2. Hungerford, T.G. (1991). *Hungerford's Diseases of Livestock* (9th ed.). Sydney, Australia: McGraw-Hill Book Co.


Chairman
Department of Animal Sciences
College of Veterinary Medicine
University of Sargodha

This course is graduate level course and the introductory course about the commercial poultry and rural poultry farming in Pakistan. Study of poultry as science is one of the major disciplines of animal science and includes broiler, layer and breeder production and hatchery management. This course tells about components of commercial poultry industry and basic terms used in the poultry science. This course also tells about role of poultry industry in national economy and importance of poultry in our daily lives. It also elaborates the history and status of poultry production in Pakistan. This course also studies the types of poultry birds, their species and breeds and body characteristics. This course is aimed at introducing the commercial poultry housing and poultry farming as an enterprise. After taking this course students will be able to know the importance of poultry farming, the basics of commercial poultry farming and significance of poultry business.

Contents

Theory

1. Importance of poultry science
2. Status of poultry production in Pakistan
3. Classification of world poultry
4. Poultry breeds and their characteristics
5. Strains for egg and meat production
6. Basic terms used in poultry production
7. Poultry housing and its types
8. Equipments used in poultry production
9. Poultry feeding
10. Selection and culling in poultry
11. Waste management
12. Rural poultry production
13. Biosecurity
14. Record keeping

Practical

1. Description and demonstration of different poultry breeds
2. Body parts of chicken
3. Structure of egg
4. Selection and culling techniques
5. Dead bird disposal pit
6. Visit to commercial poultry farms

Recommended Texts

1. Morley A. jull (2003) *Successful poultry management*. Biotech Books.
2. N. Gosh (2015). *Poultry science and practice*. CBS Publishers & Distributors.

Suggested Books

1. Bell, D. D. & William, D. W. Jr. (2002). *Commercial Chicken Meat and Egg Production* (5th ed.). USA: Springer publisher.
2. Boushy, El. A. H & Van der Poel A. F. B. (2000). *Handbook of Poultry Feed from Waste*. Netherlands: Springer.

Haq, A. & Akhtar M. (2004). *Poultry Farming*. Islamabad, Pakistan: Higher Education Commission.

This course is designed for under graduate programs of agriculture sciences. The objective of this course is to impart basic and applied knowledge about statistics for collection, presentation, analysis and interpretations of data related to agriculture issues. After completing this course agriculture students will be able to understand the general concepts of basic statistics, to conduct agriculture surveys, to understand design of experiments, and other statistical tools. These statistical concepts are further will be helpful to complete a research related to agriculture sciences. Moreover over students will also learn some statistical softwares such as Minitab, SPSS and Design Expert to improve their computational and analytical skills.

Contents

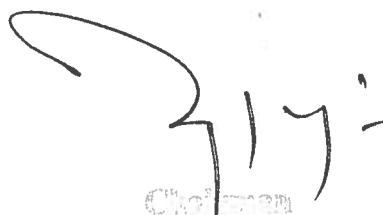
1. Definition and importance of Statistics in Agriculture.
2. Data, Different types of data and variables
3. Classification and Tabulation of data.
4. Frequency distribution, Graphical representation of data.
5. Measure of Central tendency and Measure of Dispersion. Calculation of averages, Range, variance, Standard deviation and coefficient of variation.
6. Regression and Correlation Analysis: Simple and Multiple regression, correlation cases.
7. Sampling and its types: Probability and non-Probability Sampling, Simple random sampling, stratified random sampling, Systematic sampling, Sampling and non-sampling error
8. Sampling distribution of mean and difference between two means.
9. Inference Theory: Estimation and testing of hypothesis, Type-I and type-II error, Testing of hypothesis about mean and difference between two means using Z-test and t-test, Paired t-test.
10. Test of association of attributes using χ^2 (chi-square) Testing hypothesis about variance.
11. ANOVA and its assumptions, One-way ANOVA, Two-way ANOVA.

Recommended Texts

1. Muhammad, F. (2000). *Statistical methods and data analysis*. Pakistan: Ilmi Kitab Khana.
2. Rao, G. N. (2007). *Statistics for agricultural sciences* (2nd ed.). BS Publication.

Suggested Readings

1. Lawal, B. (2014). *Applied statistical methods in agriculture, health and life sciences*. USA: Springer.
2. Sahu, P. K. (2016). *Applied statistics for agriculture, veterinary, fishery, dairy and allied fields*. USA: Springer.
3. Crawshaw, J. & Chambers, J. A. (1994). *Concise course in A. level statistic with world examples*. USA: Springer.


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Department of Agricultural Sciences
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University of Sargodha



General Education Cluster: Quantitative Reasoning

URCG-5121

Tools for Quantitative Reasoning

3(3-0)

This is a sequential undergraduate course that focuses on logical reasoning supported with mathematical and statistical concepts and modeling / analysis techniques to equip students with analytical skills and critical thinking abilities necessary to navigate the complexities of modern world. The course is designed to familiarize students with the quantitative concepts and techniques required to interpret and analyze numerical data and to inculcate ability in students the logical reasoning to construct and evaluate arguments, identify fallacies, and think systematically. Keeping the pre-requisite course of Quantitative reasoning (I) as its base, this course will enable students further their quantitative. Logical and critical reasoning abilities to complement their specific major field of study

Course Learning Outcomes

By the end of the course, student shall have:

1. Understanding of logic and logical reasoning:
2. Understanding the basic quantitative Modeling and Analyses.
3. Logical reasoning skills and abilities to apply them to solve quantitative problems and evaluate arguments;
4. Ability to critically evaluate quantitative information to make evidence based decisions through appropriate computational tools.

Contents

1. Logic, Logical and Critical Reasoning:
 - i. Introduction and importance of logic,
 - ii. Introductory, deductive and abductive approaches of reasoning,
 - iii. Propositions, arguments (valid; invalid), logical connectives, truth tables and propositional equivalences,
 - iv. Logical fallacies,
 - v. Venn Diagrams,
 - vi. Predicates and quantifiers,
 - vii. Quantitative reasoning exercises using logical reasoning concepts and techniques.
2. Mathematical Modeling and Analyses:
 - i. Introduction to deterministic models,
 - ii. Use of linear function for modeling in real-world situations,
 - iii. Modeling with the system of linear equation and linear solutions,
 - iv. Elementary introduction to derivatives in mathematical modeling,
 - v. Linear and exponential growth and decay models,
 - vi. Quantitative reasoning exercises using mathematical modeling.
3. Statistical Modeling and Analyses:
 - i. Introduction to probabilistic models,
 - ii. Bivariate analysis, scatter plots,
 - iii. Simple linear regression model and correlation analysis,
 - iv. Basics of estimation and confidence interval,
 - v. Testing of hypothesis (z-test; t-test),
 - vi. Statistical inference in decision making,
 - vii. Quantitative reasoning exercise using statistical modeling.

Recommended Texts

1. Bennett, J., & Briggs, W. (2019). *Using & understanding mathematics: a quantitative reasoning approach*. Pearson.
2. Rosen, K. H., & Krithivasan, K. (2012). *Discrete mathematics and its applications* (Vol. 6). New York: McGraw-Hill.

Suggested Readings

1. Epp, S. S. (1990). *Discrete mathematics with applications*. Wadsworth Publ. Co..
2. Budnick, F. S., Quinn, S., Bowser, K., & Flaherty, E. H. (1993). *Applied mathematics for business, economics, and the social sciences*. New York: McGraw-Hill.
3. Bluman, A. (2014). *Elementary Statistics: A step by step approach 9e*. McGraw Hill.
4. Mann, P. S. (2007). *Introductory statistics*. John Wiley & Sons.
5. Babones, S. (2013). *Applied statistical modeling. (No Title)*.
6. Green, S. W., Wolf, I.k., Stewrat, B. W. (2022). *SAT Study Guide Premium*. Barrons

URCG-5119

Expository Writing

3 (3-0)

This course prepares undergraduates to become successful writers and readers of English. The course helps students develop their fundamental language skills with a focus on writing so that they can gain the confidence to communicate in oral and written English outside the classroom. The course is divided into five units and takes a Project-based Learning approach. Unit themes target the development of 21st century skills and focus on self-reflection and active community engagement. The course completion will enable the students to develop communication skills as reflective and self-directed learners. They will be able to intellectually engage with different stages of writing process, and develop analytical and problem-solving skills to address various community-specific challenges.

Contents

1. Self-Reflection
 - Introduction to the basics of the writing process
 - Introduction to the steps of essay writing
 - Prewriting activities: Brainstorming, listing, clustering and freewriting
 - Practicing Outlining of the essay
2. Personalized Learning
 - Learning Process, Learning Styles, Goal Setting and Learning Plan
3. Oral Presentation
 - Structure and Significance, Content Selection and Slide Presentation, Peer Review
4. Critical Reading Skills
 - Introducing Authentic Reading (Dawn and non-specialist academic books/texts)
 - Reading Strategies and Practice: Skimming, scanning, SQW3R, Annotating, Detailed reading and note-taking, Standard Test Practice: TOEFL and IELTS, Model Review Reports and Annotated Bibliographies
5. Community Engagement
 - Student-led brainstorming on local versus global issues, Identifying research problems
 - Drafting research questions, Drafting interview/survey questions for community research (in English or L1)
 - Engaging students in Critical reading, Presenting interview/ survey information, Field work
 - Writing Community Engagement Project
6. Letter to the Editor
 - Types of letters, Format and purpose of letter to the editor, Steps in writing letter-to-editor

Recommended Texts

1. Bailey, S. (2011). *Academic writing: A handbook for international students* (3rd ed.). New York: Routledge.
2. Swales, J. M., & Feak, C. B. (2012). *Academic writing for graduate students: Essential tasks and skills* (3rd ed.). Ann Arbor: The University of Michigan Press.

Suggested Readings

1. Cresswell, G. (2004). *Writing for academic success*. London: SAGE.
2. Johnson-Sheehan, R. (2019). *Writing today*. Don Mills: Pearson.
- 3- Silvia, P. J. (2019). *How to write a lot: A practical guide to productive academic writing*. Washington: American Psychological Association.

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Chairman
Department of Arts and Sciences
College of Agriculture
University of Saragaha

Course Description:

This course focuses on ideological background of Pakistan. The course is designed to give a comprehensive insight about the constitutional developments of Pakistan. Starting from the Government of India Act, 1935 till to date, all important events leading to constitutional developments in Pakistan will be the focus of course. Failure of the constitutional machinery and leading constitutional cases on the subject. Moreover, students will study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan. It will also cover the entire Constitution of Pakistan 1973. However, emphasis would be on the fundamental rights, the nature of federalism under the constitution, distribution of powers, the rights and various remedies, the supremacy of parliament and the independence of judiciary

Outline:

- **Ideology of Pakistan**
 - Ideological rationale with special reference to Sir Syed Ahmed Khan, Allama Muhammad Iqbal and Quaid-e-Azam Muhammad Ali Jinnah.
 - Two Nation Theory and Factors leading to Muslim separatism.
- **Constitutional Developments**
 - Salient Feature of the Government of India Act 1935
 - Salient Feature of Indian Independence Act 1947
 - Objectives Resolution
 - Salient Feature of the 1956 Constitution
 - Developments leading to the abrogation of Constitution of 1956
 - Salient features of the 1962 Constitution
 - Causes of failure of the Constitution of 1962
 - Comparative study of significant features of the Constitution of 1956, 1962 and 1973
- **Fundamental rights**
- **Principles of policy**
- **Federation of Pakistan**
 - President
 - Parliament
 - The Federal Government
- **Provinces**
 - Governors
 - Provincial Assemblies
 - The Provincial Government
- **The Judiciary**
 - Supreme Court
 - High Courts
 - Federal Shariat Courts
 - Supreme Judicial Council
 - Administrative Courts and tribunals
- **Islamic Provisions in Constitution**
- **Significant Amendments of Constitution of Pakistan 1973**

Recommended Books:

1. Constitutional and Political History of Pakistan by Hamid Khan
2. Mahmood, Shaukat and Shaukat, Nadeem. Constitution of the Islamic Republic of Pakistan, 3rd re edn. Lahore: Legal Research Centre, 1996.
3. Munir, Muhammad. Constitution of the Islamic Republic of Pakistan: Being a Commentary on the Constitution of Pakistan, 1973. Lahore, Law Pub., 1975.
4. Rizvi, Syed Shabbar Raza. Constitutional Law of Pakistan: Text, Case Law and Analytical Commentary. 2nd re edn. Lahore: Vanguard, 2005.
5. The Text of the Constitution of the Islamic Republic of Pakistan, 1973 (as amended).
6. Fundamental Laws of Pakistan by A.K. Brohi

SEMESTER-IV

ANSC-5110

Principles of Animal Breeding

2(1-1)

This is the course of under graduate level. It deals with the concept that enables combining fundamental and modern knowledge in the breeding and selection of animals based on balanced and quality manner. This course can be divided into several thematic sections. The first one relates to the classical notions of domestic animals breeding such as the history of breeding, domestication, breed, hereditary and non-hereditary variability and description of general and production traits. The second section focuses on the basic concepts in population and quantitative genetics, as well as biometrics. The third unit is dedicated to the principles of selection and domestic animals improving. The fourth unit relates to the current concepts and objectives of the molecular markers use in domestic animals selection and breeding. The course provides the students theoretical and practical knowledge and skills to identify their characteristics according to their nature and systems of breeding. Students practically trained to rearing, production, reproduction and nutritional management of livestock This course will help students gain an insight into the latest techniques of breeding and breeding plans.

