



UNIVERSITY of
RWANDA

UNIVERSITY OF RWANDA

COLLEGE OF VETERINARY MEDICINE AND ANIMAL SCIENCES

SCHOOL OF ANIMAL SCIENCE AND BIOTECHNOLOGY

DEPARTMENT OF ANIMAL PRODUCTION

PROGRAMME HANDBOOK

Programme of Bachelor of Science in Animal Production

Award: Bachelor of Science with Honours in Animal Production

Programme Code: BH8ANP

NQF Level: 8

Academic Year: 2026 / 2027

Campus: Nyagatare

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1.1 Welcome message

You are warmly welcome to the Programme of Bachelor of Science in Animal Production. The programme provides broad-based scientific, practical and professional training in animal production. Through classroom learning, laboratory and field practicals, industrial attachments and research, students develop the knowledge and skills required to improve livestock production, animal health and welfare, food security and agricultural sustainability. The programme prepares graduates for careers and self-employment in livestock production, agribusiness, research, extension services, animal-related industries and other agricultural sectors, while equipping them with the technical, practical and entrepreneurial skills needed to contribute to national development. We welcome you to explore this handbook and learn more about the programme, its academic opportunities and its contribution to the livestock sector and society.

Dr. Eric HATUNGIMANA

Dean, School of Animal Sciences and Biotechnology

College of Veterinary medicine and Animal Sciences

University of Rwanda

1.2 Purpose and status of this handbook

This handbook describes the Bachelor of Science in Animal Production programme as approved by the University of Rwanda Senate and the Rwanda Higher Education Council (HEC). It should be read together with the University of Rwanda Academic Regulations for undergraduate students and the Academic Calendar for the year of study. Where any statement in this handbook conflicts with the University regulations, the University regulations take precedence. The University reserves the right to amend the content of this handbook. Any amendment will be approved through the standard quality assurance channels and published on UR website.

2 Programme at a Glance

Programme title	Bachelor of Science in Animal Production
Exit Award / qualification	Bachelor of Science with Honours in Animal Production
Intermediate Award / qualification	
Programme code	BH8ANP
College	College of Veterinary Medicine and Animal Sciences
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Campus(es) of delivery	Nyagatare campus
NQF / qualification level	8
Total credits required	540
Standard duration	4 years Full-time
Maximum registration period	6 years
Mode of delivery	Blended
Language of instruction	English
Intake(s) per year	September only
Professional accreditation	Rwanda Higher Education Council

3 Programme Goals and Learning Outcomes

3.1 Programme rationale

The Bachelor of Science in Animal Production programme responds to the need for competent professionals with scientific, technical, practical and entrepreneurial skills to support the development of Rwanda's livestock sector. The programme contributes to improving livestock productivity, food security, livelihoods and sustainable agricultural development through training, research, innovation, extension and technology transfer. The programme is aligned with national development priorities, including Rwanda Vision 2050, the National Strategy for Transformation (NST2) and the Strategic Plan for Agriculture Transformation (PSTA 5), as well as the Sustainable Development Goals. It equips graduates with the competencies required to address current and emerging challenges in animal production, health and welfare, agribusiness and sustainable livestock production. Graduates are prepared for employment in livestock production, agribusiness, research, extension services, animal-related industries and other agricultural sectors, enabling them to contribute effectively to the livestock industry, society and national development.

3.2 Programme Learning Outcomes

On successful completion of this programme, graduates will be able to:

Code	Programme Learning Outcome
PLO1	Demonstrate mastery of the scientific principles, theories, and concepts that underpin animal production, including nutrition, breeding and genetics, reproduction, health, welfare, and production systems.
PLO2	Apply appropriate practical methods, techniques, and technologies to livestock production, management, feeding, breeding, health, and welfare across diverse production systems.
PLO3	Use livestock-related data with appropriate numerical, statistical, graphical, ICT, and digital tools to inform decision-making.
PLO4	Establish professional, ethical, responsible, and collaborative practice within animal production and related professional contexts.
PLO5	Evaluate livestock production challenges and synthesize evidence to inform professional decisions and recommendations.
PLO6	Investigate animal production, health, and management problems using scientific evidence and sound professional judgment.
PLO7	Design research and sustainable livestock enterprise solutions to address animal production challenges and advance agribusiness, agricultural development, and societal needs.
PLO8	Communicate animal production information, ideas, problems, and solutions effectively to both specialist and non-specialist audiences via written, oral, and digital platforms.

4 Entry Requirements and Admission

4.1 Standard entry requirements

Entry requirements in this program are available on <https://ur.ac.rw/spip.php?page=admissions> and concern the following:

- ❖ Academic qualification
- ❖ Subject prerequisites
- ❖ Minimum grade
- ❖ Language proficiency
- ❖ Other requirements: Biology (70-100% or B-A); Chemistry (60-100% or C-A); Physics (50-100% or D-A); Mathematics (50-70% or D-A); if TVET (Veterinary: ≥70%; Animal Health: ≥70%)

For international applicants, other documentation may be required such as equivalency requirements, visa and residence permit requirements

4.2 Application, selection and registration process

Application, selection and registration in program follows university approved process available on <https://ur.ac.rw/spip.php?page=admissions> and concern the following

Step	Activity	Responsible
1	Application submitted through UR online admission portal	Applicant
2	Eligibility screening against published criteria	Registrar Office
3	Academic selection / interview / entrance test	Registrar Office and Colleges selection panel
4	Admission decision communicated	Registrar Office
5	Registration and enrolment	Admitted student

4.3 Program Fees & Payments

On this link <https://ur.ac.rw/spip.php?page=university-fees-structure> you can find all updated official information about fees at the University of Rwanda. Information applies for Academic Administrative fees and Tuition fees for Undergraduate and Postgraduate programmes.

5 Programme Structure: Modules, Units and Credits

5.1 Credit framework

One credit represents 10 notional learning hours, comprising contact hours, guided independent study and assessment. The total credit load for this programme is 540 credits.

Credits per semester (normal load)	60 credits
Credits per academic year	Year 1: 150 credits Year 2: 140 credits Year 3: 130 credits Year 4: 120 credits
Total programme credits	540 credits
Minimum credits for the award	540 credits
Notional hours per credit	10 hours

5.2 Curriculum by year and semester

5.2.1 Year 1

Module code	Module / unit title	Credits	Type	Semester	Prerequisite
CT80111	Citizenship and Transformative Education	10	Core	1	-
CL80111	English for general Purposes	10	Core	1 & 2	-
AP80181	Information Technology and communication skills	10	Core	1	-
AP80182	General Mathematics	10	Core	1	-
AP80183	General Physics	10	Core	1	-
AP80184	Basic Agricultural Sciences	10	Core	1	-
AP80185	Rural Development and Professional Ethics	10	Core	1	-
AP80281	Entrepreneurship and Innovation (Foundation)	10	Core	2	-
AP80282	General Biology	10	Core	2	-
AP80283	General Chemistry	10	Core	2	-
AP80284	Basics of Environmental Sciences	10	Core	2	-
AP80285	Basics of Economics	10	Core	2	-
AP80286	Anatomy and Physiology	20	Core	2	AP80282
AP80287	Earth Sciences	10	Core	2	-

Note: prerequisites in year one match the entry requirements

5.2.2 Year 2

Module code	Module / unit title	Credits	Type	Semester	Prerequisite
CL80311	English for Specific Purposes	10	Core	3 & 4	CL80111
AP80381	Intermediate Entrepreneurship and Innovation	10	Core	3	AP80281
AP80382	Biochemistry	10	Core	3	AP80282, AP80283
AP80383	Forage Production and Pasture Management	15	Core	3	AP80282, AP80283, AP80382
AP80384	Aquatic Resources Management	10	Core	3	AP80282, AP80283, AP80382
AP80385	Animal Nutrition	20	Core	3	AP80282, AP80283, AP80286
AP80481	General Farm Animal Production	15	Core	4	AP80282, AP80184, AP80383
AP80482	Feed Technology and Production	15	Core	4	AP80385,
AP80483	Introduction to Animal Health	15	Core	4	AP80282, AP80286, AP80382
AP80484	General Pathology and Immunology	10	Core	4	AP80282, AP80286, AP80382
VM80181	Animal Ethology and Welfare	10	Core	4	AP80282, AP80286,

5.2.3 Year 3

Module code	Module / unit title	Credits	Type	Semester	Prerequisite
CL80511	English for Academic Purposes	10	Core	5 & 6	CL80311
AP80581	Advanced Entrepreneurship and Innovation	10	Core	5	AP80381
AP80582	Geo-Science and Land Use Planning	15	Core	5	AP80181
AP80583	Animal Reproductive Management	15	Core	5	AP80286, AP80382
AP80584	Market and Marketing of Animal Products	10	Core	5	AP80285
AP80585	Agribusiness Management	10	Core	5	AP80185, AP80285
AP80681	Industrial Attachment I	10	Core	6	Modules Y1-Y2
AP80682	Ruminant Production	20	Core	6	AP80282, AP80286
AP80683	Applied Animal Genetics and Biotechnology	15	Core	6	AP80282, AP80382
VM80881	Veterinary Public Health, Food Safety and One Health	15	Core	6	AP80282

5.2.4 Year 4

Module code	Module / unit title	Credits	Type	Semester	Prerequisite
AP80781	Biostatistics and Research Methodology	10	Core	7	AP80182,
AP80782	Wildlife Management, Apiculture and Aquaculture	15	Core	7	AP80384
AP80783	Non-Ruminant Production, Hatchery Technology and Management	15	Core	7	AP80184, AP80282, AP80286
AP80784	Development Policies and Legislation	10	Core	7	AP80185 AP80285
AP80785	Agricultural Extension	10	Core	7	AP80184
AP80881	Animal Products Processing and Quality Control	20	Core	8	AP80282, AP80286, AP80382, AP80483
AP80882	Industrial Attachment II	20	Core	8	Modules Y1-Y4
AP80883	Research Project	20	Core	8	Modules Y1-Y4

5.3 5.3 Elective and specialisation options

Specialisation / track	Module code	Module title	Credits
[Track name]	-	-	-
[Track name]	-	-	-

5.4 Programme structure summary

Component	Number of modules	Credits	% of programme
Core / compulsory modules	43	490	90.74%
Elective / specialisation modules	-	-	-
Research project / dissertation / thesis	1	20	3.70%
Industrial attachment / practicum	2	30	5.56%
Total		540	100%

6.1 CT80111: Citizenship and Transformative Education

Module code and name	CT80111: Citizenship and Transformative Education
School	Centre for Conflict Management (CCM)
Department	-
Programme	-
Number of credits	10 credits
Year of study and semester	Year 1, Semester 1
Prerequisites:	-

6.1.1 Module introduction and aim

This module provides students with foundational knowledge and practical skills in civic education, integrity, human rights, and peace education. It is designed for first-year students at the University of Rwanda and aims to equip them with the values, attitudes, and competencies necessary to become responsible, ethical, patriotic, and active citizens who contribute positively to national development and social cohesion.