Contents

Theory

1. Selection: natural and artificial selection
2. Methods of selection; tandem method, independent culling level and selection index.
3. Kinds of selection
4. Selection for single and multiple traits, correlated response, genetic effects of selection, methods of assessing genetic progress.
5. Various systems of breeding
6. Development of inbred lines; selection for best combining abilities; reciprocal recurrent selection.
7. Breeding for threshold characters; Genetic drift its role in inbreeding.
8. Breeding Value and its importance; Genetic gain.
9. Breeding goal

Practical

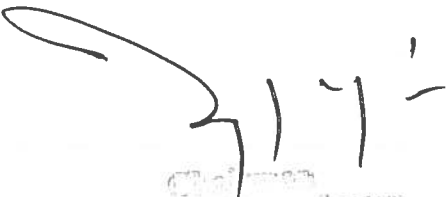
1. Estimation of genetic gain
2. Evaluation of livestock on the basis of their own performance, pedigree and progeny.
3. Calculation of breeding values from single and repeated records.
4. Measurement of coefficient of relationship and inbreeding by methods of paths and variance-covariance chart; Measurement of heterosis.
5. Estimation of genetic changes in performance traits due to various mating systems.

Recommended Texts

1. Bourdon, R. M. (2000). *Understanding Animal Breeding*. Upper Saddle River, New Jersey: Prentice-Hall, Inc.
2. F. H. Khan, Ashok Singh (2002). *Principles of genetics & Animal Breeding*: Jaypee Brothers

Suggested Books

1. Lush, J. L. (1943). *Animal Breeding Plans*. USA: The Iowa State College Press.
2. Weller, J. I. (1994). *Economic Aspects of Animal Breeding*. USA: Springer publishers.


Department of Animal Breeding
College of Veterinary Medicine
University of Baghdad

This is the course of under graduate level about management of dairy animals. Dairy is a universal agricultural production: people milk dairy animals in almost every country across the world, and up to one billion people live on dairy farms. It is a vital part of the global food system and it plays a key role in the sustainability of rural areas in particular. Dairy farming is a class of agriculture for long-term production of milk, which is processed (either on the farm or at a dairy plant, either of which may be called a dairy) for eventual sale of a dairy product. It is a well-known fact that the dairy industry actively contributes to the economies of a number of communities, regions and countries. An increasing demand worldwide is noticeably emerging at present, and the industry is globalizing, thus increasing the scope and intensity of the global dairy trade. However, the question of how and on what criteria we can objectively assess the economic benefits of the dairy sector still remains. The following course aims to summarize the different aspects of dairy economy.

Contents

Theory

1. Scope and importance of the dairy industry of Pakistan
2. characteristics of local, exotic and crossbred dairy animals
3. principles of profitable dairy production
4. buffalo and cow as major dairy animals, selection of dairy animals
5. establishing a dairy enterprise, raising dairy replacement stock
6. management of sire, pregnant and lactating animals
7. grazing management of dairy animals, significance of dry buffalo/cow therapy
8. thermal stress and buffalo/cow performance
9. feeding for economical milk production, dairy herd improvement associations
10. dairy system models, modern trends in dairy industry
11. buying and selling guide, prophylactic measures, common ailments.

Practical

1. Daily feeding management practices;
2. Care, handling and feeding of calves, Weaning practices
3. Use of score card for animal judging, Protecting animals from inclement weather
4. Mastitis screening tests; suckling, drenching, dipping, foot bath and spraying
5. Vaccination and preventive measures
6. Improved fodder and forage production, harvesting and feeding/grazing practices
7. Hay and silage making practices, Preparing feasibility reports
8. Use of computer for record keeping, Visit to livestock farms and shows.

Recommended Texts

1. Banerjee, G. C. (1998). *A textbook of Animal Husbandry*. New Delhi, India.: Oxord and IBH Publishing Co.
2. W.J. Miller (2012). *Dairy cattle feeding and nutrition*: Elsevier

Suggested books

1. Shah, S.I. (1994). *Animal Husbandry*. Islamabad, Pakistan: National Book Foundation.
2. Mackintosh, J.B. (1983). *Sheep Production in Pakistan*. Islamabad: PARC.

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Department of Animal Husbandry
College of Agriculture
University of Sargodha

This course is graduate level course of construction of commercial poultry houses. The course is aimed at elaboration and understanding of different poultry housing equipments, their purchase, installation and running. It focuses on standard civil engineering recommendations for construction of poultry house and designing of house for the provision of comfortable zone to birds so that they can perform optimally under intensified conditions. This course focuses on calculating the needs of air exchange for minimum ventilation and for the control of temperature power ventilated houses. It also gives the knowledge about understanding the need of insulation in a commercial poultry shed along with calculation of insulation requirements of shed buildings for hot and cold areas. At the completion of course students will be able to design the commercial poultry house and to prepare plan for the designing and construction of poultry houses along with feeding, watering, lighting and ventilation system installation.

Contents

Theory

1. Importance and purpose of poultry housing
2. Poultry housing systems
3. Types and styles of poultry houses
4. Selection of site and location of poultry house
5. Construction of poultry farm buildings; Heating and cooling systems
6. Role of house design and insulation poultry housing
7. Open-sided and environmentally controlled housing
8. Brooding, rearing and laying house equipments; Feeding and watering systems
9. Automation in housing, equipments and effective climate control in poultry houses
10. Feasibility report of poultry housing

Practical

1. Basic principles for site selection and poultry house construction
2. Demonstration of poultry farm buildings
3. Designing of farm buildings; Poultry house insulation material
4. Demonstration and operation of poultry farm equipments
5. Automatic feeding and watering systems and its trouble shooting
6. Poultry housing practices; Visit to poultry farms

Recommended Texts

1. P. V. Sreenivasaiah (2006). *Scientific poultry production*: International Book Distributing Company
2. N. Gosh (2015). *Poultry science and practice*. CBS Publishers & Distributors.

Suggested Books

1. Sonaiya, E.B. & Swan, S.E.J. (2008). *Small Scale Poultry Production*. New Delhi, India: Discovery Publishing House.
2. Brown, T. (2010). *Poultry Farming*. USA: Apple Academic Press, Mistwell Crescent, Oakville ON.

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This under-graduate level course critically focuses on nutrition of poultry birds to get optimum performance. It also critically focuses on production problems related to poultry feeding and feeding standards of the poultry birds. It is aimed at production problems related to poultry nutrition and feeding standards of the poultry birds. This course gives the knowledge about different poultry feeding methods and nutrient requirements of poultry birds and breeder raised for day old broiler chick production. It also explicitly tells about feedstuffs available for formulation and preparation of commercial feeds for poultry birds along with measures to improve quality of feed and standard storage practices. This course also tells about feed additives and their mixing in poultry feed. After taking this course students will be able to understand methods of feeding of poultry and manufacturing commercial poultry feed. After taking this course students will improve about poultry nutrition and will be able to formulate rations for different classes of poultry.

Contents

Theory

1. Sources and classification of nutrients and their functions
2. digestion and absorption of nutrients
3. metabolism of water, carbohydrates, protein and fats
4. hormonal control of metabolism
5. feed additives: antibiotics, coccidiostats, antioxidants, probiotics and prebiotics enzymes, toxin binders, flavoring agents, anti-nutritional factors in feed ingredients
6. diet specifications for different poultry birds
7. amino acids and energy ratio in poultry rations
8. nutrient requirements of commercial layers, broilers, breeders, quails, ducks and turkeys.

Practical

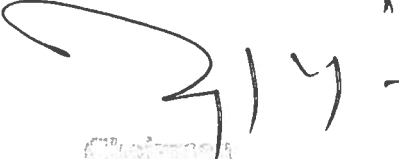
1. Composition of feedstuffs used in poultry rations;
2. Characteristics of poultry rations;
3. Formulation of rations for broilers, layers and breeders, quails, ducks, and turkeys; Introduction to computer ration formulation.
4. Economics of poultry rations; Visits to feed mills and poultry farms.

Recommended Texts

1. Lesson, S. & Summers, J.D. (2009). *Commercial Poultry Nutrition* (3rd ed.). Canada:University Book.
2. NRC. (1994). *Nutrient Requirements of Poultry*. USA: National Academy of Sciences.

Suggested Books

1. Sing, R. A. (2004). *Poultry Production*. New Delhi, Ludhiana: Kilyani Publishers.
2. Dagher, N. J. (1995). *Poultry Production in Hot Climates*. UK: CAB International.


Chairman
Department of Poultry Extension
College of Agriculture
University of Sargodha

The major constraint in the development of livestock sector in Pakistan is poor availability of nutrients. The ever decreasing area under fodder production coupled with its scarcity period is the main factor which deteriorates the normal fodder supply. Forages and fodders are important agronomic crops that constitute important and basic component of animal feed. To develop skills regarding fodder production technology in graduate level students, a separate course was included in scheme of studies. This is very important course due to increasing demand of fodder for livestock throughout the year. During studying this students will be taught about the different fodders their complete production technology and management, Pasture management and factors affecting productivity of pasture. It makes the students able to do different choices of fodder availability during different season throughout the year. Techniques of fodder preservation silage, hay, haylage will be practically demonstrated and students will be equipped all such techniques after completion of this course.

Contents

Theory

- 1 Importance and characteristics of forages and fodders
- 2 Critical period of fodder scarcity.
- 3 Factors influencing productivity and quality
- 4 Methods of increasing biomass production
- 5 Factors affecting chemical composition and nutritive value of forages
- 6 Preservation of fodders and forages (silage and hay making)
- 7 Toxicity due to chemicals and poisonous plants
- 8 Establishment of grasses and legumes in range lands
- 9 Constraints in fodder production and remedies.

Practical

- 1 Identification of forage, fodder crops and poisonous plants
- 2 Estimation of sprout density
- 3 Carrying capacity
- 4 Preparation of fodder calendar
- 5 Measurement of cover frequency
- 6 Preparation of silage and hay

Recommended Texts

- 1 Hedayetullah, M. & Zaman, P. (2019). *Fodder Crops of the World, Vol-I, Major fodder crops*. Florida, USA: Apple Academic Press
- 2 Balasubramanian, P.O. & Polanippa, S.P. (2001). *Principles and Practices of Agronomy*. India: Agrobios.

Suggested Readings

- 1 Advan, R.L. (2018). *New Perspective in Forage Crops*. Brazil: Intech open.
- Singh, A.K. (2011). *Forage and Fodder*. Delhi, India: Daya Publishing House

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Department of Plant Production
College of Agriculture
University of Sargodha

Topic	Details
Semester/Level	In some discipline 3 rd semester and in some discipline 4 th Semester/ ADP Program 2 nd Year
Objectives	<ul style="list-style-type: none"> ▪ Students will come to know about the real nature, significance and relevance of the Islamic beliefs in light of the text of the Holy Quran. ▪ Students will seek knowledge of translation and transliteration of the Holy Book Quran. ▪ To familiarize the students with the concept of Ibādah (Its significance, scope and relevance) and its types in Islam. ▪ Students will learn literal and idiomatic way of translation of the Holy Book. ▪ Students will learn about the polytheism and its incompatibility in Islam highlighted by the Holy Quran. ▪ To highlight the significance of learning through using all human faculties provided by the almighty Allah and familiarize the students about condemnation of ignorance mentioned in the Quranic text. ▪ To develop Awareness among the students about rights and duties of different circles of society in the light of Holy Quran. ▪ To introduce the students to Quranic Arabic grammar in practical manner.
Course Contents:	<p>○ ایمانیات اور عبادات الله پر ایمان، فرشتوں پر ایمان، رسولوں پر ایمان، آسمانی کتابوں پر ایمان یوم آخرت پر ایمان، تقدیر پر ایمان نماز، روزہ، زکوٰۃ، حج، جہاد</p> <p>○ معاشرے کے حقوق</p> <ul style="list-style-type: none"> • خاندان کی تکوین • حق مہر • رضاعت و حمل • اولاد کو قتل کرنے کے ممانعت • شوہر کی نافرمانی • طلاق • بیوہ کی عدت کے احکام • نکاح کا پیغام بھیجنا • عورت کی وراثت (اس کے شوہر کی طرف سے) • والدین کے حقوق • بیویوں اور اولاد کے بیچ عداوت ○ خاندان کے حقوق • مہمان کی عزت • اجازت طلب کرنے کے اصول • مجلس کے آداب • تعاون اور بھائی چارہ • گروہ بندی • محبت • لوگوں کے درمیان صلح • عفو و درگزر، غصہ پر قابو اور معاف کرنا • شعوب و قبائل • لوگوں کے بیچ اختلافات • حمایت و نگہبانی
Grammar:	<ul style="list-style-type: none"> • قرآنی عربی گرامر کے اصول اور ان کے اطلاقات (متن قرآنی پر اطلاق سے توضیحات)
Details of	<ul style="list-style-type: none"> ▪ منتخب آیات مع ترجمہ و تجرید