6.1.2 Module Indicative content

UNIT 1: CIVIC EDUCATION: citizenship, state building, national identity, overview of the history of Rwanda in connection with citizenship, state building and national identity

UNIT 2: INTEGRITY SYSTEMS: integrity and related concepts. mechanisms of promoting integrity, integrity systems in Rwanda

UNIT 3: HUMAN RIGHTS AND CITIZENSHIP EDUCATION: generalities on human rights, integrity systems and citizenship; theories and characteristics of human rights; history and classification of human rights; mechanisms for the promotion and protection of human rights; human rights in the context of Rwanda; gender and human rights

UNIT 4: PEACE EDUCATION; peace, conflict and related concepts; key areas of peace education; conflict analysis (with emphasis on conflict mapping and tracking model); approaches to peacebuilding; local mechanisms for peace (with emphasis on peace education and welfare programmes contributing to peace promotion in the Rwandan context)

6.1.3 Teaching and Learning Methods

The module promotes active learning through discussion, reflection, and practical activities. It uses lectures, group work, case studies, films, and other participatory methods. Students apply their experiences and knowledge to citizenship and transformative education. Guest speakers and community activities provide practical learning experiences. UR e-learning platform will support all these strategies in the blended-learning mode.

6.2 CL80111: English for General Purposes

Module code and name	CL80111: English for General Purposes
School	Centre for Language Enhancement
Department	-
Programme	-
Number of credits	10 credits
Year of study and semester	Year 1, Semester 1 & 2
Prerequisites:	-

6.2.1 Module introduction and aim

This module is designed to develop students' proficiency in English by strengthening their listening, speaking, reading, and writing skills for academic, professional, and everyday communication. It provides a foundation for effective language use and supports students in engaging successfully with university studies and future careers. The module adopts an Integrated Skills Approach, encouraging active participation, research, critical thinking, and meaningful communication across a variety of contexts, thereby enhancing students' overall communicative competence in English.

6.2.2 Module Indicative content

Unit 1: Culture and Society

Focuses on communication for travel, tourism, entertainment, and everyday social situations, with emphasis on pronunciation and basic language structures.

Unit 2: Environment and Sustainability

Develops listening and note-taking skills through topics related to the environment, weather, and climate.

Unit 3: Health and Welfare

Develops oral communication, presentation, and debate skills, using health and social issues as discussion topics.

Unit 4: Education, Technology and Career Development

Strengthens reading, writing, vocabulary, and formal communication skills for academic, professional, and career-related contexts.

6.2.3 Teaching and Learning Methods

The module uses diverse teaching and learning strategies, including group work, debates, blended learning, role-play, and self-directed study. Students receive prepared handouts, readings, audio-visual materials, and regular assessments to support learning. Peer learning and mentorship help students with language difficulties improve their skills. Weekly consultation sessions provide additional academic and language support. UR e-learning platform will support all these strategies in the blended-learning mode.

6.3 AP80181: Information Technology and Communication Skills

Module code and name	AP80181: Information Technology and Communication Skills
School	School of Animal Sciences and Biotechnology (SASB)
Department	Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10 credits
Year of study and semester	Year 1, Semester 1
Prerequisites:	-

6.3.1 Module introduction and aim

This module introduces students to essential ICT skills for academic and professional use. Students learn to operate standard computer applications, use the internet and digital databases for research, apply data processing tools, and communicate effectively using digital platforms. The module supports digital literacy across all areas of the BVM programme and prepares students to use technology as a professional tool.

6.3.2 Module Indicative content

Unit 1: ICT Literacy and Theories of Communication: Introduces basic ICT, digital communication, internet use, online research, AI, information security, and digital ethics.

Unit 2: Library and Reading Skills: Develops skills in using library resources, finding and evaluating information, academic reading, and literature searching.

Unit 3: Scientific Writing, Reporting and Oral Presentation Skills: Develops academic writing, research, referencing, data presentation, oral communication, and effective use of digital and e-learning platforms.

6.3.3 Teaching and Learning Methods

The course will be delivered with the view of giving more emphasis on clear concepts and solid theoretical and practical knowledge of computer systems and applications in specific areas. This is achieved by giving several real time examples in lectures and giving enough lab exercises as well as some video tutorials for the students to do and practice in the laboratory. Forum, both individual and group discussion is applied in their learning process with UR eLearning platform. Online resources are given to them as supplement to handouts.

6.4 AP80182: General Mathematics

Module code and name	AP80182: General mathematics
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10 Credits
Year of study and semester	Year 1, Semester 1
Prerequisites:	-

6.4.1 Module introduction and aim

The Module aims to introduce students to the various solving system of linear equations with different methods, evaluating the limit with different methods and finding an area by applying integrals and resolve problems involving 1st order differential equations. The module will deal with these topics at a basic level, leaving more advanced techniques to the specialist courses in Agricultural Engineering.

6.4.2 Module Indicative content

Unit 1: Matrices and Determinants

This unit introduces matrices and determinants, including operations on matrices, determinants of matrices, and inverse matrices. It develops students' understanding and application of matrix methods in solving mathematical problems.

Unit 2: Systems of Linear Equations and Differential Equations

This unit covers systems of linear equations and their solutions using matrices, Cramer's method, and Gaussian elimination. It also introduces ordinary differential equations of the first and second order and develops methods for solving and applying them.

Unit 3: Trigonometry and Real and Complex Functions

This unit covers the trigonometric circle, trigonometric identities, trigonometric equations and inequalities, as well as the analysis of real and complex functions. It develops students' ability to work with trigonometric relationships and analyze different types of functions.

Unit 4: Integral Calculus and Applications

This unit introduces integral calculus and its applications, focusing on techniques of integration and their use in solving mathematical problems and interpreting practical applications.

6.4.3 Teaching and Learning Methods

The course is delivered mainly through lectures supported by tutorial sessions and interactive group activities. Handouts and online resources are provided to support students' understanding and independent notetaking. Problem sheets are used for individual and group practice, followed by classroom and online forum discussions. Selected problems are submitted for peer marking to provide formative feedback and support learning. Assignments may involve computer programmes such as Python, requiring independent investigation, practical application, and written reports.

6.5 AP80183: General Physics

Module code and name	AP80183: General Physics
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10 Credits
Year of study and semester	Year 1, Semester 1
Prerequisites:	-

6.5.1 Module introduction and aim

The course aims to provide the basics of Analyzing physical situations and physical phenomena. It covers the mathematical relationships between physical quantities. Use basic principle of physics to solve problems and manipulate experiments in laboratory will be covered

6.5.2 Module Indicative content

Unit 1: Optics

This unit covers geometrical, wave, physical, quantum, modern, and applied optics. It examines reflection, refraction, mirrors, lenses, interference, diffraction, polarization, photoelectric effects, lasers, fiber optics, optical sensors, imaging systems, and quantum applications. It also introduces radiometry, photometry, laboratory equipment, mathematical modelling, simulation tools, and optical system design.

Unit 2: Electricity

This unit introduces basic electrical concepts, including electric charge, current, voltage, resistance, Ohm's law, conductors, and insulators. It covers electrical circuits, circuit components, series and parallel connections, electrical power and energy, electromagnetism, electromagnetic induction, transformers, generators, and applications in agricultural equipment. It also develops skills in electrical measurement, instrumentation, laboratory safety, renewable energy, sustainability, smart grids, and energy efficiency.

Unit 3: Mechanics

This unit covers kinematics, dynamics, work, energy, power, circular motion, and rotational dynamics. It examines motion, displacement, velocity, acceleration, Newton's laws, forces, friction, momentum, work, kinetic and potential energy, conservation of energy, power, efficiency, torque, moment of inertia, and rotational motion. Applications include wheels, gears, turbines, and other mechanical systems.

6.5.3 Teaching and Learning Methods

The course is delivered mainly through lectures supported by tutorial sessions and laboratory experiments. Interactive lectures involve group activities where students apply principles to simple problems to enhance understanding. Handouts and online resources support lecture materials, note-taking, and independent learning. Problem sheets are discussed in class and online, with selected problems peer-marked to provide formative feedback. Practical activities and assignments encourage independent investigation, application of ideas, and preparation of reports.

6.6 AP80184: Basic Agricultural Sciences

Module code and name	AP80184: Basic Agricultural Sciences
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10 Credits
Year of study and semester	Year 1, Semester 1
Prerequisites:	-

6.6.1 Module introduction and aim

The module aims to introduce students to the fundamental principles of agricultural sciences, including the factors influencing soil formation and soil properties, the principles and processes of crop production, basic concepts of forestry science, and the fundamentals of livestock production, with consideration of both global and Rwandan contexts.

6.6.2 Module Indicative content

Unit 1: Introduction to Soil Science

This unit introduces soil concepts, formation, components, physical, chemical and biological properties, and basic soil classification.

Unit 2: Introduction to Crop Production

This unit introduces crop production processes, plant nutrition, fertilization, fertilizer use efficiency, and major cropping systems.

Unit 3: Introduction to Forestry and Agroforestry

This unit covers the principles of forestry and agroforestry, tree management, tree-environment interactions, and the products and services provided by trees.

Unit 4: Introduction to Animal Production

This unit introduces livestock production, major animal species and breeds, production management, production systems, other animal enterprises, and livestock products.

6.6.3 Teaching and Learning Methods

The course is delivered through lectures, tutorials, farm work, field visits, and laboratory experiments, with interactive group activities. Handouts and online resources support lecture materials, note-taking, and independent learning. Problem sheets are discussed in class, with selected work peer-marked to provide formative feedback. Experiments and assignments encourage independent investigation, practical application, and individual or group report writing.

6.7 AP80185: Rural Development and Professional Ethics

Module code and name	AP80185: Rural Development and Professional Ethics
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10 Credits
Year of study and semester	Year 1, Semester 1
Prerequisites:	-

6.7.1 Module introduction and aim

This module aims to introduce students to the key concepts and principles of rural development, rural sociology, professional ethics, and Rwandan culture. It provides students with an understanding of the social, cultural, ethical, and developmental dimensions of rural communities, with particular emphasis on the Rwandan context.

6.7.2 Module Indicative content

Unit 1: Introduction to Rural development

Rural development theories and concepts. Relationship between poverty and development. Role of Agriculture to sustainable development. Constraints of Rwandan agricultural sector and its future prospective.

Unit 2: Introduction to Rural Sociology

Basic concepts used in sociology. Evolution, theories, and major trends in sociology. Contemporary views of modern society. Analyzing Social change in the modern world. Relationship between society, modern science, technology, and development. Sociological strategies for socioeconomic transformation and sustainable development of Rwanda.

Unit 3: Ethics and Rwandan Culture

Basic concepts used in ethics. Evolution, theories, and major trends in ethics. Typology of ethics. Professional ethics for agriculturalists. Defining and grasping cultural patterns of Rwanda from pre-colonial periods. Describing Rwandan culture in pre-colonial, colonial, postcolonial era analyzing current Rwandan culture in the post genocide era.

6.7.3 Teaching and Learning Methods

Lecture and class interactions will form the basis of the component. The exercises and practical learning activities are organized to reinforce lectures and to encourage students to read more the courses handouts. Tests and guided assignments are organized to facilitate students to internalize the learned content.

6.8 AP80281: Entrepreneurship And Innovation (Foundation)

Module code and name	AP80281: Entrepreneurship and Innovation
School	School of Animal Sciences and Biotechnology (SASB)
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10 credits
Year of study and semester	Year 1, Semester 2
Prerequisites:	-

6.8.1 Module introduction and aim

This module introduces students to the principles of entrepreneurship, innovation, and business management, with emphasis on veterinary and agri-business enterprises. It is designed to equip students with the knowledge, skills, and attitudes required to identify opportunities, develop innovative solutions, and establish viable and sustainable ventures. Students explore the entrepreneurial mindset, business planning, venture creation, and the economic environment influencing enterprise development in Rwanda and elsewhere. The module lays a foundation for recognizing and transforming opportunities into commercially feasible businesses, while fostering self-reliance, job creation, and sustainable livelihoods in the animal health and agricultural sectors.

6.8.2 Module Indicative content

The module will cover the following content:

- a) Characteristics of a Successful Entrepreneur
- b) Entrepreneur in the context of doing Business
- c) Identification of business opportunities and ideas
- d) Creativity, Innovation and Entrepreneurs
- e) Social entrepreneurship development
- f) Design thinking for Customer Delight
- g) Communicate Effectively
- h) Managing Risks and Learning from Failures
- i) Process of entrepreneurship and innovation
- j) Sales Skills to Become an Effective Entrepreneur

6.8.3 Teaching and Learning Methods

The achievement of learning outcomes will be supported through a variety of teaching, learning, and assessment strategies, including face-to-face and online learning, live cases, case studies, classroom exercises, role plays, and end-of-lesson quizzes. Students will also engage in individual and group assignments to reinforce their understanding and application of concepts and theories. Public lectures and other interactive learning activities will provide additional opportunities for knowledge development and practical engagement. An end-of-course examination and a capstone project will be used to assess students' achievement of the intended learning outcomes.

6.9 AP80282: General Biology

Module code and name	AP80281: General Biology
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10 Credits
Year of study and semester	Year 1, Semester 2
Prerequisites:	-

6.9.1 Module introduction and aim

This module introduces students to the fundamental principles of zoology, entomology, botany, genetics and microbiology that underpin animal production and related biological sciences. It develops understanding of biological classification and binomial nomenclature; the structure, diversity and organization of plants and animals; parasites and insect biology; plant cells, tissues and angiosperms; and the principles of inheritance and evolution. Through lectures, guided study and laboratory practicals, students learn to distinguish major groups of organisms, relate structure to function, and apply basic biological knowledge and practical skills to subsequent study in animal health, nutrition, genetics and production.

6.9.2 Module Indicative content

Unit 1: Zoology and Entomology

Classification and binomial nomenclature; invertebrates and chordates; parasites and life cycles; metamerism; insect mouthparts and metamorphosis.

Unit 2: Botany

Plant cell structure and histology; plant tissues and tissue systems; anatomy of stems, roots and leaves; secondary growth; angiosperm organography; plant identification and classification.

Unit 3: Genetics

Mendelism; genetic material and replication; mitosis and meiosis; gene interaction and linkage; crossing over; sex chromosomes and sex linkage; mutation and theories of evolution.

Unit 4: Microbiology

Foundational concepts in microorganisms are relevant to biological and animal sciences.

6.9.3 Teaching and Learning Methods

Formal lectures backed up with tutorials will be used to provide background information and basics of each learning unit of this module. Lecturers will give the students an opportunity for discussion of the topics with a Lecturer to clear eventual doubt. Lecturers' direct students to electronic sources and articles relevant to the topics of lectures which make the students read more about the relevant topics. In addition, practical work will reinforce and facilitate students in understanding various topics that were given in theoretical lectures.

6.10 AP80283: General Chemistry

Module code and name	AP80283: General Chemistry
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10 Credits
Year of study and semester	Year 1, Semester 2
Prerequisites:	-

6.10.1 Module introduction and aim

This module introduces the principles and practical applications of inorganic, analytical and organic chemistry and biochemistry. It develops students' understanding of atomic structure, chemical elements, reactions, stoichiometry, solutions and chemical thermodynamics. Students also learn to identify and apply separation, volumetric and instrumental analytical methods; describe hydrocarbons and their derivatives; and explain the structures and functions of major biomolecules and metabolic processes. Laboratory activities develop skills in solution preparation, titration, separation and the qualitative and quantitative determination of biomolecules in animal and plant samples, providing a foundation for further study in animal and agricultural sciences.

6.10.2 Module Indicative content

Unit 1. Inorganic Chemistry

Atomic structure and quantum models; chemical bonding and intermolecular forces; the periodic table; stoichiometry; solutions and equilibria; chemical thermodynamics

Unit 2. Analytical Chemistry

Distillation, chromatography and solvent extraction; volumetric and gravimetric analysis; redox, precipitation and complexometric titration; salt solubility and instrumentation.

Unit 3. Organic Chemistry

Functional groups and classes of organic compounds; IUPAC nomenclature; physical and chemical properties; reaction mechanisms; economic importance and environmental hazards.

Unit 4. Biochemistry

Cell biology; proteins and enzymes; carbohydrates and lipids; vitamins and hormones; nucleic acids and protein biosynthesis; carbohydrate, lipid and protein metabolism; biomolecule determination.

6.10.3 Teaching and Learning Methods

The course is delivered through lectures, tutorials, and laboratory experiments, with interactive group activities to enhance understanding. Handouts and online resources support lecture materials, note-taking, and independent learning. Problem sheets are discussed in class, with selected problems peer-marked to provide formative feedback. Experiments and assignments encourage independent investigation, practical application, and individual or group report writing.

6.11 AP80284: Basics of Environmental Sciences

Module code and name	AP80284: Basics of Environmental Sciences
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10 Credits
Year of study and semester	Year 1, Semester 2
Prerequisites:	-

6.11.1 Module introduction and aim

This module introduces the fundamental concepts of climatology and general ecology that are relevant to agriculture, animal production and natural resource management. It enables students to understand the atmosphere and the climatic factors that influence an area, analyze climatic data, distinguish climatic classifications, and examine climate change and its effects on natural resources. The module also develops understanding of biodiversity, ecological balance, agro-ecological zones in Rwanda, ecosystem dynamics, food chains, environmental degradation and disasters. Students gain practical experience in using meteorological equipment, interpreting environmental information and identifying appropriate responses to environmental risks.

6.11.2 Module Indicative content

Unit 1: Climatology

Concepts of the atmosphere and different climatological elements: solar radiation, temperature, rainfall, pressure, wind, air masses, humidity, type of climates. Analysis of climatological data; Differentiate the Koppen classification from others.

Unit 2: General Ecology

Biodiversity and environmental degradation. Policy of agro ecological zoning (Crop Regionalization according to different agro-ecological zones of Rwanda). Impact of Environmental disasters and disease and be able to define high risk zones and what will be the appropriate management. Natural and agro ecosystem dynamic; food chain.

6.11.3 Teaching and Learning Methods

Lectures, seminars, laboratory practicals, case studies, group projects, fieldwork, group work, case studies, small-group discussions and presentations, practical exercises, and field visits to examine environmental problems and the measures used to mitigate them supported by the UR E-learning platform.

6.12 AP80285: Basics of Economics

Module code and name	AP80285: Basics of Economics
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10 Credits
Year of study and semester	Year 1, Semester 2
Prerequisites:	-

6.12.1 Module introduction and aim

This module provides students with basic theoretical and practical knowledge of economics and accounting. It introduces core microeconomic concepts, including choice, opportunity cost, price, production, costs, consumer behavior, markets and elasticity, alongside macroeconomic concepts such as national income, inflation, unemployment, monetary and fiscal policy, and economic development. The module also develops understanding of accounting principles, the accounting equation, double-entry bookkeeping, the accounting cycle, cash and bank transactions, inventory and financial statements. Students learn to interpret business financial performance and apply basic analytical tools, including Excel and agricultural economics software.

6.12.2 Module Indicative content

Unit 1: Introduction to Microeconomics

Basic economic principles; price theory and the cobweb model; production and cost theory; consumer behavior; market theory and elasticity.

Unit 2: Introduction to Macroeconomics

The relationship between microeconomics and macroeconomics; national income and its measurement; circular flow of income; aggregate demand and the multiplier; money, banking, inflation, fiscal and monetary policy; unemployment, population, aid and development; macroeconomic policy in Rwanda.

Unit 3: Fundamentals of Accounting

Accounting concepts and users; forms of business organization; accounting principles; the accounting equation and double-entry system; journals, ledgers, trial balance and financial statements; correction of errors; cash books, petty cash and bank reconciliation; accounting for non-profit organizations and inventory.

6.12.3 Teaching and Learning Methods

The course uses lectures, tutorials, project-based group activities, project writing assignments, and self-study to develop understanding of business planning. Handouts and online resources support learning, note-taking, problem-solving, and independent study. Problems are discussed in class and online forums, with selected work peer-marked to provide formative feedback. Field visits to young entrepreneurs and assignments encourage independent investigation, idea development, and practical application in real business contexts.

6.13 AP80286: Animal Anatomy and Physiology

Module code and name	AP80286: Anatomy and Physiology
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	20 Credits
Year of study and semester	Year 1, Semester 2
Prerequisites:	-

6.13.1 Module introduction and aim

This module develops students' understanding of the structure and major functions of the animal body as a foundation for effective animal production and management. It integrates farm animal anatomy, general embryology, histology, general physiology and applied physiology. Students examine the external regions, organs, tissues and body systems of domestic animals and relate their structures to normal functions. The module covers circulation, respiration, excretion, thermoregulation, nervous and endocrine regulation, digestion, reproduction and lactation. Practical sessions develop skills in dissection, microscopic examination, measurement of physiological parameters and interpretation of findings for animal husbandry.