<p>Chapters and verse Numbers:</p>	<ul style="list-style-type: none"> ▪ البقره ((١٦٤، ٢٣٨، ٢٥، ٢٤٤، ٢١٩، ١١٠، ٣٥، ١٥٣، ٢٣٤، ٢٠١، ٢٨٥، ٣٣، ٢٨٥، ١٥، ١٢٩، ٢٥٣، ٩٨، ٦٢، ١٢٦، ٢٨٥، ١٣٦، ١٤٤، ٢٥٦، ٢٨٥، ١٢٦، ١٨٣، ٢٠٠، ١٨٩، ١٣٦، ١٤٤، ٢٥٦، ٢٨٥، ١٢٦، ١٨٣، ٢٠٠، ٢٣٠، ٢٣٥، ٢٣٤، ٢٣١، ٢٢٩، ٢٢٨، ٢٣٤، ٢٢٦، ٢٢٤، ١٩٩، ٢٣١، ١٥٨، ٢١٨، ٨٢، ١٨٣، ٢٣٣، ١٨٢، ١٦٠، ٨٣)) ▪ النساء (٩٥، ٩٢، ٥٩، ١٣٦، ٦٩، ٨٠، ١٣، ٦٩، ٨٠، ٨٦، ٨٠، ٣٦، ١٢٦، ١٢، ٣٥، ١٢٨، ٣٣، ١١، ١١، ٢٥، ٢٢، ١٤٦، ٣، ١١، ٣٣، ١١، ٢٠، ١، ٦، ١٩١، ٣٥، ٢٠، ٣٥، ١٩١، ١٢٨، ١١، ١١، ٢٥، ٢٢، ١٤٦، ٣، ١١، ٣٣، ١٦، ١٣٦، ١٣٦، ٥٣، ١٢٨، ٨١) ▪ الانعام (٢٢، ١٣٤، ١٣، ٩٢، ١٥١، ٣٨، ٥٣) ▪ آل عمران (٩٤، ٣٩، ٨٥، ١٢٥، ٨٣، ١٣٣، ١٩، ١) ▪ المائدہ (٥٣، ٢، ٩٢، ٣٩، ١٩، ٨٢، ٢، ٥) ▪ الاعراف (٣٥، ١٨٩، ١٨٩) ▪ التوبہ (٢٠، ٤١، ١٦) ▪ بود (١٢) ▪ الزمر (٦) ▪ النور (٥٣، ٥٢، ٢٨، ٥٢، ٢٤، ٦٠، ٢٩) ▪ محمد (٣٣) ▪ انفال (٨٢، ٢٠) ▪ الرعد (٣) ▪ الطلاق (٣) ▪ الحج (٥) ▪ ابراهيم ((٢٣، ٣٢)) ▪ الاسراء (٢٣، ٢٣) ▪ الاحقاف (١٥) ▪ المؤمنون (٢٤) ▪ العنكبوت (٢٥، ٣٨، ٨) ▪ النحل (٢٢) ▪ لقمان (١٥، ٣، ١٣) ▪ الاحزاب ((٣٥، ٣٨، ٣٩)) ▪ الشعراء (٤) ▪ الروم (٢١) ▪ مريم (١٣، ٢٦) ▪ المجادلہ (١٢، ١١)
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Climate Change i.e., Global Warming. Natural and Anthropogenic Activities and their impact; **Energy** i.e., Renewable and non-renewable energy resources; **Water Security** i.e., water scarcity and waste water treatment; **Land Degradation** i.e., salinity, water logging, deforestation, land erosion; **Food Security** and role of Biotechnology in food production; **Global Health Pandemics** i.e., Infectious diseases, vaccine, development of drug discovery for newly explored diseases ✓

Practical:

- 1: Preparation of standard solution and their standardizations
- 2: Soil and Water Analysis

Recommended Text:

Usman, M. (2022). *Science of Global Challenges*. Ilmi Kitab Khana, Lahore

Suggested Books

- 1: Thieman, W.J. & Palladino, M.A. (2014). *Introduction to biotechnology*. Edinburgh Gate UK: Pearson Education Limited.
- 2: Daugherty, E. (2012). *Biotechnology: Science for the New Millennium*, 1st Edition, Revised, USA: Paradigm Publication.
- 3: Karaduman, I. C. (Ed.) (2014) *Global Challenges for the world*. Obroonnosc. Zeszytl Naukowe. Turkey

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Department of Applied Sciences
University of Sargodha

This course is designed to provide students with a comprehensive exploration of Pakistan's identity, spanning geographical, historical and cultural dimensions. It delves into the diverse landscape, ancient civilizations, and rich cultural heritage that define Pakistan. Moreover, it examines the socio-cultural and political transformations in Pakistan over time including democratic transitions and military interventions. The aim of this course is to inculcate in students a nuanced understanding of Pakistan's past, present, and potential future trajectories, enabling them to critically evaluate the complex dynamics shaping the nation's development.

Course Learning Outcomes

By the end of this course, student will be able to:

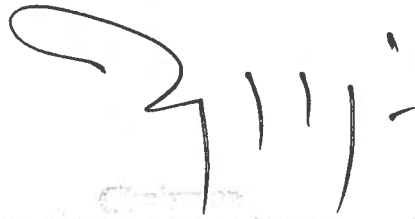
1. Have enhanced knowledge of the geographical, historical and political aspects of Pakistan.
2. Understand the society and cultural of Pakistan.
3. Understand and explain the socio-economics developments in Pakistan.
4. Explore contemporary issues and challenges faced by Pakistan and their implications for the future.

Contents

1. **Introduction to Pakistan:**
 - Geographical location and significance.
 - Historical background: Ancient civilizations in the region.
 - Factors leading to the creation of Pakistan
2. **Political History of Pakistan:**
 - Formative phase
 - Military interventions and democratic transitions.
3. **Geography of Pakistan:**
 - Physiography: Mountains, plains, plateaus, deserts, valleys and coastal areas.
 - River system: Indus river and its tributaries;
 - Climatic regions of Pakistan.
4. **Society and Culture of Pakistan:**
 - Socio-cultural diversity.
 - Language and literature of Pakistan.
5. **Economics Development of Pakistan:**
 - Agriculture and industrial sectors of Pakistan.
 - Economic challenges of Pakistan.
6. **Contemporary Issues:**
 - Foreign relations of Pakistan.
 - Security challenges: terrorism, extremism, regional conflicts.
 - Environmental problems and sustainable development (SDGs).
 - Media and social change.

SUGGESTED READING MATERIALS

1. "Jinnah of Pakistan" by Stanley Wolpert
2. "The sole Spokesman: Jinnah, the Muslim League, and the Demand for Pakistan" by Ayesha Jalal
3. "The struggle for Pakistan" by Ishtiaq Hussain Qureshi
4. "Pakistan, the Formative Phase, 1857-1948" by Khalid B. Sayeed
5. "Pakistan Studies: A Book of Readings" by Sikandar Hayat
6. "Constitutional and Political History of Pakistan" by Hamid Khan
7. "Trek to Pakistan" by Ahmad Saeed and Kh. Mansur Sarwar
8. "Pakistan: A Modern History" by Ian Talbot
9. "Politics in Pakistan: The Nature and Direction of Change" by Khalid B. Sayeed
10. "Physical Geography of Pakistan" by Umar Jahangir
11. "A Geography of Pakistan: Environment, people, and Economy" by Fazle Karim Khan
12. "Pakistan's Foreign Policy: An Historical Analysis" by S.M. Burke
13. "Separatism in East Pakistan" by Rizwan Ullah Kokab
14. "Being Pakistani: Society, Culture and the Arts" by Raza Rumi
15. "Pakistani's Culture Heritage: Socio-Economic and Technological Aspects" edited by Abdul Jabbar Khan
16. "Language and Politics in Pakistan" by Tariq Rahman
17. "Sociology" by Horton and Hunt
18. "Pakistan in the Twentieth Century: A Political History" by Lawrence Ziring
19. "Economic Development of Pakistan" by Ishrat Husain
20. "Issues in Pakistan's Economy" by S. Zaidi


Department of Political Science
College of Agriculture
University of Sargodha

This course addresses the unique entrepreneurial experience of conceiving, evaluating, creating, managing, and potentially selling a business idea. The goal is to provide a solid background with practical application of important concepts applicable to the entrepreneurial environment. Entrepreneurial discussions regarding the key business areas of finance, accounting, marketing and management include the creative aspects of entrepreneurship. The course relies on classroom discussion, participation, the creation of a feasibility plan, and building a business plan to develop a comprehensive strategy for launching and managing a new venture.

Course Learning Objectives

1. To enhance the 'entrepreneurial intentions' of the students by improving their natural willingness to start a business.
2. To understand the process of entrepreneurship and learn the ways to manage it by working individually in the class and in the form of groups outside the class to conduct field assignments.
3. To educate the students about the practical underpinnings of the entrepreneurship with the aid of practical assignments and idea pitching.

Contents

1. **Background:** What is an Organization, Organizational Resources, Management Functions, Kinds of Managers, Mintzberg's Managerial Roles.
2. **Forms of Business Ownership:** The Sole proprietorship, Partnership, Joint Stock Company
3. **Entrepreneurship:** The World of the Entrepreneur, what is an entrepreneur? The Benefits of Entrepreneurship, The Potential Drawbacks of Entrepreneurship, Behind the Boom: Feeding the Entrepreneurial Fire.
4. **The Challenges of Entrepreneurship:** The Cultural Diversity in Entrepreneurship, The Power of "Small" Business, Putting Failure into Perspective, The Ten Deadly Mistakes of Entrepreneurship, How to Avoid the Pitfalls, Idea Discussions & Selection of student Projects, Islamic Ethics of Entrepreneurship.
5. **Inside the Entrepreneurial Mind:** From Ideas to Reality: Creativity, Innovation, and Entrepreneurship, Creativity – Essential to Survival, Creative Thinking, Barriers to Creativity, How to Enhance Creativity, The Creative Process, Techniques for Improving the Creative Process, Protecting Your Ideas, Idea Discussions & Selection of student Projects.
6. **Products and technology, identification opportunities**
7. **Designing a Competitive Business Model and Building a Solid Strategic Plan:** Building a strategic plan, Building a Competitive Advantage, The Strategic Management Process, Formulate strategic options and select the appropriate strategies, Discussion about execution of Students' Project.
8. **Conducting a Feasibility Analysis and Crafting a Winning Business Plan:** Conducting a Feasibility Analysis, Industry and market feasibility, Porter's five forces model, Financial feasibility analysis. Why Develop a Business Plan, The Elements of a Business Plan, What Lenders and Investors Look for in a Business Plan, Making the Business Plan Presentation.
9. **Building a Powerful Marketing Plan:** Building a Guerrilla Marketing Plan, Pinpointing the Target Market, Determining Customer Needs and Wants Through Market Research. Plotting a Guerrilla Marketing Strategy: How to Build a Competitive Edge, Feed Back & Suggestions on Student Project, Islamic Ethics for Entrepreneurial Marketing

10. **E-Commerce and the Entrepreneur:** Factors to Consider before Launching into E-Commerce, Ten Myths of E-Commerce, Strategies for E-Success, Designing a Killer Web Site, Tracking Web Results, Ensuring Web Privacy and Security, Feed Back & Suggestions on Student Project.
11. **Pricing Strategies:** Three Potent Forces: Image, Competition, and Value, Pricing Strategies and Tactics, Pricing Strategies and Methods for Retailers, The Impact of Credit on Pricing
12. **Attracting Venture Capitalist:** Projected Financial Statements, Basic Financial Statements, Ratio Analysis, Interpreting Business Ratios, Breakeven Analysis, Feed Back & Suggestions on Student Project,
13. **Idea Pitching:** Formal presentation, 5-minutes pitch, funding negotiation and launching.

Recommended Texts:

1. Scarborough, N. M. (2011). *Essentials of entrepreneurship and small business management*. Publishing as Prentice Hall, One Lake Street, Upper Saddle River, New Jersey 07458..

Suggested Readings:

1. Burstiner, I. (1989). *Small business handbook*. Prentice Hall Press.



Chairman
Department of Applied Sciences
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Course Description:

The Civics and Community Engagement course is designed to provide students with an understanding of the importance of civic participation, culture and cultural diversity, basic foundations of citizenship, group identities and the role of individuals in creating positive change within their communities. The course aims at developing students' knowledge, skills and attitudes necessary for active and responsible citizenship.

Learning outcomes

After completing this course, students will be able to

- Understand the concepts of civic engagement, community development, and social responsibility.
- Understand rights and responsibilities of citizenship
- Understand cultural diversity in local and global context
- Analyze the significance of civic participation in promoting social justice, equity, and democracy.
- Examine the historical and contemporary examples of successful civic and community engagement initiatives.
- Identify and assess community needs, assets, and challenges to develop effective strategies for community improvement. ✓
- Explore the ethical implications and dilemmas associated with civic and community engagement.
- Develop practical skills for effective community organizing, advocacy, and leadership.
- Foster intercultural competence and respect for diversity in community engagement efforts.
- Collaborate with community organizations, stakeholders, and fellow students to design and implement community-based projects.
- Reflect on personal growth and learning through self-assessment and critical analysis of community engagement experiences.