6.13.2 Module Indicative content

Unit 1: Anatomy of Farm Animals

This unit introduces the anatomy of domestic animals, covering external regions, anatomical nomenclature, body planes, the locomotor system, splanchnology, angiology, neurology, and avian anatomy. Practical laboratory dissection sessions enable students to observe the structures, topography, and forms studied in theory.

Unit 2: Physiology of Farm Animals

This unit covers the general functions of the animal body, including blood circulation, heart activity, respiration, kidney and skin functions, thermoregulation, and nervous and endocrine regulation. It examines digestion and feeding behavior in different farm animals, including ruminants, non-ruminants, young ruminants, herbivores, and birds, as well as reproduction and lactation, including fertilization, gestation, parturition, and post-partum activity.

Unit 3: Embryology and Histology

This unit introduces embryonic development, including gametogenesis, fertilization, cleavage, blastulation, gastrulation, morphogenesis, and differentiation. It also covers the structure and organization of epithelial, connective, bone, cartilage, nervous, and muscular tissues, as well as tissues and cells of the digestive, reproductive, immune, and cardiovascular systems. Practical sessions use PowerPoint slides to illustrate major tissue structures.

6.13.3 Teaching and Learning Methods

Basic knowledge is developed through lectures, discussions, examples, practical sessions, assignments, and self-reading exercises. Tutorial problems are solved in groups, presented, and discussed to encourage participation. The lecturer provides notes, guides discussions, emphasizes key concepts, and evaluates understanding. Practical sessions and assignments reinforce materials. Blended learning will be used via UR E-Learning platform.

6.14 AP80287: Earth Sciences

Module code and name	AP80287: Earth Sciences
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	20 Credits
Year of study and semester	Year 1, Semester 2
Prerequisites:	-

6.14.1 Module introduction and aim

This module introduces the composition and structure of the Earth, including the atmosphere, hydrosphere, biosphere and lithosphere. It develops foundational knowledge of geology, geomorphology and mineralogy, with emphasis on the origin, properties, identification and classification of rocks, minerals and landforms. Students examine geological processes, weathering, erosion, landform evolution and the interactions among Earth's major systems. The module relates earth materials and surface processes to soil formation, agricultural land use, environmental management and the identification of land potential and constraints, thereby supporting informed decision-making in agriculture and animal production.

6.14.2 Module Indicative content

Unit 1: Geology

Branches of geology and their relationship to agriculture; Earth's structure and history; composition and properties of rocks; origin, identification and classification of igneous, sedimentary, residual and metamorphic rocks.

Unit 2: Geomorphology

Basic geomorphological concepts; landform evolution and interactions among the hydrosphere, lithosphere, biosphere and atmosphere; erosional landforms caused by water, ice, wind and gravity; physical, chemical and biological weathering; identification of faults and major landscape features.

Unit 3: Mineralogy

The relationship between mineralogy and agriculture; mineral and crystal structures; crystal systems; optical, physical and chemical properties; mineral identification and classification; agricultural uses of minerals.

6.14.3 Teaching and Learning Methods

The course is delivered through face-to-face and blended lectures supported by tutorials, practical sessions, field visits, seminars, and group discussions. Laboratory and field activities develop practical skills in examining and exploring earth materials, particularly those from soil sources. Handouts, online resources, UR E-learning platform introductory videos, and self-directed study support learning, while students undertake group problems and prepare reports. Field-visit and practical reports provide formative assessment and encourage students to apply knowledge through active learning.

6.15 CL80311: English for Specific Purposes

Module code and name	CL80311: English for Specific Purposes
School	Center for Language enhancement
Department	-
Programme	-
Number of credits	10 credits
Year of study and semester	Year 2, Semester 3 & 4
Prerequisites:	CL80111

6.15.1 Module introduction and aim

This module develops students' English language proficiency within the context of agriculture, animal sciences, and veterinary medicine. Building on foundational language skills, it strengthens students' ability to read and analyze scientific literature, write academic and technical reports, present scientific information effectively, and communicate professionally in academic and workplace settings. The module adopts an Integrated Skills Approach that promotes active learning, research, critical thinking, and effective communication across listening, speaking, reading, and writing. It prepares students to meet the language demands of advanced studies, clinical practice, research, and professional careers in the agricultural and veterinary sectors.

6.15.2 Module Indicative content

Unit 1: Technology in Agriculture and Animal Husbandry

Develops oral communication, interview, and effective note-taking skills in agriculture and animal husbandry.

Unit 2: Environment and Sustainability in Agriculture and Animal Production

Develop professional correspondence skills, including letters, memos, CVs, personal statements, and emails.

Unit 3: Climate Change and Agriculture

Develops essay and report writing skills for academic and professional purposes.

Unit 4: Agriculture and Animal Husbandry Terminologies

Develop skills in reading, summarizing, and paraphrasing technical agricultural and animal science texts.

Unit 5: Livestock and Global Change

Develops meeting skills, including participation, chairing, minutes writing, and expressing opinions appropriately.

6.15.3 Teaching and Learning Methods

The module uses participatory approaches, including group work, discussions, role play, presentations, and digital resources. Students develop reading, writing, listening, speaking, summarizing, and technical communication skills. Practical activities include reports, essays, presentations, case studies, meetings, and professional communication tasks. Peer learning, audio-visual materials, and consultation support students with language-learning difficulties.

6.16 AP80381: Intermediate Entrepreneurship and Innovation

Module code and name	AP80381: Intermediate Entrepreneurship and Innovation
School	School of Animal Sciences and Biotechnology
Department	Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10 credits
Year of study and semester	Year 2, Semester 3
Prerequisites:	AP80281

6.16.1 Module introduction and aim

This module equips students with advanced knowledge, skills, and attitudes required to develop and manage successful business ventures. Students learn to apply tools such as the Lean Canvas and other innovation frameworks to assess the feasibility, desirability, and viability of business ideas within veterinary and agri-business contexts. The module explores business planning, value chain analysis, funding opportunities, and enterprise development strategies. It enhances students' ability to identify commercial opportunities, develop sustainable business models, and design innovative veterinary and agricultural enterprises that contribute to economic growth and livelihood improvement.

6.16.2 Module Indicative content

The module will cover the following content:

1. **Idea/Problem Identification**
Identify problems and develop viable business ideas.
2. **Customer Development**
Identify customers, understand needs, and test market demand.
3. **Business Model**
Develop a sustainable model for delivering and capturing value.
4. **Validation**
Test assumptions and confirm business ideas with evidence.
5. **Money**
Understand funding, budgeting, costs, revenue, and financial management.
6. **Team Building and Leadership**
Build effective teams and develop leadership skills.
7. **Marketing and Sales**
Develop strategies to promote products and attract customers.
8. **Support**
Identify and access resources, networks, mentors, and business support.
9. **Pitching and Presentation**
Present business ideas clearly and persuasively to stakeholders.

6.16.3 Teaching and Learning Methods

This module will be taught using face to face lectures, platforms and case studies. Classroom exercises will also be applied to help the students to understand the concepts and theories. Also, individual and group assignments will be given to the students to boost their creative and innovative ideas.

6.17 AP80382: Biochemistry

Module code and name	AP80382: Biochemistry
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10
Year of study and semester	Year 2, Semester 3
Prerequisites:	AP80282, AP80283

6.17.1 Module introduction and aim

This module introduces pH, buffers, water and the structures and physicochemical properties of major biological molecules, including carbohydrates, lipids, nucleic acids, proteins, vitamins and minerals. It develops understanding of enzymes, enzyme kinetics and their applications, together with bioenergetics and the metabolic processes and pathways that occur in living organisms. Students learn to relate biochemical structure to biological function, explain nutrient digestion and absorption, and apply biochemical knowledge and laboratory skills to animal, agricultural, health and environmental contexts. The module also strengthens practical competence in biomolecule analysis and interpretation of experimental results.

6.17.2 Module Indicative content

Unit 1: Functional Biochemistry

Functional biochemistry focuses on understanding the chemical processes and molecular mechanisms that underpin biological function. It bridges molecular biology, physiology, and biotechnology, making it especially relevant for fields like health sciences, agriculture, and environmental biology.

Unit 2: Nutritional Biochemistry

Nutritional Biochemistry covers the fundamentals of metabolism, including carbohydrate metabolism through glycolysis, gluconeogenesis, and glycogen synthesis. It also examines cellular respiration, bioenergetics and metabolic pathways; lipid digestion, absorption, steroid synthesis and beta-oxidation; nitrogen cycling and protein synthesis and degradation; and the classification, mechanisms of action and regulation of hormones.

6.17.3 Teaching and Learning Methods

A course handbook will be provided in advance to give students detailed course information and support preparation. Teaching will combine lectures, online materials, tutorials, group discussions, PowerPoint presentations, study visits, and self-directed learning. Case studies, mini-research projects, assignments, seminars, and workshops will reinforce knowledge and develop key and subject-specific skills. Students will use the UR E-learning platform to access teaching materials and quality online journals in Biochemistry and related disciplines.

6.18 AP80383: Forage Production and Pasture Management

Module code and name	AP80383: Forage Production and Pasture Management
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	15
Year of study and semester	Year 2, Semester 3
Prerequisites:	AP80282, AP80283, AP80382

6.18.1 Module introduction and aim

This module introduces the production, establishment, improvement, utilization and management of forages, fodder crops and pastures for sustainable animal production and welfare. Students examine the principal forage species available in Rwanda, their classification, nutritive value and methods of establishment and popularization. The module develops understanding of tropical and Rwandan natural pastures, pasture productivity, carrying capacity, palatability and grazing behavior. It also equips students with practical techniques for creating and improving artificial pastures, managing grazing, conserving forage and improving the nutritional value of crop residues and agro-industrial by-products used in animal feeding.

6.18.2 Module Indicative content

Unit 1: Range Management

This unit introduces forage and fodder plants, including their definitions, taxonomy, nomenclature, and classification. It covers principal forage species in Rwanda, particularly grasses (Poaceae) and legumes (Fabaceae), their characteristics, selection and quality of fodder species, principles of forage crop establishment, and methods and zones for popularizing suitable fodder species.

Unit 2: Pasture Production and Management

This unit covers tropical natural pastures, including their characteristics, types, dynamics, productivity, fodder value, palatability, and feeding behavior. It introduces artificial pasture establishment, including soil preparation, sowing, planting, fertilization, maintenance, protection, and exploitation, as well as pasture management and improvement techniques such as continuous, tethering, ranching, zero grazing, rationed, and rotational grazing. It also covers crop residues and agro-industrial by-products, their nutritional improvement and use in animal feeding, and forage conservation through standing, dry, and wet processes.

6.18.3 Teaching and Learning Methods

The course will use field trips, laboratory work, individual and group activities, composition and reading assignments, and presentations to promote active and practical learning. Students will undertake extensive reading in the library and at home, supported by debates, presentations, negotiations, and discussions to develop communication and critical-thinking skills. Pictures and video materials will be used for demonstrations, while students will receive guidance and responses to their questions during class sessions, office consultations, and through the UR E-Learning platform. The UR E-Learning platform will provide access to learning materials, supplementary resources, assignments, and opportunities for continued interaction and independent learning.

6.19 AP80384: Aquatic Resources Management

Module code and name	AP80384: Aquatic Resources Management
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10
Year of study and semester	Year 2, Semester 3
Prerequisites:	AP80282, AP80283, AP80382

6.19.1 Module introduction and aim

This course aims at introducing principles of Limnology, aquaculture, and fisheries management to students to prepare them for in-depth understanding of the 3 components of the modules. Students are expected to be familiar with aquaculture and fisheries terminologies, culture and fishing techniques, and infrastructure needed for aquatic resources management.

6.19.2 Module Indicative content

Learning Unit 1: Aquaculture

This unit introduces the basic principles of fish farming, including site selection and planning, types of fish farms, and major fish farming practices. It covers the culture of carp, tilapia, and catfish.

Learning Unit 2: Fisheries

This unit covers fishery systems, including natural, human, and management systems, as well as fisheries policy and planning. It also addresses fishery management, development, and research.

Learning Unit 3: Limnology

This unit introduces inland waters and the scope of limnology, including lentic and lotic freshwater systems and their ecological, agricultural, and health importance. It covers the physical, chemical, and biological properties of water, aquatic biodiversity, food webs, productivity, water quality, pollution, eutrophication, and monitoring. The unit also addresses watershed dynamics, land-use impacts, sedimentation, ecosystem services, fisheries, aquaculture, wetland conservation, climate change, and water-resource governance. Practical components include sampling water, sediment, and biota; using limnological instruments; applying GIS and remote sensing; and analyzing and interpreting aquatic data.

6.19.3 Teaching and Learning Methods

The course will be delivered through introductory lectures and guided textbook reading, supported by exercises using selected software to develop practical skills. Students will undertake project writing, assignments, and self-study to reinforce understanding and promote independent learning. The UR E-Learning platform will provide access to course materials, supplementary resources, exercises, assignments, and opportunities for continued learning and interaction.

6.20 AP80385: Animal Nutrition

Module code and name	AP80385: Animal Nutrition
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	20
Year of study and semester	Year 2, Semester 4
Prerequisites:	AP80282, AP80283, AP80286

6.20.1 Module introduction and aim

This module is designed for the understanding of feed resources used to feed livestock and the processes of feed digestion and nutrient absorption in the gastrointestinal tract as well as nutrient metabolism in animal body. The module also includes how different feed resources are blended to formulate a ration that meets animal nutrient requirements.

6.20.2 Module Indicative content

Unit 1: Basic Animal Nutrition

This unit introduces the concepts and importance of nutrition in animals, including nutrients, the development of nutrition science, and the role of animal nutrition in modern agriculture and society. It covers nutrient and feedstuff analysis, measurement of feed and nutrient utilization, gastrointestinal anatomy and motility in ruminant and non-ruminant animals, rumen development and microorganisms, digestion and metabolism of major nutrients, bioenergetics, and metabolic disorders such as acidosis, bloat, ketosis, and grass tetany.

Unit 2: Applied Animal Nutrition

This unit covers the classification of feedstuffs, including forages, silages, roughages, concentrates, minerals, vitamins, and non-nutritive additives. It addresses feeding strategies and ration formulation for ruminants and non-ruminants, factors affecting feed intake and its estimation, anti-nutritional factors and methods of reducing their effects, and raw ingredients used in animal feed manufacturing. It also introduces equipment and techniques used in the production of compound feeds.

6.20.3 Teaching and Learning Methods

The course will be delivered through face-to-face sessions, supported by individual and group work, debates, presentations, and guided classroom discussions. Students will undertake extensive reading in the library and at home through take-home assignments to promote independent learning. The UR E-Learning platform will provide access to learning materials, supplementary resources, assignments, and opportunities for continued learning. Students will receive guidance and responses to sample questions during class sessions, office consultations, and through UR E-Learning platform.

6.21 AP80481: General Farm Animal Production

Module code and name	AP80481: General Farm Animal Production
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	15
Year of study and semester	Year 2, Semester 4
Prerequisites:	AP80282, AP80184, AP80383

6.21.1 Module introduction and aim

The objective of the module is to familiarize students with different practices and techniques in farm animal production. The areas that will be covered include cattle production, sheep production, goat production, pig production, rabbit production, poultry production, beekeeping, sericulture, farm shed construction and mechanization.

6.21.2 Module Indicative content

Unit 1: Principles of Ruminant Production

This unit covers production, feeding, breeding, health, reproduction, genetic improvement, productivity, and economic management of cattle, sheep, and goats.

Unit 2: Principles of Non-Ruminant Production

This unit covers pig, rabbit, poultry, beekeeping, and sericulture production, including breeds, feeding, reproduction, management, disease control, productivity, and economic aspects.

Unit 3: Farm Animal Housing and Mechanization

This unit covers livestock housing and construction principles, farm buildings and equipment, waste management, and the use and management of machinery for feeding, milking, processing, planting, harvesting, storage, and other farm operations.

6.21.3 Teaching and Learning Methods

The course will use face-to-face lectures, individual and group assignments, classroom presentations, discussions, field visits, and audio-visual materials to support active and practical learning. Students will be provided with lecture notes and guided to conduct independent reading, information searches, and assignments to strengthen their understanding. UR E-Learning platform will provide access to lecture materials, supplementary resources, assignments, and opportunities for continued learning and interaction. Field-visit reports, classroom discussions, consultations, and lecturer feedback will reinforce theoretical knowledge and support students' learning progress.

6.22 AP80482: Feed Technology and Production

Module code and name	AP80482: Feed Technology and Production
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	15
Year of study and semester	Year 2, Semester 4
Prerequisites:	AP80385

6.22.1 Module introduction and aim

This module aims at equipping students with knowledge and practical skills in compound feed manufacturing and conservation techniques, feed manufacturing regulations, feed analysis and feed formulation to meet animal nutrient requirements for better growth and production performances.

6.22.2 Module Indicative content

Unit 1: Feed Manufacturing

This unit covers the economic background of the animal feed industry, nutrient requirements and feed forms, feed ingredients and their characteristics, and anti-nutritional factors in feeds and techniques for their removal. It also addresses feed processing techniques, the processes used in feed manufacturing, feed processing regulations, and methods of silage and hay making.

Unit 2: Feed Analysis

This unit covers nutrient analysis techniques for feeds, including carbohydrates, fats, minerals, vitamins, and other nutrients. It also addresses the equipment and tools used in feed analysis, protocols for conducting feed analysis, and the interpretation of feed analysis results.

Unit 3: Feed Formulation

This unit introduces the information required for formulating animal diets and the nutrient requirements of different livestock species. It also covers mechanisms of diet formulation using both hand calculations and computer-based feed formulation programs.

6.22.3 Teaching and Learning Methods

The course will be delivered through scheduled class lectures, field trips to modern ruminant farms, laboratory activities, and individual and group work, including reading, composition, and presentations. Students will undertake extensive reading in the library and at home through take-home assignments, supported by debates, presentations, negotiations, and picture-based demonstrations. The UR E-Learning platform will provide access to learning materials, supplementary resources, assignments, and opportunities for continued learning and interaction. Students will also receive guidance and responses to their questions during class sessions, office consultations, and through the UR E-Learning platform.

6.23 AP80483: Introduction to Animal Health

Module code and name	AP80483: Introduction to Animal Health
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	15
Year of study and semester	Year 2, Semester 4
Prerequisites:	AP80281, AP80286, and AP80382

6.23.1 Module introduction and aim

This module and its associated practical activities provide students with broad knowledge of immunology, infectious and parasitic diseases, metabolic disorders, toxicology and drug management. It develops understanding of the immune system and pathogen-elimination pathways and practical skills for the clinical and laboratory diagnosis of protozoan and helminth infections.

6.23.2 Module Indicative content

Unit 1: Immunology and Infectious Diseases

This unit covers immune organs, innate and adaptive immunity, general epidemiology, disease transmission, diagnosis and control, and major infectious and contagious livestock diseases, including their aetiology, epidemiology, treatment, prevention and public-health importance.

Unit 2: Parasitic Diseases

This unit introduces parasitology, protozoology and helminthology, including parasite biology, life cycles, effects on hosts, diagnosis, treatment and control. It examines important protozoan and helminth diseases found in Rwanda and includes clinical and laboratory diagnosis.

Unit 3: Metabolic Disorders

This unit covers the causes, epidemiology, diagnosis, treatment and prevention of major production and metabolic diseases, including milk fever, grass tetany, ketosis, fatty liver, neonatal hypoglycemia, post-parturient hemoglobinuria and bloat.

Unit 4: Toxicology and Drugs Management

This unit introduces toxicology, routes of exposure, toxic substances, drug-related risks, and the application of risk assessment, risk communication and outreach skills.

6.23.3 Teaching and Learning Methods

The course will be delivered through illustrated lectures, discussions, worked examples, Power-Point presentations, printed handouts, and supervised laboratory exercises to develop knowledge and understanding. Students will undertake individual and group assignments, self-reading, tutorial problems, seminars, workshops, and group presentations to encourage active participation and practical application of concepts. The UR E-Learning platform will provide access to lecture materials, supplementary resources, assignments, exercises, and opportunities for continued learning, discussion, and interaction. The lecturer will guide discussions, emphasize key concepts, provide feedback, organize learning activities, and respond to students' questions during class sessions, consultations, and through the UR E-Learning platform.

6.24 AP80484: General Pathology and Immunology

Module code and name	AP80484: General Pathology and Immunology
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10
Year of study and semester	Year 2, Semester 4
Prerequisites:	AP80282, AP80286, AP80382

6.24.1 Module introduction and aim

This module equips students with knowledge and skills in immunology and general pathology. It develops a critical understanding of inflammatory and non-inflammatory disorders, oncology and immunopathology. The module uses a blended-learning approach, with some activities conducted online through Moodle.

6.24.2 Module Indicative content

Unit 1: Immunology

This unit covers the organs of the immune system, innate and adaptive immunity, and inflammatory and non-inflammatory disorders. It examines immune protection against foreign macromolecules and invading organisms, including viruses, bacteria, protozoa, and parasites, as well as immune responses involved in autoimmunity and tumor immunity.