Course Content:**Introduction to Civics & Community Engagement**

- Overview of the course: Civics & Community Engagement
- Definition and importance of civics
- Key concepts in civics: citizenship, democracy, governance, and the rule of law
- Rights and responsibilities of citizens ✓

Citizenship and Community Engagement

- Introduction to Active Citizenship: Overview of the Ideas, Concepts, Philosophy and Skills
- Approaches and Methodology for Active Citizenship

Identity, Culture, and Social Harmony

- Concept and Development of Identity, Group identities
- Components of Culture, Cultural pluralism, Multiculturalism, Cultural Ethnocentrism, Cultural relativism, Understanding cultural diversity, Globalization and Culture, Social Harmony,
- Religious Diversity (Understanding and affirmation of similarities & differences)
- Understanding Socio-Political Polarization
- Minorities, Social Inclusion, Affirmative actions

Multi-cultural society and inter-cultural dialogue

- Inter-cultural dialogue (bridging the differences, promoting harmony)
- Promoting intergroup contact/ Dialogue
- Significance of diversity and its impact
- Importance and domains of Inter-cultural dialogue

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Active Citizen: Locally Active, Globally Connected

Importance of active citizenship at national and global level

Understanding community

Identification of resources (human, natural and others)

Utilization of resources for development (community participation)

Strategic planning, for development (community linkages and mobilization)

Human rights, constitutionalism and citizens' responsibilities

Introduction to Human Rights

Human rights in constitution of Pakistan

Public duties and responsibilities

Constitutionalism and democratic process

Social Institutions, Social Groups, Formal Organizations and Bureaucracy

Types of Groups, Group identities, Organizations

Bureaucracy, Weber's model of Bureaucracy

Role of political parties, interest groups, and non-governmental organizations

Civic Engagement Strategies

- Grassroots organizing and community mobilization
- Advocacy and lobbying for policy change
- Volunteerism and service-learning opportunities

Social issues/Problems of Pakistan

Overview of major social issues of Pakistani society

Social Action Project

Recommended Books:

1. Kennedy, J. K., & Brunold, A. (2016). Regional context and Citizenship education in Asia and Europe. New York: Routledge, Falmer.
2. Henslin, James M. (2018). Essentials of Sociology: A Down to Earth Approach (13th ed.). New York: Pearson Education
3. Macionis, J. J., & Gerber, M.L. (2020). Sociology. New York: Pearson Education

Reference Books:

1. Glencoe McGraw-Hill. (n.d.). Civics Today: Citizenship, Economics, and Youth.
2. Magleby, D. B., Light, P. C., & Nemacheck, C. L. (2020). Government by the People (16th ed.). Pearson.
3. Sirianni, C., & Friedland, L. (2005). The Civic Renewal Movement: Community-Building and Democracy in the United States. Kettering Foundation Press.
4. Bloemraad, I. (2006). Becoming a Citizen: Incorporating Immigrants and Refugees in the United States and Canada. University of California Press.
5. Kuyek, J. (2007). Community Organizing: Theory and Practice. Fernwood Publishing.
6. DeKieffer, D. E. (2010). The Citizen's Guide to Lobbying Congress. The Capitol.Net.
7. Rybacki, K. C., & Rybacki, D. J. (2021). Advocacy and Opposition: An Introduction to Argumentation (8th ed.). Routledge.
8. Kretzmann, J. P., & McKnight, J. L. (1993). Building Communities from the Inside Out: A Path Towards Finding and Mobilizing a Community's Assets. ACTA Publications.
9. Patterson, T. E. (2005). Engaging the Public: How Government and the Media Can Reinvigorate American Democracy. Oxford University Press.
10. Love, N. S., & Mattern, M. (2005). Doing Democracy: Activist Art and Cultural Politics. SUNY Press.

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The aim of this course is to introduce students with basic concepts of microbiology. Microbiology is the study of microscopic organisms, those being unicellular (single cell), multicellular (cell colony), or acellular (lacking cells). Microorganisms are typically too small to be seen with the naked eye. Bacteria, fungi, viruses, protozoa, and algae are the major groups of microorganisms. As an application of microbiology, medical microbiology is often introduced with medical principles of immunology as microbiology and immunology with food microbiology and veterinary microbiology focusing on microbes beneficial and harmful for food and animal industry. There are many uses of microorganisms, which is known to humankind long before the advancement of science and development of microscope, which actually started the era of microbiology. This course focuses on classical and modern approaches to the study of microorganisms and their roles/applications in everyday life, medicine, research, and the environment. Microbial cell structure, function, growth, genetics, metabolism, evolution, and ecology. Study of disease, infection, and immunology. This course will help the students to identify important microbes of livestock and poultry. They will be able to isolate, cultivate and identify the important pathogenic and beneficial microbes related with the livestock industry

Contents

Theory

1. Introduction to Microbiology
2. Scope, history, terminology, branches and applied areas of Microbiology
3. Diversity of microbes, Differentiation between Prokaryotes and Eukaryotes.
4. Taxonomy of bacteria: basis of taxonomy, origin and evolution of bacteria, species concept in bacteria, Morphology and detailed anatomy of bacterial cell
5. Microbial growth and requirements: Physicochemical requirements; pH, temperature, oxidation reduction potential, gaseous and nutritional requirements
6. Microbial multiplication and growth curves
7. Structure and physiology of fungi, The yeasts Morphology and reproduction
8. Fundamental characteristics of viruses: Definition and history of virology; general properties of viruses, methods for studying viruses
9. Microscopy: light, dark field, fluorescent, polarizing, phase contrast and special stains
10. A brief introduction to structure and propagation of fungi, protozoa, algae, viruses and bacteriophages

Practical

1. Safety in the microbiological laboratory: contamination and decontamination.
2. Demonstration of laboratory equipments, their basic functions and handling.
3. Microscopy: An outline of principles and applications: Light, dark field, fluorescent, polarizing, phase contrast and electron microscopes.
4. Preparation of slides for microbiological examination including cleaning and disposing of slides,
5. Preparations, performing Gram staining.
6. Sterilization and disinfection

Recommended Texts

1. Christine L. Case (2003). *Microbiology: An Introduction 8th Ed*: Benjamin-Cummings Publishing Company
2. John L. Ingraham (2000). *Introduction to Microbiology 3rd Ed*: The University of Michigan

Suggested Books

1. Parker. M.T. & Collin, L.H. (1998). *Topley and Wilson's Principles of Bacteriology. Virology & Immunity* (9th ed). London, UK: Edward Arnold.
2. Schaehter, M., Medoff, G. & Schlessinger, D. (1997). *Mechanism of Microbial Diseases*. Williams and Wilkins, Baltimore.

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College of Agriculture
University of Sulaymaniyah

This course will help the students to understand functioning of different systems and organs of domestic animals. They will be able to differentiate between the normal and abnormal physiology of all vital organs, which will ultimately help them to identify the problem with the animals. Veterinary physiology deals with the investigation of animal systems and the functioning of these biological systems. It includes the study of how animals work and the physical and chemical processes that occur within animals. Animal physiologists study how animals react to internal and external elements in their environment. The examples of various biological processes in animals include gas exchange, blood and circulation, osmoregulation, digestion, nervous and muscle systems and endocrinology. Animal Physiology studies include the anatomy, histology and endocrine functioning of the physiological processes of livestock, under specific conditions. This also includes the possible manipulation of the reproductive processes by means of accelerated breeding techniques for more efficient livestock and poultry production. The main objective of the course is to make students able to understand physiology of farm animals.

Contents

Theory

1. Introduction: intracellular organization and physiology
2. body fluids, blood, lymph, cerebrospinal fluid, synovial fluid
3. blood circulation and cardiovascular system
4. physiological properties and cellular and chemical constituents of blood, blood coagulation, blood groups and their importance in livestock
5. the conduction system of the heart; regulation of cardiac output, regulation of the heart and blood vessels; regional circulation and pulmonary circulation
6. respiratory system: mechanism of respiration, types of breathing, air volumes and capacities exchange of gases, control of respiration, artificial respiration
7. difference between simple stomach and poly gastric animals (Digestive system)
8. water balance and excretion: electrolytes, physiology of the kidney and physiology of the skin
9. endocrine glands and their secretions and functions, physiology of lactation
10. nervous system, spinal cord and brain functions, autonomic nervous system
11. rumen biochemistry

Practical


1. collection of blood in different species of animals and use of anticoagulants
2. measurement of normal pulse, respiration and rectal temperature
3. haematological experiments, determination of blood groups, determination of blood pressure
4. determination of various lung capacities and volume
5. urine examination for normal constituents, microscopic examination of urine; test for saliva
6. dissection for location for endocrine glands in rat and chicken

Recommended Texts

1. William O. Reece (2015). *Duke's Physiology of domestic Animals*: Wiley
2. John E. Hall (2015). *Guyton and Hall Textbook of Medical Physiology*: Elsevier

Suggested Books

1. Rahman, Z. U., Aslam B. & Khaliq, T. (2010). *Physiology-I*. Department of Physiology and Pharmacology, University of Agriculture, Faisalabad.
2. Ankers, R.M. & Denbow, D.M. (2008). *Anatomy and Physiology of Domestic Animals*. UK.: Blackwell Publishing Ltd.


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Department of Animal Sciences
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University of Sargodha

This is the course of undergraduate level. The importance of selection by nature and important aspects of the domestication process will be described. Mankind started to create breeds accompanied with artificial selection 250 years ago. Nowadays, breeding of high productive farm animals, like cattle, pigs and poultry is in the hands of multinational companies which invest a lot of money in state of the art breeding programs. The breeding of sheep, goats, horses and companion animals, e.g. the dog are based on individual breeders collaborating in the setting of a herd book or a breeder's association. Animal breeding is aiming at the improvement of animals by changing their genetic abilities for important traits. These traits are determined by the requirements and wishes from the society which might change over time. Animal breeding is highly influenced by research and developments in population-, quantitative- and molecular genetics. Sometimes, unexpected negative effects of animal breeding are observed that require adequate corrections. A breeding program will be presented here as a circular activity. Each generation, the program starts with formulating the breeding goal and ends with a critical review of the results obtained in the next generation. The evaluation might lead to a reconsideration of the breeding goal for the next round of selection.

Contents

Theory

1. History of animal genetics
2. Animal genetic resources of Pakistan
3. Role of animal breeding in livestock production
4. Opportunities for breeding and improvement of farm animals and poultry. Animal genetic resources.
5. National breeding policy. Constraints and future breeding plans. Emerging breeding technologies. Selection methods and kinds.
6. Various systems of breeding: inbreeding, line-breeding, out-breeding, out-crossing, crossbreeding, grading up.
7. Development of inbred lines, selection for best combining abilities, reciprocal recurrent selection. Traits of economic importance in cattle/buffalo, sheep/goat and poultry.
8. Role of breed registry societies/associations in developed countries and its application in Pakistan.
9. Conservation of animal genetic resources: scope, techniques and problems
10. Biotechnologies in animal breeding.

Practical

1. Exercises on biometrical concepts related to measures of central tendency
2. Measures of dispersions and association among traits at phenotypic and genetic level.

Recommended Texts

1. Bourdon, R. M. (2000). *Understanding Animal Breeding*. Upper Saddle River, New Jersey: Prentice-Hall, Inc.
2. Anju Singh, (2010). *Animal Genetics*: Shree Publishers

Suggested Books

1. Legates, J. E. & Warwick, E. J. (1990). *Breeding and Improvement of Farm Animals*. New York, USA: McGraw-Hill Publishing Co.
2. Bourdon, R. M. 2000. *Understanding Animal Breeding*. Upper Saddle River, NJ, USA: Prentice-Hall, Inc.

This is the introductory course of under graduate level involved the study of molecular genetics. Molecular genetics is the field of biology that studies the structure and function of genes at a molecular level and thus employs methods of both molecular biology and genetics. The study of chromosomes and gene expression of an organism can give insight into heredity, genetic variation, and mutations. This is useful in the study of developmental biology and in understanding and treating genetic diseases. Students will build a comprehensive working knowledge of proteins - their chemistry and their role as enzymes, structural, recognition, and signaling molecules, nucleic acids - their structures, properties, and their roles in the storage and transmission of genetic information. The roles of biomolecules in cellular signaling, metabolism, structure, and cellular organization the thermodynamics of specific molecular transformations, as well as integrated complex processes, and the integration, interaction, and regulation of complex developmental, signaling, and metabolic pathways at the organism level. The field of study is based on the merging of several sub-fields in biology: classical Mendelian inheritance, cellular biology, molecular biology, biochemistry, and biotechnology. Researchers search for mutations in a gene or induce mutations in a gene to link a gene sequence to a specific phenotype. Molecular genetics is a powerful methodology for linking mutations to genetic conditions that may aid the search for treatments/cures for various genetics diseases.

Contents

Theory

1. Biochemical basis of heredity: the nature of genetic material, nucleic acids
2. Structure of DNA and RNA, DNA replication, Protein synthesis and its regulation.
3. Developmental aspects of genetic control, Gene expression and cell differentiation
4. Control of gene expression in eukaryotes, Genetic basis of immune response
5. Components of immune system, immune response
6. Genetic diversity, genetic diversity in immune system
7. Mutations, gene mutations and their types
8. Variation in chromosome structure and number
9. Genetic engineering: basic concepts of recombinant DNA technology
10. Gene cloning and manipulation, application and future.
11. Causes of variation in gene expression.
12. Phenotypic expression of gene, Bio chemical genetics.
13. Concept of different types of genetics

Practical

1. Demonstration of various cytogenetic techniques, Karyotyping and banding.
2. DNA extraction, Gel electrophoresis.

Recommended Texts

1. Hasan Khatib, (2015). *Molecular and quantitative animal genetics*: Wiley
2. Khan, F. H. & Singh, A. (2002). *Principles of Genetics and Animal Breeding*. India: JP Brothers Medical Publishers Ltd.

Suggested Books

1. Lewis, R. (2005). *Human Genetics*. New York, USA: McGraw-Hill Co. Inc.
2. Tamarin R. H. (1998). *Principles of Genetics* (6th ed.). USA: William C. Brown Pub.

This course focuses on protein which is a primary nutrient in nutrition of the animals. It elaborates metabolic and biochemical pathways regarding nutrient utilization. The pathways of metabolism rely upon nutrients that they breakdown in order to produce energy. This energy in turn is required by the body to synthesize new proteins, nucleic acids (DNA, RNA) etc. The most important metabolic pathways are: glycolysis - glucose oxidation in order to obtain ATP. Citric acid cycle (Krebs' cycle) - acetyl-CoA oxidation in order to obtain GTP and valuable intermediates. oxidative phosphorylation - disposal of the electrons released by glycolysis and citric acid cycle. This course gives details about chemical nature and functioning of nutrients. This course also studies non-conventional feed sources and digestion and metabolism of nutrients in body. After taking this course students will be able to understand the nutrition of nutrients, requirements, estimation of quality of dietary nutrients.

Contents

Theory

1. Metabolic functions of water.
2. Metabolism of carbohydrates: classification, digestion, absorption and utilization in monogastric and ruminant animals; glycolysis, lactic acid and volatile fatty acid fermentation, citric acid cycle, pentose phosphate pathway, gluconeogenesis, glycogenesis and glycogenolysis.
3. Metabolism of Lipids: classification, digestion, absorption and utilization in monogastric and ruminant animals; beta oxidation of fatty acids, fate of glycerol with respect of fat synthesis, glucose/glycogen synthesis and its oxidation, storage of fat, catabolism of fat and ketosis.
4. Metabolism of proteins: classification, digestion, absorption and utilization in monogastric and ruminant animals;
5. essential and non-essential amino acids, protein quality, ideal protein, fate of absorbed amino acids, transamination, deamination, decarboxylation and interconversion of amino acids;.
6. Utilization of non-protein nitrogenous compounds in ruminants.

Recommended Texts

1. Leeson, S & Summers D. J. (2008). *Commercial Poultry Nutrition*. Nottingham, England: Nottingham University Press.
2. McDonald, P., Edwards, R.A., Greenhalgh, J.F.D. & Morgan, C.A. (2002). *Animal Nutrition*. UK: Longman scientific and technical publisher.

Suggested Books

1. Moren, L. A. (1994). *Biochemistry*. USA: Neil Peterson Publishers, Prentice Hall Inc.
2. Sarwar, M. & Zia-ul-Hasan.(2000). *Nutrient Metabolism in Ruminants*. Faisalabad.: University of Agriculture Press.
3. Lehninger A. L., Nelson, D.L. & Cox, M.M. (2004). *Principles of Biochemistry* (4thed.). NY,USA: Worth Publishing.

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Department of
University of Sarajevo

This course is aimed at provision of complete information regarding hatching of eggs to produce quality day old chicks for commercial poultry farming systems. It also tells about the history, current status and importance of hatchery industry in Pakistan. This course critically focuses on standards for handling, storage and selection of hatching eggs to maximize profitability of the business. It also elaborates the ways to troubleshoot the problems related to fertility of hatching eggs on breeder farms and issues related to hatchability of eggs at hatchery. It also tells about the practices that may be adopted at commercial hatching egg facility and ways to get optimum hatchability. It also tells about types of incubators and working of setters and hatcher used in commercial hatching industry. It also studies the sanitization of hatching eggs to produce disease free chicks, proper removal of hatchery wastes, and maintenance of different records to successfully run the hatchery business.

Contents

Theory

1. History and development of hatchery industry in Pakistan
2. Collection, handling, selection, fumigation, storage and transport of hatching eggs
3. Seasonal hatching, Incubation methods
4. Types of incubators and incubation requirements
5. Role of computer in modern hatchery operations, Setting and candling of eggs
6. Daily changes in embryonic development during incubation
7. Effect of maternal nutrition on growth and development of embryo
8. Physical act of hatching
9. Factors influencing fertility, hatchability and quality of chicks
10. Taking off the hatch, Hatchery services, Hatchery sanitation and waste disposal
11. Trouble shooting during incubation, Incubation records

Practical

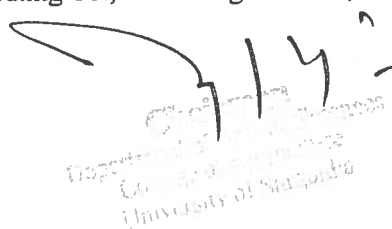
1. Planning and designing of hatchery, Demonstration of parts of incubator
2. Setting and candling of hatching eggs
3. Handling of incubator, Disinfection and fumigation of incubator
4. Observing daily changes during embryonic development
5. Sexing, grading, detoeing and dubbing of day old chicks
6. Examining malposition of embryo, Dead embryo and dead in shell
7. Estimation of fertility and hatchability, Trouble tracing chart of the chick embryo
8. Fertility report of hatchery, Visit to commercial hatcheries

Recommended Texts

1. P. V. Sreenivasaiah (2006). *Scientific poultry production*: International Book Distributing Company
2. Donald, D. B. and W.D. Weaver, Jr. (2007). *Commercial Chicken Meat and Egg Production*. India: Springer Pvt. Ltd.

Suggested Books

1. Lakhoria R.L. (2003). *Poultry Eggs*. Jodhpur, India: Agrobios.
2. Sexena, H.C. (2009). *Hatchery Practice and Management*. Lucknow, Uttar Pradesh, India: International Book Distributing Co., Publishing Division, IBDC.



Handwritten signature and stamp of the University of Sargodha, Department of Poultry Science, Faculty of Agriculture.

This is the course of under-graduate level about range. Rangeland, also called Range, any extensive area of land that is occupied by native herbaceous or shrubby vegetation which is grazed by domestic or wild herbivores. Temperate and tropical forests that are used for grazing as well as timber production can also be considered rangeland. Rangelands thus occupy about 40–50 percent of the land area of the Earth. In concrete terms, range-management practices center on the regulation of the number of animals allowed to graze on a given range, along with the duration and season of their grazing. The stocking of a range must be carefully regulated so that the existing grasses are not depleted or exhausted from overgrazing. Overgrazing of the vegetation reduces the production of forage; exposes the soil to sealing, baking, and erosion; reduces the infiltration of water into the soil; increases water runoff and flooding; and induces unfavorable changes in the botanical composition of the vegetation.

Contents

Theory

1. Introduction to ranges; basic concepts and terminology
2. range statistics; ecological zones of world/Pakistan
3. soil, plant and animal relationship; various range animals
4. range management policy
5. vegetation manipulation and other tools for improvement
6. important range and cultivated grasses; trees and shrubs as animal feed
7. grazing management systems and supplementary feeding
8. grazing capacity and stocking rates; effect of climate on animals and vegetation
9. shelter on ranges and fence types; housing of range livestock; wild animals
10. poisonous plants their hazards and prophylactic measures on ranges.

Practical

1. Identification of various range grasses. trees, shrubs and cultivated forages
2. preservation/mounting of important range grass samples
3. determining range carrying capacity and forage production
4. animal units and stocking rates
5. animal take off rate
6. visit to rangelands.

Recommended Texts

1. Robert E. Taylor (2001). *Scientific Farm Animal Production 7th Ed. Prentice Hall*
2. G. C. Banerjee (2018). *Textbook of Animal Husbandry 8th Ed. Oxford*

Suggested Books

1. Qureshi, M.A.A., Ishaq, M. & Khan, R.A. (2000). *Field Exercises in Range management and Wildlife*. University of Agriculture, Faisalabad.
2. Muhammad, N. (1989). *Rangeland Management in Pakistan*. Kathmandu, Nepal: Intl. Centre for Integrated Mountain Development.
3. Qureshi, M. A. A., Khan, G. S. & Yaqoob, M. S. (1993). *Range Management in Pakistan*. Ganpat Road, Lahore: Kazi Publications.
4. Heady, H.F. (1975). *Rangeland Management*. New York, USA: McGraw Hill Book Co.

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OCT 2023
 Department of Agriculture
 University of Sindh

Vitamins and minerals are two of the main types of nutrients that your body needs to survive and stay healthy. Vitamins are organic substances (made by plants or animals) help your body grow and work the way it should whereas minerals are inorganic elements that come from the soil and water and are absorbed by plants or eaten by animals. Minerals are those elements that our bodies need to develop and function normally. Those essential for health include calcium, phosphorus, potassium, sodium, chloride, magnesium, iron, zinc, iodine, chromium, copper, fluoride, molybdenum, manganese, and selenium. This course tells about significance of minerals and vitamins in animal nutrition. This course studies details of chemical nature of all macro, micro minerals, water soluble and fat soluble vitamins and estimation of their quantity in animal feed. This course critically focuses on essentiality of all minerals and vitamins, their role in metabolism and performance of animals and understanding of effects deficiencies of different minerals on animal health and production. After taking this course students will be able to know about minerals and vitamin nutrition and biochemical and metabolic functions of different micro, macro minerals water and fat soluble vitamins.

Contents

Theory

1. Historical perspective of minerals and vitamins
2. essential mineral elements and their distribution in living body
3. classification and their functions
4. interrelationship and efficiency of calcium, phosphorus, magnesium, sodium, potassium, chlorine, iron, copper, cobalt, manganese, iodine, molybdenum, fluorine, zinc and selenium
5. relationship of minerals with dietary components and mineral toxicity
6. vitamins: classification, chemical structure and functions of vitamin A, D, E, K, C and B-complex
7. deficiencies, hypervitaminosis; interrelationship among vitamins and other nutrients
8. Different sources of minerals and vitamins.

Practical

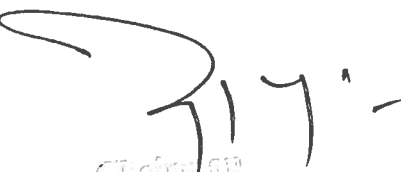
1. Preparation of feed samples for mineral and vitamin analysis.
2. Demonstration of analytical techniques for mineral and vitamin analyses.

Recommended Texts

1. Steve Blake (2007). *Vitamins and Minerals Demystified*: McGraw Hill LLC
2. McDowell, L.R. (2000). *Vitamins in Animal Nutrition*. London: Academic Press Inc., Harcourt Brace Jovanovich, Publishers.

Suggested Books

1. Sarwar, M. & Zia-ul-Hasan. (2000). *Nutrient Metabolism in Ruminants*. Faisalabad.: University of Agriculture Press.
2. McDonald, P., Edwards, A.R., Greenhalgh, J.F.D. & Morgan, C.A. (2004). *Animal Nutrition* (7th ed.). Singapore: Pearso Education Pvt. Ltd


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University of Sargodha

SEMESTER- VI

ANSC-6122

Poultry Hygiene and Disease Prevention

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This graduate level course deals with the understanding of disease prevention practices that must be adopted in commercial poultry farming. This course critically focuses on pathogenic poultry diseases, their diagnosis and recommendations to cope up these diseases. This course also tells about non-pathogenic diseases. This course is aimed at sanitation of poultry buildings and studies the strategies to biologically secure the birds. This course critically focuses on different stages of biosecurity and prophylactic measures that may be practiced to reduce the occurrence of disease on poultry farms and the procedures that may be followed to reduce the medication cost in an intensive poultry system. This course also gives some knowledge about disease transmission in poultry birds and also tells about different chemicals used for disinfection of the poultry facilities. After taking this course, students will be able to understand the diagnosis of diseases along with the knowledge of treatment of the major diseases and immunization procedure for prevention of different poultry diseases.