Unit 2: General Pathology

This unit covers cellular responses to stress and toxic insults, including cellular adaptation, injury, and death. It addresses the causes, mechanisms, and morphological changes associated with cell injury and death, including necrosis, apoptosis, autophagy, intracellular accumulations, pathological calcification, cellular aging, and the genetic basis of disease. It also covers inflammation and healing, including acute inflammation, inflammatory mediators, outcomes and patterns of inflammation, tissue repair, regeneration, extracellular matrix and cell-matrix interactions, scar formation, and fibrosis. In addition, the unit addresses vascular disorders and thrombosis, including edema, hyperemia, congestion, hemorrhage, hemostasis, thrombosis, embolism, infarction, and shock; mechanisms of microbial infections caused by viral, bacterial, fungal, protozoan, and prion agents; and, optionally, neoplasia and tumor biology, including tumor characteristics, evolution, spread, genetics, etiology, molecular determinants, and effects on animals.

6.24.3 Teaching and Learning Methods

Formal lectures will provide the background and basic concepts of each learning unit, supported by discussions and peer interaction through the UR E-Learning platform. Students will use electronic sources, practical laboratory work, seminars, field visits, and assignments to reinforce understanding and develop practical knowledge. The UR E-Learning platform will provide access to syllabi, key notes, handouts, reference materials, discussion forums, and quality online journals in relevant disciplines. Students will participate in discussions, complete and submit assignments on time, and receive feedback from lecturers on their learning activities and work.

6.25 VM80181: Animal Ethology and Welfare

Module code and name	VM80181: Animal Ethology and Welfare
School	School of Veterinary Medicine and Life Sciences
Department	Department of Veterinary Clinical Sciences
Programme	Bachelor of Veterinary Medicine
Number of credits	10
Year of study and semester	Year 2, Semester 4
Prerequisites:	AP80282, AP80286

6.25.1 Module introduction and aim

This module examines the behavior, protection and welfare of animals, with emphasis on farm and companion animals. It considers welfare in housing, management, transport, competition, exhibition and slaughter, and introduces animal-protection legislation and ethical perspectives concerning animals.

6.25.2 Module Indicative content

Unit 1: Animal Behavior and Welfare

This unit introduces animal behavior and welfare, including animal communication, aggression, social structure, biological rhythms, sleep, stereotypic behavior, sexual and maternal behavior, behavioral development, learning, ingestive behavior, and behavioral genetics. It also covers methods for assessing animal welfare and welfare considerations for dairy cattle, pigs, poultry, companion animals, and wild animals, together with animal rights and ethics.

Unit 2: Animal Handling

This unit covers safety protocols, zoonotic disease prevention, use of personal protective equipment, and safe restraint techniques for animal examination, treatment, and diagnostic procedures. It addresses species- and age-specific handling, restraint for veterinary procedures and diagnostic imaging, medication administration, ethical and legal responsibilities, emergency and critical care handling, and effective communication and teamwork among veterinary professionals and clients. Practical hands-on training, simulations, and role-playing provide opportunities for students to apply animal handling and restraint skills in controlled and supervised environments.

6.25.3 Teaching and Learning Methods

The module will use lectures, group discussions, plenary sessions, audio-visual materials, and case studies to promote reflection, debate, and deeper understanding of animal behavior, handling, and welfare. Students will participate in exercises, group work, guided discussions, and interactive activities that build on their knowledge, experiences, and professional backgrounds. The UR E-Learning platform, library resources, Internet sources, daily readings, films, course manuals, handouts, and relevant articles will support independent and continued learning. Lecturers will guide students in accessing resources, facilitate discussions, provide feedback, and support learning through interactive activities both in class and online.

6.26 CL80511: English for Academic Purposes

Module code and name	CL80511: English for Academic Purposes
School	Centre for Language Enhancement
Department	-
Programme	-
Number of credits	10 credits
Year of study and semester	Year 3, Semester 5 & 6
Prerequisites:	CL80311

6.26.1 Module introduction and aim

This module develops advanced academic English skills required for success in veterinary medicine and related scientific disciplines. Students strengthen their productive and receptive language competencies through critical reading of scientific literature, academic listening, scholarly writing, and professional oral communication. The module focuses on developing research proposals, writing scientific reports and manuscripts, presenting at conferences, and communicating scientific information effectively. It also promotes independent learning, critical thinking, and academic integrity, enabling students to produce academically acceptable work and communicate confidently in academic, research, and professional veterinary contexts.

6.26.2 Module Indicative content

Unit 1: Academic English and Rhetorical Functions

Covers the features, vocabulary, collocations, and common structures of academic English, including tenses, hedging, voice, and nominalization. It develops descriptive and critical rhetorical functions such as defining, describing, classifying, comparing, arguing, evaluating, expressing certainty, providing support, taking a stance, drawing conclusions, and making recommendations.

Unit 2: Plagiarism and Referencing

Covers types of plagiarism and strategies for avoiding plagiarism through summarizing, paraphrasing, quoting, and synthesizing. It also develops skills in using in-text citations and preparing reference lists.

Unit 3: Developing Language Skills for Academic Purposes

Develops academic listening, reading, speaking, and writing skills. It covers effective listening, listening strategies and note-taking, academic reading techniques including skimming, scanning and inference, critical thinking and reading, overcoming reading difficulties, vocabulary development, academic presentations, discussions and debates, and academic writing, including descriptive, comparison-contrast, cause-effect, argumentative, and extended essays.

6.26.3 Teaching and Learning Methods

The English for Academic Purposes module will be largely interactive and more practical to increase particularly students' critical reading, critical thinking, and critical writing. Various teamwork learning techniques such as class presentations, student defense of aired opinions individually or in teams. Various online applications such as google docs, library databases, Turnitin, Padlet, etc. will be used in practicals and assessments.

6.27 AP80581: Advanced Entrepreneurship and Innovation

Module code and name	AP80581: Advanced Entrepreneurship and Innovation
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10
Year of study and semester	Year 3, Semester 5
Prerequisites:	AP80381

6.27.1 Module introduction and aim

This module equips learners to achieve product-market fit, deepen and validate their business models, and identify opportunities for growth in customer segments, channels and other business-model components. Students develop financial models and pitch decks and examine business compliance, legal and registration requirements.

6.27.2 Module Indicative content

- a) Getting ready for growth
- b) Expanding customer base
- c) Scaling
- d) Channels and Strategy
- e) Growing Revenue
- f) Scaling Planning
- g) Strengthening Sales
- h) Improving Margins
- i) Financial Modelling
- j) Legal Compliance and Registration of Business
- k) Mentors, Advisors and Experts

6.27.3 Teaching and Learning Methods

The course will use face-to-face teaching, live cases, case studies, classroom exercises, role plays, and public lectures to develop understanding of concepts and theories. The UR E-Learning platform will support interactive learning through online materials, quizzes, discussions, and access to supplementary resources. Students will undertake individual and group assignments, end-of-lesson quizzes, and a capstone project to promote active and applied learning. An end-of-course examination, together with continuous assignments and learning activities, will be used to assess students' achievement of the intended learning outcomes.

6.28 AP80582: Geo-Science and Land Use Planning

Module code and name	AP80582: Geo-Science and Land Use Planning
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	15
Year of study and semester	Year 3, Semester 5
Prerequisites:	AP80181

6.28.1 Module introduction and aim

This module provides students with basic theoretical knowledge and practical skills in land-use planning, surveying, topography, Geographic Information Systems and remote sensing, enabling them to implement a GIS project and apply geospatial tools in animal production and related fields.

6.28.2 Module Indicative content

Unit 1: Land Use Planning and Mapping

This unit introduces land use planning concepts, processes, levels, participatory planning, stakeholders, and land evaluation, including land suitability assessment and presentation of results.

Unit 2: Land Survey and Topography

This unit covers land surveying, linear and compass measurements, chain surveying, traversing, levelling, contouring, contour maps, and interpolation methods.

Unit 3: GIS and Remote Sensing

This unit introduces theodolite surveying, GPS, GIS, remote sensing, spatial data management and analysis, surface analysis, and spatial modelling, with practical work in surveying, GIS mapping, GPS data collection, digitizing, interpolation, and map preparation.

6.28.3 Teaching and Learning Methods

The module will use interactive lectures, tutorials, and exercises to develop essential knowledge, encourage discussion, and support active student participation. Practical computer sessions will enable students to apply statistical software packages and develop relevant practical skills. Assignments and project-based group work will develop problem-solving, teamwork, information searching, database use, report writing, and oral presentation skills. Tutorials and exercises will involve student presentations, discussions, problem solving, individual and group activities, with lecturer guidance, supervision, and feedback. Self-study will support independent learning through individual study, library consultation, preparation of assignments, and access to relevant information and resources.

6.29 AP80583: Animal Reproductive Management

Module code and name	AP80583: Animal Reproductive Management
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	15
Year of study and semester	Year 3, Semester 5
Prerequisites:	AP80286, AP80382

6.29.1 Module introduction and aim

This module develops students' understanding of the principles of reproduction and production management in livestock. It focuses on reproductive physiology, reproductive techniques, and the management of reproductive disorders and diseases.

6.29.2 Module Indicative content

Unit 1: Reproductive Physiology

This part will focus on the functional anatomy of male and female reproduction, physiology of reproduction (male and female) in domestic animals with a particular emphasis on reproductive cycles; the mechanisms of folliculogenesis, egg maturation and ovulation, fertilization, gestation, parturition, and lactation; the post-partum sexual activity in female and the technical applications to reproduction and production management.

Unit 2: Reproductive disorders management

This part will focus on reproductive failure in domestic farm females (ovarian dysfunction, disorders of fertilization, Pregnancy wastage, perinatal and neonatal mortality, disorders of gestation, parturition, and puerperium) and reproductive failure in males (Congenital malformations, ejaculation disturbances, fertilization failure, nutrition and infertility, infertility and chromosomal aberrations)

Unit 1: Assisted reproductive techniques

This part will focus on different techniques used in livestock reproduction like natural reproduction techniques, Artificial insemination, embryo transfer, control of estrus cycle and heat synchronization, In vitro fertilization, Intracytoplasmic sperm injection, Cloning, pregnancy diagnostic and bull and semen collection, processing, and management.

6.29.3 Teaching and Learning Methods

The module uses student-centred learning that combines theoretical lectures with practical sessions to develop knowledge, understanding, and hands-on skills. Assignments and self-reading exercises encourage students to deepen their understanding and apply concepts to practical problems. The UR E-Learning platform will provide access to learning materials, supplementary resources, assignments, discussions, and opportunities for continued learning and interaction. Tutorial problems and case studies are solved through individual and group work, followed by presentations and class discussions to promote active participation and reinforce acquired knowledge and skills.

6.30 AP80584: Market and Marketing of Animal Products

Module code and name	AP80585: Agribusiness Management
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10
Year of study and semester	Year 3, Semester 5
Prerequisites:	AP80285

6.30.1 Module introduction and aim

This module equips students with theoretical knowledge and practical skills for creating and managing their own agricultural enterprises. It develops competence in farm business management, agricultural entrepreneurship, financial planning and project management.

6.30.2 Module Indicative content

Unit 1: Value Chain Management

This unit introduces value chains and value-chain analysis, defining the scope of analysis, identifying product features, examining exchanges and physical markets, preparing generic value-chain diagrams, distinguishing value chains from supply chains, and applying the approach to the chicken-meat value chain in Rwanda.

Unit 2: Market Analysis of Animal Products

This unit covers market and marketing concepts, analytical approaches, livestock marketing systems, market types and structures, demand and supply, costing and marketing of live animals and animal products, marketing constraints and opportunities, marketing tactics and channels in Rwanda, international trade, and cooperative or group marketing.

Unit 3: Institutional Economics Analysis

This unit examines institutions and new institutional economics, economic and political power, institutional variation, theories and hierarchies of institutions, price regulation, institutional regimes, prosperity and change, reforms in Rwanda, and institutional analysis of Rwanda's agriculture, livestock and natural-resource sectors, including development priorities and cross-cutting issues.

6.30.3 Teaching and Learning Methods

The course will be delivered through scheduled class lectures, field trips, individual and group work, presentations, debates, and demonstrations using pictures and other learning materials. Students will undertake extensive reading in the library and at home through take-home assignments to promote independent learning and deeper understanding. UR E-Learning platform will provide access to lecture materials, supplementary resources, assignments, and opportunities for continued learning and interaction. Lecturers will guide discussions, respond to students' questions, and provide support during class sessions, office consultations, and through the UR E-Learning platform.

6.31 AP80585: Agribusiness Management

Module code and name	AP80585: Agribusiness Management
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10
Year of study and semester	Year 3, Semester 5
Prerequisites:	AP80185, AP80285

6.31.1 Module introduction and aim

This module equips students with theoretical knowledge and practical skills for creating and managing their own agricultural enterprises. It develops competence in farm business management, agricultural entrepreneurship, financial planning and project management.

6.31.2 Module Indicative content

Unit 1: Farm Management

This unit introduces the scope and importance of farm management, management functions and decision-making on large-scale and smallholder farms. It covers production and economic principles, costs, farm resources, crop and livestock planning, labour and machinery planning, budgeting, financial statements, performance analysis, capital and information management, and the effects of farmers' problems, macroeconomic factors and government policies on farming in Rwanda.

Unit 2: Project Planning and Management

This unit covers project-management concepts, contexts, phases, life cycles, stakeholders and processes. It addresses project integration, scope, time, cost, quality, human resources, communication, procurement and risk management, including project-plan development and execution, scheduling, budgeting, reporting, change control and team development.

6.31.3 Teaching and Learning Methods

The course will be delivered through project-oriented education, combining introductory lectures, textbook reading, and exercises using selected software to develop practical skills. Students will undertake project writing, individual and group assignments, and self-study to reinforce understanding and promote independent learning. The UR E-Learning platform will provide access to course materials, supplementary resources, exercises, assignments, and opportunities for continued learning and interaction.

6.32 AP80681: Industrial Attachment I

Module code and name	AP80681: Industrial Attachment I
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10
Year of study and semester	Year 3, Semester 6
Prerequisites:	All modules of the Y1-Y2, AP

6.32.1 Module introduction and aim

This module provides students with professional experience by enabling them to apply theoretical learning in practical animal-production settings and develop hands-on skills through off-campus training. It also helps students evaluate their career objectives and allows host institutions to assess their employment potential.

6.32.2 Module Indicative content

Internship must be in the field of livestock Production. During this internship, the students will carry out activities related to Animal Production and other related activities. The student will work closely with the local supervisor and ensure enhancement in his knowledge and skills. Before the commencement of Internship, each student must be given a Logbook which will be detailing all the activities done per day. The student and field supervisor must sign. Students need to participate in day-to-day activities of the selected institution, either chosen by the institute or by themselves. The students will be encouraged to ensure that they gain experience in all the sections in the selected institution to broaden their knowledge and ability.

6.32.3 Teaching and Learning Methods

The learning outcomes will be developed through a student-centred approach, with most learning activities undertaken by students under the guidance and facilitation of the supervisor. Independent study will enable students to consolidate and clarify knowledge gained during field training, prepare for written assessments, and broaden their understanding of the field of study. Practical work will enhance students' programming productivity and develop relevant practical skills. Students will prepare daily reports documenting the work undertaken and the knowledge and skills acquired.

6.33 AP80682: Ruminant Animal Production

Module code and name	AP80682: Ruminant Animal Production
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science with Honours in Animal Production
Number of credits	20
Year of study and semester	Year 3, Semester 6
Prerequisites:	AP80282, AP80286

6.33.1 Module introduction and aim

This module develops students' understanding and application of ruminant-production and management principles, factors affecting product quality and quantity, farm biosecurity, and breeds raised in Rwanda and elsewhere. It also prepares students to establish sustainable dairy, beef and small-ruminant farms.

6.33.2 Module Indicative content

Unit 1: Dairy Production

This unit covers dairy breeds and production systems, environmental effects on dairy production, milk composition and secretion, mammary gland structure, milking, factors affecting milk yield, milk hygiene, feeding, common diseases, dairy farm management, and economic analysis of milk production.

Unit 2: Beef Production

This unit covers beef cattle breeds and selection, desirable production traits, growth and development, beef production systems, feeding and management of cattle at different stages, meat quality, slaughter and carcass evaluation, and the status, challenges, and prospects of beef production in Rwanda.

Unit 3: Small Ruminant Production

This unit covers sheep and goat breeds, their importance and production systems, factors affecting productivity, feeding and management, grazing behavior, housing and equipment, common diseases and their management, and breeding strategies for improved small ruminant production.

6.33.3 Teaching and Learning Methods

The course will be delivered through scheduled class lectures, field trips to modern ruminant farms, laboratory activities, and individual and group work. Students will undertake extensive reading in the library and at home, supported by compositions, presentations, debates, negotiations, and take-home assignments. The UR E-Learning platform will provide access to learning materials, supplementary resources, assignments, and opportunities for continued learning and interaction. Pictures and demonstrations will support practical understanding, while lecturers will respond to students' questions during class sessions, office consultations, and through the UR E-Learning platform.

6.34 AP80683: Applied Animal Genetics and Biotechnology

Module code and name	AP80683: Applied Animal Genetics and Biotechnology
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	15
Year of study and semester	Year 3, Semester 6
Prerequisites:	AP80282, AP80382

6.34.1 Module introduction and aim

This module develops advanced understanding of molecular biology, farm-animal genetics and applied biotechnology. It equips students to conduct molecular-biology laboratory practicals and to design, implement and evaluate animal-breeding and production programmes.

6.34.2 Module Indicative content

Unit 1: Molecular Biology

This unit covers DNA and RNA structure and function, replication, transcription, translation, gene expression, mutations, and genetic variation, with practical work in DNA/RNA extraction, electrophoresis, cDNA synthesis, and PCR.

Unit 2: Applied Animal Biotechnology

This unit covers biotechnology applications in animal breeding, reproduction, nutrition, health, welfare, and performance, including marker-assisted selection, transgenesis, cloning, AI, embryo transfer, IVF, MOET, and sex selection, with attention to ethical and economic implications.

Unit 3: Animal Genetic Improvement

This unit covers quantitative genetics, population genetics, heritability, breeding value estimation, selection, genetic progress, inbreeding, crossbreeding, economically important traits, biotechnology, and genomic selection in animal breeding.

Unit 4: Animal Genetic Resources Management

This unit covers animal genetic diversity, major livestock breeds, threats to genetic resources, breed conservation and characterization, economic values, and strategies for conserving indigenous animal genetic resources in Rwanda.

6.34.3 Teaching and Learning Methods

The course will use lectures, discussions, worked examples, supervised exercises, and group tutorials to develop knowledge and understanding of key concepts. Assignments, self-reading, and practical exercises will encourage students to apply concepts to relevant problems, while the Unit on Animal Genetic Resources Management will include a student project based on available documentation. The UR E-Learning platform will provide access to lecture notes, learning materials, exercises, assignments, discussions, and supplementary resources. Lecturers will guide discussions, emphasize key concepts, provide feedback, and support students' participation through classroom, group, practical, and online activities.

6.35 VM80881: Veterinary Public Health, Food Safety and One Health

Module code and name	VM80881: Veterinary Public Health, Food Safety and One Health
School	School of Veterinary Medicine and Life Sciences (SVMLS)
Department	Department of Veterinary Clinical Sciences (DVCS)
Programme	Bachelor of Veterinary Medicine (BVM)
Number of credits	15 credits
Year of study and semester	Year 4, Semester 7
Prerequisites:	AP80282

6.35.1 Module introduction and aim

This module equips students with knowledge and practical skills in veterinary public health, focusing on the protection of human health through safe production and consumption of foods of animal origin. It covers meat inspection, food hygiene, food poisoning, food preservation, inspection of food-handling premises, zoonotic disease surveillance, environmental contamination, and the application of HACCP and the One Health approach. The module prepares students to effectively contribute to food safety and disease prevention in abattoirs, food control laboratories, veterinary services, and public health institutions.

6.35.2 Module Indicative content

Unit 1: Food Hygiene and Safety

Covers principles of food safety and hygiene, food production, handling, processing, transportation, storage, and preparation; food processing premises and food-handler hygiene; food preservation, spoilage, food poisoning and foodborne infections. It also covers food sampling and quality control, food safety laws and regulations, licensing, food-handler capacity building, monitoring and inspection, veterinary certification, and milk and milk-product hygiene, including production, handling, storage, transport, hazard control, and quality assurance.

Unit 2: Veterinary Public Health and Meat Inspection

Covers meat inspection methodology, legal requirements, ante-mortem and post-mortem inspection, carcass/offal examination, lesion identification, differential diagnosis, and public health hazards, informing meat fitness decisions. Also addresses disease prevention and control, environmental and occupational health, biosecurity, waste management, veterinary product regulation, residue avoidance, and quality control of poultry, fish, eggs, and honey.

Unit 3: Principles of One Health

Covers concepts, principles, history, and importance of One Health, emphasizing zoonotic diseases, antimicrobial resistance, global health security, biodiversity, ecosystem health, and climate change. Also addresses antimicrobial stewardship, disease surveillance, pandemic preparedness, conservation medicine, Rwanda's One Health policy, multisectoral collaboration, roles of WHO, WOA, FAO, UNEP, and policymaker engagement.