Contents

Theory

1. Importance of poultry hygiene and disease prevention
2. Terms related to poultry health and hygiene
3. Disinfectants and their application
4. Cleaning and disinfections of poultry houses and equipments
5. Fumigation and its importance
6. Prophylactic measures against bacterial, viral, parasitic, and mycotic diseases
7. Biosecurity measures
8. Significance of clean drinking water in poultry
9. Nutritional disorders and their prevention
10. Practices to control vertically and horizontally transmitted diseases

Practical

1. Poultry carcass inspection
2. Blood, organs and carcass specimen collection and dispatch to the diagnostic laboratory
3. Vaccines and vaccination
4. Disinfectants, medicines and vaccines available in market
5. Common practices for bio-security measures
6. Dead bird disposal
7. Visit to poultry disease diagnostic laboratory

Recommended Texts

1. Vegad, J.L. (2007). *Poultry Diseases: A guide for Farmers and Poultry Professionals*. Lucknow, India: International Book Distributing Co.
2. Simon M. Shane (2005). *Handbook of poultry diseases*: American Soybean Association

Suggested Books

1. Haq, A. and Ahmad, T. (2001). *Poultry Hygiene and Disease Prevention*. Lahore, Pakistan: Pak Book Empire.
2. Donald, D.N & Waver, W.D. (2007). *Commercial Chicken Meat and Egg Production*. India: Springer Pvt. Ltd.

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This is the course of under graduate level about the population genetics. Population genetics is a subfield of genetics that deals with genetic differences within and between populations, and is a part of evolutionary biology. Studies in this branch of biology examine such phenomena as adaptation, speciation, and population structure. Population genetics was a vital ingredient in the emergence of the modern evolutionary synthesis. Traditionally a highly mathematical discipline, modern population genetics encompasses theoretical, lab, and field work. Population genetic models are used both for statistical inference from DNA sequence data and for proof/disproof of concept. What sets population genetics apart today from newer, more phenotypic approaches to modelling evolution, such as evolutionary game theory and adaptive dynamics, is its emphasis on genetic phenomena. But of course there is a link between all three types of study: the genetics of variation. And broadly speaking, population genetics can be defined as the study of the genetical basis of naturally occurring variation, with the aim of describing and understanding the evolutionary forces that create variation within species and which lead to differences between species. The course provides the students theoretical and practical knowledge of the population genetics. Students practically and theoretically trained for getting better genotype in the next generation. This course will help students gain an insight into the latest techniques for livestock improvement through genetics.

Contents

Theory

1. Gene and genotypic frequency; Hardy-Weinberg law
2. Forces affecting gene frequency and composition of population
3. Quantitative characters and their inheritance
4. Measures of central tendency and dispersion for quantitative traits
5. Basic theorems of additivity of variance, regression and correlation concepts
6. Nature and causes of variation in quantitative traits and partitioning of hereditary variance
7. Concepts of heritability and repeatability and methods of their estimation
8. Genetic and phenotypic correlations; Genetic basis and causes of variation
9. Lethal Factors; Genetic disorders and genetic resistance to diseases
10. Genetic constitution of population; Population- Genetic properties of population.

Practical

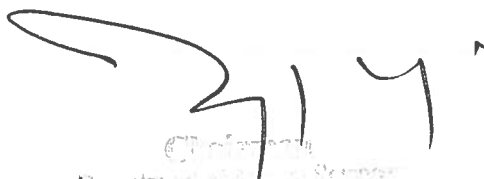
1. Exercises on gene and genotypic frequencies in random mating populations.
2. Exercises on the estimation of heritabilities, repeatabilities and genetic correlation from given data.
3. Case studies for lethal, semi-lethal and other genetic abnormalities in farm animals.

Recommended Texts

1. Khan, F. H. & Singh, A. (2002). *Principles of Genetics and Animal Breeding*. India: JP Brothers Medical Publishers Ltd.
2. Daniel L. Hartl, Elizabeth W. Jones (1998). *Genetics Principles and Analysis*: Jones and Bartlett Publishers

Suggested Books

1. Li, C. C. (1988). *First Course in Population Genetics*. California, USA: The Box wood Press, Pacific Grove.
2. Nicholas, F. W. (1996). *Introduction to Veterinary Genetics*. Oxford, UK: Clarendon Press.
3. Hamilton, M. (2009). *Population Genetics*. CA, USA: John Wiley & Sons.


Department of Animal Science
University of Guelph

This course will help to improve the knowledge of students about health and diseases of farm animals, which is to be applied in their professional life. Farmers can improve the health, welfare and productivity of their animals through animal health planning. Animal Health Planning is a continuous improvement method that encourages the development of health building and disease control measures appropriate to the particular farm circumstances leading to a system that is progressively less dependent on veterinary medicines without jeopardizing welfare. A farm animal health plan is an active management tool aimed at promoting the health and welfare of farm animals by setting out disease prevention, detection and management procedures. It should be based on farm specific issues and at its most basic, it should ensure that illness, injury and mortality amongst farmed animals are at minimum levels. More progressively, it should also be seen as providing procedures that promote positive health and welfare. This course will provide a comprehensive knowledge about vaccines and vaccination schedules of common diseases of our farm animals. Students will be able to collect samples for disease diagnosis.

Contents

Theory

1. Concept of farm animal medicine/herd medicine
2. methods of prevention and control of diseases in farm animals
3. recognition of systemic disorders and introduction to bacterial, viral, fungal, parasitic and metabolic disorders in farm animals
4. biosecurity on farms , systemic disorders
5. Bacterial and viral diseases:
6. fungal diseases: ring worm, aspergillosis, histoplasmosis, dermatophilosis, candidiasis, degnala disease and mycotoxicosis
7. parasitic diseases: coccidiosis, babesiosis, and theileriosis
8. diseases caused by nematodes, cestodes, termatodes and arthropodes
9. metabolic disorders and deficiency diseases: parturient haemoglobinuria, milk fever, transit tetany, lactation tetany, hypomagnasemic tetany, ketosis
10. vitamin and mineral deficiencies/imbbalances
11. poultry diseases: gumboro, ND, pullorum, CRD etc.

Practical

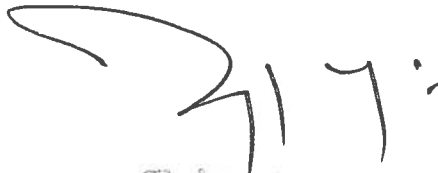
1. Vaccination and deworming schedule for farm animals
2. mastitis microbiology; evaluation of milking machine
3. microbiological examination of milk and other dairy products for potential human pathogens
4. Diagnostic techniques for brucellosis, hydatidosis etc.
5. detection of milk and other dairy products, manual and computerized farm records

Recommended Texts

1. Har pal singh, amresh kumar, p c chauduri (1990). *Veterinary clinical guide*: Kalyani Publishers
2. . D.C Blood, O.M. Radostits, J.A Henderson (2010). *Veterinary Medicine*: University of Minnesota.

Suggested Books

1. Khan, B.B. (2008). *Health and Husbandry of Dairy Animals*. Faisalabad, Pakistan: Pak TM. Printers.
2. Hungerford. T. G. (1991). *Hungerford's Disease of Livestock* (9th ed.). Sydney: McGraw-Hill Book Company.


 Chairman
 Department of Animal Husbandry
 College of Agriculture
 University of Faisalabad

This is the course of under graduate level about small ruminants. Livestock play an important role in the rural economy of Pakistan. It produces food, enhances crop production, generates cash income, provides year-round employment, spreads risk and provides fuel and transport. In the mountainous, rainfed, saline affected and desert areas of Pakistan, where crop production is uncertain, farmers subsist on livestock farming. Sheep and goats are reared as a subsidiary source of livelihood in these areas and utilized for milk, mutton, skin and wool production. The growth pattern of goat population in Pakistan shows an annual increase of 3.04% per year. Meat (mutton) production from both sheep and goats in the country has generally increased rapidly over the last two decades at a rate of 3.67% to meet the demand of ever growing population. On the other hand, high emphasis on wool production may lead to a reduction in mutton produced per head as both ewes and wethers that would otherwise be sent to slaughter may be kept for wool production.

Contents

Theory

1. Scope of small ruminant industry in Pakistan
2. share in national economy; world distribution
3. domestication of small ruminants
4. feeding, breeding, selection, kidding/lambing, rearing and housing; nursing orphan kids/lambs
5. system of production; sheep and goat as meat and dairy animals
6. measures for increased production
7. preparing feasibility reports
8. characteristics and utility of wool, hair/mohair; shearing and handling of wool/hair
9. sheep and goats on ranges
10. transportation and marketing; slaughter and flaying; showing of sheep/goats
11. keeping flock healthy, common ailments.

Practical

1. Identification of different sheep and goat breeds; judging for milk, meat and wool/hair production
2. farm practices such as castration, hoof trimming, condition scoring etc.
3. grading and sorting wool; studying characteristics of hair, wool and mohair in the lab
4. flaying and skin preservation
5. various farm records; practical prophylactic measures
6. shepherd calendar; visit to sheep and goat farms.

Recommended Texts

1. Nelson, M.G. (2010). *Rearing sheep and goats*. Atlantic Publishing Company
2. Ensminger, M.E. & Parker, R. O. (1986). *Sheep and Goat Science*. USA: Interstate Printers and Publishers Inc..

Suggested Books

1. Pulina, G. (2004). *Dairy Sheep Nutrition*. USA: Cabi Publisher.
2. Khan, B.B., Iqbal, A. & Mustafa, M.I. (2003). *Sheep and Goat Production*. Department of Livestock Management, University of Agriculture, Faisalabad, Pakistan.

This under-graduate level course is aimed at nutrition of farm animals for better performance and health. After taking this course students will be able to understand the basics of nutrient requirement estimation of cattle, buffaloes, sheep, goats, camels and horses for maintenance, growth, production and reproduction. It focuses on production problems related to ruminant nutrition and process of ingestion, digestion and metabolism of different essential nutrients in farm animals. Farm animals require four main groups of nutrients to live, grow, produce and reproduce - water, energy, protein, and minerals and vitamins. The nutrient requirement of each animal varies with difference in age, sex, body weight, physiological status and type of specie. This course gives the knowledge about nutrient requirements of ruminants raised for different purposes. It also explicitly tells about feedstuffs available for farm animals and preparation of commercial feeds for ruminants along with measures to improve quality of feed and utilization of non-conventional feed resources.

Contents

Theory

1. Feeding standards, history, usefulness and limitations
2. nutrient requirements of cattle, buffaloes, sheep, goats, camels and horses for maintenance, growth, production and reproduction
3. measurement of body needs, feeding trials, digestibility and balance trials
4. factors affecting digestibility and balance of nutrients
5. respiratory quotients; partitioning of nutrients in the body
6. factors governing energy, protein, minerals and vitamins needs of farm animals
7. Concepts of rumen bypass nutrients.

Practical

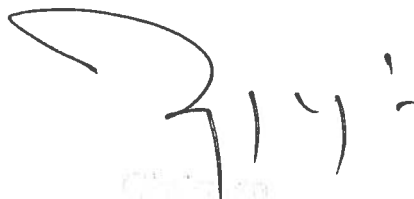
1. Determination of acid detergent fiber (ADF) and neutral detergent fiber (NDF).
2. Determination of nutrient digestibility and nitrogen balance.
3. Determination of energy value of feedstuffs. .

Recommended Texts

1. NRC (2000). *Nutrient Requirement of Beef Cattle*. Washington DC, USA: National Academy Press.
2. NRC (2001). *Nutrient Requirement of Dairy Cattle*. Washington DC, USA: National Academy Press.
3. NRC (1994). *Nutrient Requirement of Poultry*. Washington DC, USA: National Academy Press.

Suggested Books

1. Ensminger, M.E., Oldfield, J.E. & Heinemann, W.W. (1990). *Feeds and Nutrition Digest*. California, USA: The Ensminger Publishing Co.
2. McDonald, P., Edwards, R.A. , Greenhalgh, J.F.D. & Morgan, C.A. (2004). *Animal Nutrition*. U.K: Longman Scientific and Technical Publisher.


Department of Animal Science
College of Agriculture
University of Sargodha

This course is graduate-level course about rearing of rural or backyard poultry birds. This course mainly focuses on importance of rural poultry farming, knowledge about different rural breeds of poultry, and management of rural poultry and evaluates existing system and identifies measures to improve them. This course also tells about the diet formulation of rural poultry birds. It also tells about the standard practices that may be adopted to improve production backyard poultry. It also focuses on breeding of rural poultry birds and ways to improve hatchability by using natural incubation or small scale incubators. This course also tells about the major health issues and medication of backyard poultry. This course also tells about the ways to select a good producing bird in backyard system. This course also critically studies the perceptions of people about poultry and poultry products. This course also helps to chalk out the plan for the start of a new backyard poultry business.

Contents

Theory

1. Status of rural poultry production in Pakistan
2. Significance and scope of rural poultry farming
3. Desires commercial poultry products, Consumer attitudes
4. Choosing right rural breed/strain for meat and egg production
5. Housing and equipments, Natural incubation
6. Incubation requirements, Characteristics of broody hen
7. Selection of hatching eggs, Management during incubation
8. Management during brooding, growing and laying
9. Selection of feed ingredients
10. Feed formulation for rural poultry, Feeding and watering practices
11. Vaccination, medication and parasitic control
12. Impact of season on performance of rural poultry
13. Record keeping, Marketing of rural poultry and its products
14. Measures to improve rural poultry production in Pakistan

Practical


1. Demonstration of suitable breeds for rural poultry production
2. Types of houses and equipments
3. Nest preparation for natural incubation, Small scale incubators
4. Differentiation between laying and a non-laying hen, Vaccination and medication
5. Preparation and handling of small incubators
6. Feasibility report for 100 rural poultry birds, Visit to government poultry farms

Recommended Texts

1. P. V. Sreenivasiah (2006). Scientific poultry production: International Book Distributing Company
2. N. Gosh (2015). POULTRY SCIENCE AND PRACTICE. CBS Publishers & Distributors.

Suggested Books

1. Prasad, J. (2008). *Poultry Production and Management* (3rd ed.). New Delhi, India: Kalyani Publishers.
2. Sonaiya, E.B. & Swan, S.E.J. (2008). *Small Scale Poultry Production*. New Delhi, India: Discovery Publishing House.


 Chairman
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 University of Agriculture, Faisalabad

This is the course of under graduate level. Milk is a nutrient-rich, white liquid food produced by the mammary glands of mammals. It is the primary source of nutrition for infant mammals before they are able to digest other types of food. Early-lactation milk contains colostrum, which carries the mother's antibodies to its young and can reduce the risk of many diseases. It contains many other nutrient including protein and lactose. Interspecies consumption of milk is not uncommon, particularly among humans, many of whom consume the milk of other mammals. As an agricultural product, milk, also called dairy milk, is extracted from farm animals during or soon after pregnancy. Pakistan is the world's largest producer of milk, and is the leading exporter of skimmed milk powder, yet it exports few other milk products. The ever increasing rise in domestic demand for dairy products and a large demand-supply gap could lead to India being a net importer of dairy products in the future. This course will help the students to identify the various aspects that lead to ideal milk production.

Contents

Theory

1. Structure and functions of mammary gland
2. blood and nerve supply to the udder
3. mammogenesis, lactogenesis and galactogenesis
4. synthesis of milk; milk ejection- neural and hormonal component
5. milking methods
6. factors affecting milk production and composition
7. measure to increase milk production
8. common malpractices used in milk production
9. physical and chemical properties of milk
10. hygienic milk production
11. collection and transportation, processing and marketing of milk
12. dairy products
13. milk ordinance, udder and milk borne diseases.

Practical

1. Milking practice; hand versus machine milking
2. milk let down and its inhibition; removal of residual milk
3. milking time hygiene; screening tests; macro and micro structure of udder
4. analysis of milk; cleaning and sanitizing of barns and equipment
5. visit to milk processing plants.

Recommended Texts

1. Neeraj, J.P. (2010). *Principles and Practices of Dairy Farm Management*. Kalyani Publishers, India.
2. Spreer, E. (1998). *Milk and Dairy Product Technology*. CRC Press, Florida.

Suggested Books

1. Bilal, M.Q. & Ahmad, A. (2004). *Dairy Hygiene and Disease Prevention*. Faisalabad, Pakistan: Bilal and Usman printers.
2. Davis, J.G. (1994). *Milk Testing*. India: Agro-Botanical Pub.

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Department of Animal Husbandry
University of Agriculture
Faisalabad

This course is aimed at understanding the nutrition of poultry birds to get optimum performance. It also critically focuses on production problems related to poultry feeding and feeding standards of the poultry birds. This course gives the knowledge about different poultry feeding methods and nutrient requirements of poultry birds raised for different purposes. It also explicitly tells about feedstuffs available for poultry and preparation of commercial feeds for poultry along with measures to improve quality of feed and standard storage practices. This also focuses on feeding of poultry birds reared in hot and cold areas. This course also tells about different feeding systems used in commercial poultry farming. This course also focuses on evaluation poultry feed and on farm preparation of balance feed along with feasibility of home feed mixing. This course also tells about feed additives and their mixing in poultry feed. After taking this course students will be able to understand methods of feeding of poultry and manufacturing commercial poultry feed.

Contents

Theory

1. Importance of poultry feeding, principles of poultry feeding
2. Common feedstuffs used in poultry rations
3. Poultry feed formulation
4. Feeding methods and their advantages
5. Forms of feed
6. Feed and water quality in relation to performance of chickens
7. Factors affecting quality of feed
8. Measures to avoid feed toxicity
9. Manual verses automatic feeding systems
10. Feed and water space requirements; Poultry feed additives
11. Storage of poultry feed to maintain quality; Types of poultry diets
12. Poultry feeding strategies during hot and cold climates; Measures to avoid wastage of feed

Practical


1. Different feeding methods
2. Feeding practices; Evaluation of poultry feed by gross examination
3. Storage of commercial feed at farm; Mixing of feed additives in poultry feed
4. Home feed mixing; Economics of home feed mixing
5. Visit to commercial feed mills and environment controlled poultry houses

Recommended Texts

1. P. V. Sreenivasaiah (2006). *Scientific poultry production*: International Book Distributing Company
2. Donald, D. B. and W.D. Weaver, Jr. (2007). *Commercial Chicken Meat and Egg Production*. India: Springer Pvt. Ltd.

Suggested Books

1. Ramsubba, R.V & Bhosale, D.T. (2004). *Handbook of Poultry Nutrition*. Lucknow, India: International Book Distribution Co.
2. Jull, M.A. (2003). *Successful Poultry Management*. Delhi, India: Bio-Tech Books.


Department of Poultry Science
University of Sardar Vallabhbhai Patel
Vadodra

Topic	Details
Semester/Level	In some discipline 5 th semester and in some discipline 6 th Semester/ BS (5 th Semester intake) 1 st / 2 nd
Objectives	<ul style="list-style-type: none"> To introduce ethics and highlight its importance, need and relevance for individual and collective life. To illuminate the students with the Quranic norms of Morality i.e. truthfulness, patience, gratitude, modesty, forgiving, hospitality etc. To familiarize the students with immoral values like falsify, arrogance, immodesty, extravagance, backbiting etc. To inculcate ethical and moral values in our youth. To develop a balanced dynamic and wholesome personality. To introduce the students to Quranic Arabic grammar in practical manner.
Course Contents:	<p>○ اخلاق (تعارف، ضرورت و اہمیت، اقسام، معنویت)</p> <p>اخلاق حسنہ :</p> <ul style="list-style-type: none"> برائی کو نیکی سے مٹانا نیکی کے کاموں میں مسابقت لوگوں کے درمیان صلح عدل و انصاف سچائی ایثار سلیم قلب مہمان نوازی لغوئیات سے اعراض عاجزی و انکساری نگاہ اور آواز کو پست رکھنا چال میں میانہ روی شرمگاہوں کی حفاظت صبر شکر امور میں میانہ روی <p>اخلاق سنیہ :</p> <ul style="list-style-type: none"> ظلم اور زیادتی غرور و تکبر نفسانی خواہشات کی پیروی بدگمانی جھوٹ چغلی اور تہمت تمسخر اور شیخی خوری لہو و لعب برے ناموں سے پکارنا احسان جتانا اور تکلیف دینا فضول خرچی اور حد سے بڑھنا حسد اور تنگ دل بے پردگی
Grammar:	<ul style="list-style-type: none"> قرآنی عربی گرامر کے اصول اور انکے اطلاقات (متن قرآنی پر اطلاق سے توضیحات)
Details of Chapters and	<ul style="list-style-type: none"> منتخب آیات مع ترجمہ و تجوید البقرہ (۱۱۲، ۲۳۵، ۸۳، ۱۸۲، ۱۶۲، ۱۵۲، ۱۶۲، ۵۲، ۱۵۳، ۱۴۴، ۲۵۰، ۱۲۵)

SEMESTER- VII

ANSC-6130

Animal Breeding Practices

3(2-1)

This is the course of under graduate level. This course will help the students to revise the skills and abilities to demonstrate your knowledge and understanding of principles, practices, techniques and strategies related to animal breeding and genetics. It also helps to apply the knowledge and understanding of these principles, practices, techniques and strategies to realistic breeding scenarios. This course aims to analyze and evaluate information relating to animal breeding and genetics. It shows to know how to develop breeding management programs and recommend breeding strategies in context with appropriate justification. This will need to use understanding of animal breeding and genetics, along with the skills in carrying out research based on a set task brief. Selective breeding can be unintentional, e.g., resulting from the process of human cultivation; and it may also produce unintended – desirable or undesirable – results. Animal breeding is a branch of animal science that addresses the evaluation (using best linear unbiased prediction and other methods) of the genetic value (estimated breeding value, EBV) of livestock. The students will be able to understand the implementations of economic values with the farming. The students will be able to answer the questions based on research and knowledge of animal breeding and genetics.

Contents

Theory

1. Role of animals breeding in livestock production.
2. Opportunities for breeding and selection in Pakistan.
3. Conservation of animals genetic resources in Pakistan.Scope techniques and problems.
4. Constraints in improving the productivity of livestock under traditional breeding system.
5. Review of breeding practices used by developed countries for increasing the performance of farm animals.
6. Emerging breeding technologies for increased beef and milk productivity.
7. Selection for superior breeding stock for beef and dairy animals.
8. Developmental genetics; Evolutionary development and life cycle development.
9. Systems of breeding in beef animals; heritability repeatability values.
10. Methods to improve productivity; genetic correlation among traits.

Practical

1. Exercises on History sheets manually
2. Computation of various productive and reproductive traits in different farm animals from available records

Recommended Texts

1. Bourdon, R. M. (2000). *Understanding Animal Breeding*. Upper Saddle River, New Jersey: Prentice-Hall, Inc.
2. Khan, F. H. & Singh, A. (2002). *Principles of Genetics and Animal Breeding*. India: JP Brothers Medical Publishers Ltd.

Suggested Books

1. Oldenbroek, K. (2007). *Utilization and conservation of farm animal genetics resources*. The Netherlands: Wageningen academic publisher.
2. Piper, L. & ruvinsky, A. (1997). *The genetic of sheep*. Cambridge. UK: Uni. Press.

This graduate level course specifically focuses on broiler, layer and breeder farming. This course covers all aspects of a commercial poultry farm. This course also gives some knowledge about the management of game birds. It is aimed at studying the husbandry of birds in different environment; poultry waste management, welfare of commercial poultry birds and trouble shooting of poultry farm to understand the causes of poor performance of birds. This course focuses on poultry farm practices including beak trimming, molting, medication and vaccination. This course also gives some knowledge about vices observed in poultry birds reared under intensified system and remedies to avoid abnormal behaviors in commercial birds. This course also elaborates different techniques that should be learnt to be a good manager of a commercial poultry farm. This course also tells about how a commercial poultry farm can be run successfully. Along with chicken this course also tells about the farming of quails, ducks, geese, peafowl, ostrich and turkeys.

Contents

Theory

1. Preparation for receiving day old chicks
2. Brooding, rearing and laying management of broilers, layer and breeders
3. Cage vs floor management
4. Management of quails, ducks, geese, peafowl, ostrich and turkeys
5. Feeding practices for broilers, layers and breeders; Light management
6. Causes of poor performance of layer and breeder flocks
7. Managerial practices to boost egg and meat production
8. Management of flock during hot and cold climates cannibalism; Vices and their remedies in poultry; Induced molting of spent layers and breeders
9. Trouble shooting in poultry farms; Poultry welfare
10. Poultry wastes disposal; Characteristics of an ideal poultry farm manager
11. Significance of record keeping; Use of computers in record keeping

Practical

1. Demonstration and handling of various types of brooders
2. Vaccination, medication, beak trimming and detoeing techniques
3. Remedies for different vices in poultry; Application of induced molting techniques
4. Preparation of birds for transportation; Computerized record keeping at farms
5. Feasibility report of 1000 broiler, layer and breeder flocks

Recommended Texts

1. P. V. Sreenivasaiah (2006). *Scientific poultry production*: International Book Distributing Company
2. Donald, D. B. and W.D. Weaver, Jr. (2007). *Commercial Chicken Meat and Egg Production*. India: Springer Pvt. Ltd.

Suggested Books

1. Donald, D.N & Waver, W.D. (2007). *Commercial Chicken Meat and Egg Production*. India: Springer Pvt. Ltd.
2. Haq, A. and Akhtar, M. (2004). *Poultry Farming*. H-9, Islamabad, Pakistan: Higher Education Commission of Pakistan.
3. Jull, M.A. (2003). *Successful Poultry Management*. Delhi, India: Bio-Tech Books.

This is the course of under graduate level. This course deals with the understanding of selective breeding, domestication and traits that have the economic value for the human beings. Domesticated animals are known as breeds, normally bred by a professional breeder, while domesticated plants are known as varieties, cultigens, or cultivars. In animal breeding, techniques such as inbreeding, linebreeding, and outcrossing are utilized. In this course we discuss the selective breeding and domestication of farm animals. The deliberate exploitation of selective breeding to produce desired results has become very common in agriculture and experimental biology. Selective breeding can be unintentional, e.g., resulting from the process of human cultivation; and it may also produce unintended – desirable or undesirable – results. Selecting for breeding animals with superior EBV in growth rate, egg, meat, milk, or wool production, or with other desirable traits has revolutionized livestock production throughout the world. The scientific theory of animal breeding incorporates population genetics, quantitative genetics, statistics, and recently molecular genomics. The students will be able to understand the implementations of economic values with the farming.

Contents

Theory

1. Traits of economic importance in farm animals; Selection of dairy heifers and bulls.
2. Use of standardized records, relative economic values; Breeding values and selection indices; Crossbreeding for milk and meat production.
3. Traits of economic importance in poultry and their improvement.
4. Formation of breeding stock for layers and broilers; Development of dual purpose birds and rural poultry; National breeding policy for improvement and conservation of livestock.
5. Review of the animal breeding practices used by the developed countries.
6. Future breeding plans for genetic improvement of farm animals in different agro-ecological zones of Pakistan; Emerging bio-technologies for increasing animal productivity.

Practical

1. Exercises on the maintenance and standardization of productive and reproductive records; Estimation breeding value using standardized records.
2. Exercises on the estimation of relative economic values; Construction of selection indices for large and small animals.
3. Orientation of computer packages for animal conservation and evaluation.

Recommended Texts

1. Bourdon, R. M. (2000). *Understanding Animal Breeding*. Upper Saddle River, New Jersey: Prentice-Hall, Inc.
2. Khan, F. H. & Singh, A. (2002). *Principles of Genetics and Animal Breeding*. India: JP Brothers Medical Publishers Ltd.

Suggested Books

1. McDowell, R.E. (1994). *Dairying with Improved Breeds in Warm Climates*. Raleigh, NC. USA: Kinnic Publishers, Inc.
2. Muir, W.M. & Aggrey., S.E. (2003). *Poultry Genetics, Breeding and Biotechnology*. Wallingford, Oxon, UK: CAB International.

This course tells about types, availability pattern and characteristics of feed resources of Pakistan. It also critically studies nutrient composition, utilization and significance of different feed stuffs used locally for feed manufacturing of livestock commercial poultry. This course gives an idea about effects of different feedstuffs on animal performance as well as use of non-conventional feed resources in animals. The main objectives of this course are to (a) Train students in determining the quality of raw feedstuffs and processed animal feeds. (b) Equip students with techniques involved in nutritive quality and feed efficiency estimation/determination. (c) Familiarize students with different processes involved in feed milling. (d) Train students in least cost feed formulation for various classes of livestock and poultry. After taking this course, students will be able to know that what to feed to animals and what feeding strategies should be used to economically fulfill the nutrient requirements of animals in commercial and semi-intensive system of livestock production. They will be able to determine the quality of animal feedstuffs. Students would be able to formulate balance diet and process feeds for different animal species.

Contents

Theory

1. Techniques for estimating nutritive value of feed stuffs and their validity
2. in vivo and laboratory techniques
3. factors affecting the nutritive value of feeds
4. measures of protein quality for monogastric; protein efficiency ratio, gross protein value; the essential amino acid index; protein evaluation systems for ruminants
5. natural toxicants of feeds and detoxification
6. feeding systems for livestock and poultry; raw feed material handling and storage
7. mixing processing and storage of finished; quality control in feed processing
8. forms of feeds and least cost ration formulation for ruminant livestock; equine, pets and poultry
9. Feed laws and regulations

Practical

1. Use of computer for least cost ration formulation for various classes of livestock and poultry; Availability pattern of feedstuffs in local market and their price structure; Manufacturing of wholesome feed
2. Demonstration of feeding trials for estimating feed efficiency; Visit of feed mills.

Recommended Texts

1. Miller. W.J. (2012). *Dairy cattle feeding and nutrition*. Academic Press Inc., NY.
2. Leeson. S. & Summers. J.D. (2008). *Commercial Poultry Nutrition*. Nottingham University Press, England.

Suggested Books

1. Ensminger M.E., Oldfield, J.E. & Heinemann, W.W. (1990). *Feeds and Nutrition Digest*. California, USA: TheEnsminger Publishing Co.
2. McEllihiney, R.R. (1994). *Feed Manufacturing Technology IV*. California, USA: American Feed Industry Association, Co.

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Department of Animal Sciences
College of Agriculture
University of Sargodha

The term meat industry describes modern industrialized livestock agriculture for production, packing, preservation and marketing of meat. In economics, it is a fusion of primary (agriculture) and secondary (industry) activity and hard to characterize strictly in terms of either one alone. The greater part of the entire meat industry is termed meat packing industry- the segment that handles the slaughtering, processing, packaging, and distribution of animals such as cattle, pigs, sheep and other livestock. A great portion of the ever-growing meat branch in the food industry involves intensive animal farming in which livestock are kept almost entirely indoors or in restricted outdoor settings like pens. This course will help to identify many aspects of the raising of animals for meat become industrialized, even many practices more associated with smaller family farms. The production of livestock is a heavily vertically integrated industry where the majority of supply chain stages are integrated and owned by one company.

Contents

Theory

1. Development of meat industry in Pakistan; important mutton, beef and dual purpose breeds; meat terminology; system of meat animal production
2. breeding and feeding management; veal and dairy beef
3. species-wise off take rate carcass evaluation; cuts and meat grades
4. feed additives to enhanced growth and fattening
5. growth rate and fattening potential of indigenous livestock breeds
6. factor affecting carcass and meat quality; pre-slaughter changes in carcass
7. spoilage of meat; hygienic meat production; meat storage and preservation
8. buffalo and camel as beef animals; marketing of meat animals and meat
9. economics of meat production; meat byproducts
10. feasibility reports; modern slaughter houses.

Practical

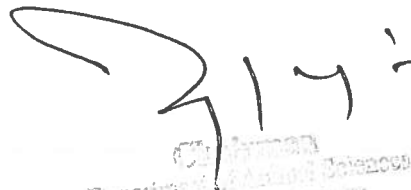
1. Body conformation of beef/meat animals; dressing percentage; carcass composition and cuts; judging meat animals
2. condition scoring of meat animals; preparing animals for slaughter house
3. scoring of carcass conformation and fatness; humane handling and animal welfare
4. slaughter house management; practical tips for housing and feeding of meat animals
5. design of modern slaughter house; visit to slaughter house and feedlots

Recommended Texts

1. Warriss. P.D. (2010) *Meat Science: an introductory text*. CABI, UK.
2. Kerry. J.P. Kerry J.F. & Ledward. D.A. (2002). *Meat processing: Improving quality*. Woodhead Publishing, Cambridge, UK.
3. Gosh. N. (2010). *Supplementary Feeding of Sheep and Beef Cattle*. Astral International Pvt. Limited,

Suggested Books

1. Ensminger, M.E. (1990). *Beef Cattle Science*. Daville, Illinois, USA: The Interstate Printers.
2. Gracey, J. F. & Huey, R. J. (1999). *Meat Hygiene*. London. UK: W. B. Saunders Company Ltd.


 Department of Animal Science
 College of Agriculture
 University of Sargodha

This course will help to improve the knowledge of students about anatomy and physiology of reproductive system of farm animals. Theriogenology (reproduction) is the branch of Animal Science concerned with reproduction, including the physiology and pathology of male and female reproductive systems of animals and the clinical practice of veterinary obstetrics, gynecology, and andrology. Theriogenologists are veterinarians with advanced training in animal reproduction and obstetrics. The Theriogenology and Reproductive Medicine Service handles all phases of breeding services including artificial insemination for a variety of large and small animal patients, advanced assisted reproductive techniques, breeding soundness evaluations of male and female, obstetrics, management of diseases or complications of the postpartum period, and medical or surgical management of diseases of the male and female reproductive tract. This course will help the students to master different techniques for estrous detection in cows and buffalos. Students will be able to identify different reproductive problems in farm animals.

Contents

Theory

1. Physiology of female reproduction
2. puberty and breeding season in farm animals
3. hormones of hypothalamus, pituitary, placenta, ovaries and uterus; estrous cycle, oogenesis, ovulation, fertilization, gestation and parturition
4. involution of uterus and post-partum ovarian activity
5. methods of heat detection and pregnancy diagnosis; reproductive efficiency parameters
6. factors affecting the reproductive efficiency of farm animals
7. physiology of male reproduction; puberty in farm animals
8. hormone of the testes; spermatogenesis; methods of semen collection
9. physical characteristics of the semen of farm animals; artificial insemination.

Practical


1. Functional anatomy of male and female reproductive system
2. in vitro palpation of female reproductive organs for anatomical and morphological study
3. observation of oestral activity
4. breeding soundness examination of the bull: physical examination of the bull
5. preparation of artificial vagina
6. semen collection and evaluation

Recommended Texts

1. Gordon. I. (2004). *Reproduction technology in farm animals* (2nd ed.). CABI Publishing Cambridge, UK.
2. Cronje. P.B. (2000). *Ruminant physiology: digestion, metabolism, growth and reproduction*. CABI Publishing, Oxford, UK.

Suggested Books

1. I.A.E.A. (2007). *Improving the Reproductive Management of Dairy Cattle subjected to Artificial Insemination*. Rome.: Joint FAO/IAEA Program of Nuclear Technique in Food and Agriculture, FAO.
2. Ball, P.J.H. & Peters R.A. (2003). *Reproduction in Cattle* (3rd ed.).USA: Wiley Blackwell Publishers.


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SEMESTER- VIII

ANSC-6136

Research Project / Internship

3(0+3)

Research Project /Internship opportunities can provide students with unique exposure to research in other environments, including private industries, federal agencies, other countries, or other universities. Because of their value to the graduate student experience, the Department of Animal Sciences offers this course. It is intended to apprise students of the basics of how to design and conduct research, data analysis as well as technical report writing and presentation. Further, it covers a wide spectrum of experiments designed for students at undergraduate level both under lab and field conditions. The experiments are selected to provide insight into the basic principles and techniques of Animal Sciences. At the end of the semester, a study tour is arranged of provincial and federal research institutes to acquaint the students with recent research activities going on there. Livestock and poultry farm visits are also arranged time to time for this course during the semester. The core objective of this course is to train the students in such a way that at the completion of this course students may design their future research proposals.

Course Contents

1. Proposal development, on spot field training
2. Report writing and project presentation. (Format as per thesis manual of the university concerned).

Recommended Texts

1. Ghafoor, A. (2016). *Manual for synopsis and thesis preparation*. Faisalabad, University of Agriculture Press.
2. Relevant latest literature on target issues.

Suggested Readings

1. Reviews, research articles
2. Illustrated Manuals, Compendiums
3. Pocket books



Chairman
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College of Agriculture
University of Sargodha

In the world universities degree programs particularly in undergraduate programs, the capstone project (CP) has become pivotal. It may be of different forms but its core objective does not change. The CP makes the student able to work independently in group research with the purpose of devising a state-of-the-art solution for any existing global problem. Though CP project is sometimes challenging but in long run it becomes rewarding for the students of the universities. The CP is generally considered as the final project or the assignment, but it plays a vigorous role developing students research abilities to compete in the world in research and technology and it hones students research skills and knowledge. The CP course also paves the way for students to get contacted with industry partners and provides solutions to the world, in this way, a strong networking develops between students and industry and even between universities and industries.

Contents

1. What is Capstone Project?
2. Significance of Capstone Project
3. Misconceptions
4. Role of Supervisor, Coordinator, and Capstone Team.
5. How to choose Supervisor?
6. Evaluation Criteria
7. Get others know your work
8. Capstone proposal development including abstract, project success criteria, supervisor selection, and Dos and Donts.
9. Capstone proposal (Research) including abstract, background, research methodology, project scope. Functional specifications/requirements including project code, internal advisor, external advisor if any, project manager, project team, and submission date. While, non-functional requirements are performance requirements, safety requirements, security requirements, user documentation.
10. Literature review-elaboration of problem. Appendices, references.

Recommended Texts

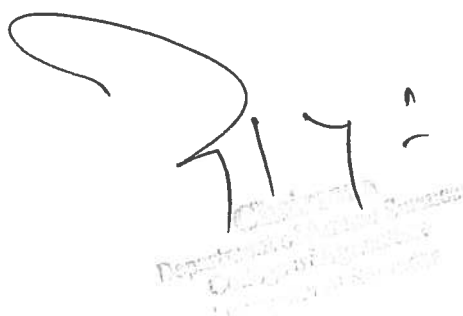
1. Hauhart, R. C., & Grahe, J. E. (2015). Designing and teaching undergraduate capstone courses. John Wiley & Sons.
2. Bemker, M., & Schreiner, B. (Eds.). (2016). The DNP degree & capstone project: A practical guide. DEStech Publications, Inc.
3. Ghafoor, A. (2016). *Manual for synopsis and thesis preparation*. Faisalabad, University of Agriculture Press.
4. Clear, T. (2009). Thinking Issues: the three p's of capstone project performance. ACM SIGCSE Bulletin, 41(2), 69-70.
5. Relevant latest literature on target issues.

Suggested Readings

1. Forestell, J. (2018). Capstone Project (Doctoral dissertation, Hamline University).

Reviews, research articles

2. Illustrated Manuals, Compendiums
3. Pocket books

A handwritten signature in black ink is written over a faint, rectangular stamp. The stamp contains text that is mostly illegible but appears to include 'Department of...' and 'University of...'. The signature is a stylized, cursive-like name.