6.35.3 Teaching and Learning Methods

The course will use interactive lectures, tutorials, group work, practical exercises, field visits, and guided self-study. Blended learning mode will be supported through UR e-learning platform, videos, handouts, and electronic resources. Problem-solving activities, peer discussions, and formative feedback will promote active student participation and understanding. Students will also access relevant scientific journals and learning materials to support independent learning.

6.36 AP80781: Biostatistics and Research Methodology

Module code and name	AP80781: Biostatistics and Research Methodology
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10
Year of study and semester	Year 4, Semester 7
Prerequisites:	AP80182

6.36.1 Module introduction and aim

This module equips students with the fundamental knowledge and skills required to conduct research in Animal Production. It focuses on the research process, research methodology, biometrics and agricultural biostatistics.

6.36.2 Module Indicative content

Unit 1: Research Methodology

This unit introduces the meaning, importance, forms, scope and basic steps of research; documentation and information sources; the role and misuse of statistics in agriculture; primary and secondary data collection, libraries, surveys and sampling; agricultural and biological experimentation, variables, error control and experimental designs; and the preparation and presentation of research proposals, results, memoirs, theses and dissertations.

Unit 2: Biometrics

This unit covers descriptive statistics, sampling techniques, hypothesis testing using t-tests, F-tests and chi-square tests, one- and two-way ANOVA, multiple comparisons and non-parametric tests. It also addresses correlation, linear and non-linear regression, experimental-design principles, CRD, RBD, Latin square, factorial and split-plot designs, ANCOVA, statistical software and seminar presentation of research proposals.

6.36.3 Teaching and Learning Methods

The learning and teaching strategy will comprise class lectures and discussions, group work and presentations, field visits, Internet searches and presentations, demonstrations, and field practicals. Blended learning will be integrated through the UR E-Learning platform to provide access to lecture materials, supplementary resources, assignments, discussions, and opportunities for continued learning and interaction.

6.37 AP80782: Wildlife Management, Apiculture and Aquaculture

Module code and name	AP80782: Wildlife Management, Apiculture and Aquaculture
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	15
Year of study and semester	Year 4, Semester 7
Prerequisites:	AP80384

6.37.1 Module introduction and aim

This module provides a foundation in wildlife management, apiculture and aquaculture. It applies animal-management knowledge to wildlife species and focuses on livestock–wildlife interactions, integrated management, beekeeping, aquatic-resource medicine and sustainable resource management.

6.37.2 Module Indicative content

Unit 1: Wildlife Diseases and Medicine

The study of Wildlife Diseases and Management is an interdisciplinary field that combines veterinary science, ecology, epidemiology, and conservation biology. It focuses on understanding, diagnosing, and managing diseases in wild animal populations, with implications for biodiversity, public health, and ecosystem stability.

Unit 2: Apiculture

The science and practice of beekeeping. It is a vital subject in agriculture, environmental science, and rural development. It covers the biology of bees, hive management, honey production, and the ecological and economic roles of pollinators.

Unit 3: Aquaculture

The farming of aquatic organisms such as fish, crustaceans, mollusks, and aquatic plants. It is a vital discipline in agriculture, food security, and environmental management. It blends biology, ecology, engineering, and business principles.

6.37.3 Teaching and Learning Methods

The course will use lectures, tutorials, group work, practical activities, field trips, presentations, and demonstrations to develop essential knowledge and practical skills. A student-centred approach will promote independent study, teamwork, interpersonal skills, problem-solving, and active participation in the learning process. The blended learning mode will use the UR E-Learning platform to provide learning materials, supplementary resources, assignments, discussions, and opportunities for continued learning and interaction. Library work, seminars, written assignments, field activities, and practical exercises will be supported by lecturer guidance, presentations, feedback, and tutorials.

6.38 AP80783: Non-Ruminant Production, Hatchery Technology and Management

Module code and name	AP80783: Non-Ruminant Production, Hatchery Technology and Management
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	15
Year of study and semester	Year 4, Semester 7
Prerequisites:	AP80184, AP80282, AP80286

6.38.1 Module introduction and aim

This module develops students' understanding of poultry, pig and rabbit production and strengthens their practical involvement in non-ruminant management. It addresses breeds, production systems, housing, nutrition, reproduction, health, processing, marketing and hatchery technology, with emphasis on improving production in Rwanda.

6.38.2 Module Indicative content

Unit 1: Poultry Production

This unit covers poultry management, breeds and production systems, housing, nutrition and feeding, reproductive management, hatchery and incubation practices, and management of chicks, broilers, and layers. It also addresses common poultry diseases and prevention, egg grading, processing, preservation, and marketing.

Unit 2: Rabbit Production

This unit covers rabbit breeds, management, feeding and nutrition, digestive physiology and cecotrophy, reproduction, housing and equipment, husbandry skills, record keeping, and financial management. It also addresses rabbit health and disease prevention, as well as meat rabbit killing and processing.

Unit 3: Pig Production

This unit covers pig breeds, production systems, housing and equipment, feeding and nutrient requirements, and management of breeding stock, piglets, weaners, growers, and finishers. It also addresses swine diseases and prevention, slaughter and meat processing, hygiene, transportation, and marketing of pig meat.

6.38.3 Teaching and Learning Methods

The course will use scheduled lectures, practical activities, assignments, self-reading, and group tutorials to develop knowledge and understanding and reinforce theoretical concepts. Students will solve tutorial problems in groups, present their work, and participate in class discussions to promote active learning and practical application. Blended learning will be supported through the UR E-Learning platform, providing access to study materials, supplementary resources, assignments, and learning activities. Lecturers will guide practical activities, discussions, and group work, providing feedback and support to strengthen students' learning and understanding.

6.39 AP80784: Development Policies and Legislation

Module code and name	AP80784: Development Policies and Legislation
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	10
Year of study and semester	Year 4, Semester 7
Prerequisites:	AP80185, AP80285

6.39.1 Module introduction and aim

This module introduces the concepts, theories and methods used in rural planning and in the design and management of development programmes. It addresses livelihoods, logical frameworks, monitoring and evaluation, cooperatives, community-based organizations, industrialization, development plans and rural transformation.

6.39.2 Module Indicative content

Unit 1: Rural Development Planning

This unit covers concepts, theories, and techniques of rural and regional development planning, including development goals, planning frameworks, data analysis, problem identification, priority setting, strategies, and area development plans. It also addresses rural livelihoods, gender and development, resource management, environmental issues, and sustainable development, with case studies from Rwanda and the East African Community.

Unit 2: Development Policies and Legislation

This unit introduces agricultural and development policy analysis, welfare analysis, global food security, the Policy Analysis Matrix, and policy issues in Rwanda. It also covers local economic development, planning strategies, poverty and inequality, economic development patterns, factor markets, productivity, and institutional analysis at local and macro levels.

6.39.3 Teaching and Learning Methods

The course will be delivered through project-oriented education, combining introductory lectures, textbook reading, and exercises using selected software to develop practical skills. Students will undertake project writing, assignments, and self-study to reinforce understanding, apply concepts, and promote independent learning. Blended learning will be integrated through the UR E-Learning platform, providing access to course materials, supplementary resources, exercises, assignments, and opportunities for continued learning and interaction.

6.40 AP80785: Agriculture Extension

Module code and name	AP80785: Agriculture Extension
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	15
Year of study and semester	Year 4, Semester 7
Prerequisites:	AP80184

6.40.1 Module introduction and aim

This module provides a broad understanding of agricultural extension concepts, approaches and communication. It examines extension methods and models used in Rwanda, the generation, transfer, adoption and diffusion of agricultural technologies, and the role of ICT in delivering extension services to farmers.

6.40.2 Module Indicative content

Unit 1: Extension

This unit covers Rwanda's agricultural and extension context, extension as communication, persuasion, education and a profession, and its role in agricultural development. It examines extension paradigms, approaches, models and methods, including technology transfer, public, commodity, training-and-visit, NGO, private-sector, farmer-field-school and innovative-linkage models, together with individual, group, mass-media and digital methods and the Crop Intensification Programme.

Unit 2: Technology Transfer

This unit introduces technology and agricultural technology and examines the processes through which agricultural technologies are transferred, adopted and diffused among farmers and other users.

Unit 3: Information and Communication Technology in Agriculture

This unit introduces ICT and e-agriculture, the role of digital tools in delivering agricultural extension, innovations in ICT for agriculture and practical case studies of ICT-based agricultural services.

6.40.3 Teaching and Learning Methods

The course will use lectures, practical work, field trips, library activities, and student-centred learning to develop essential knowledge and practical skills. Students will undertake independent study, group work, seminars, presentations, and assigned activities to promote teamwork, interpersonal skills, and active participation. The blended learning mode will use the UR E-Learning platform to provide access to lecture materials, supplementary resources, assignments, discussions, and opportunities for continued learning. Students will receive guidance and feedback through practical activities, fieldwork, presentations, library work, and classroom and online interactions with lecturers.

6.41 AP80881: Animal Products Processing and Quality Control

Module code and name	AP80881: Animal Products Processing and Quality Control
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	20
Year of study and semester	Year 4, Semester 8
Prerequisites:	AP80282, AP80286, AP80382, AP80483

6.41.1 Module introduction and aim

The aim of this module is to equip students with knowledge and practical skills in animal product technology and legislation, including the processing of milk and meat into value-added products, food safety and hygiene in the global context, and the role of animal products in food systems. The module also aims to enable students to apply food hygiene practices in food industries and adhere to HACCP standards and relevant food safety legislation.

6.41.2 Module Indicative content

Unit 1: Food microbiology

This unit will provide knowledge on General introduction; General information on microbiology; Micro-organisms and food; origin of microorganisms in food, Food intoxication and infections, Food preservation, **Microbiological** analysis of food (qualitative and quantitative).

Unit 2: Technology of animal products:

This unit will provide knowledge on Dairy science and technology and Meat science and technology. This will include introduction to dairy science and technology; milk production and biosynthesis; dairy chemistry and physics; dairy microbiology; milk grading and defects; dairy technology (processing); and dairy products. It will also look at introduction to meat production in the world; meat structure; chemical composition of meat; technological and organoleptic quality of meat; transformation of meat; meat conservation; ingredients and additives added to meat products; and transformation of meat by products.

Unit 3: Legislation and Quality management:

This unit will focus first on Animal products and by-products inspection especially Meat and meat by-product; milk and milk by products; eggs; and fish. Then after, the role of animal products in human nutrition; generalities on food safety; general Hygiene in food manufacturing industries; food safety and quality management in food manufacturing industries; laws and standards on food safety management.

6.41.3 Teaching and Learning Methods

The course will use lectures, discussions, supervised exercises, group tutorials, assignments, self-reading, and practical activities to develop knowledge and practical application. The blended learning mode will use the UR E-Learning platform to provide lecture notes, learning materials, exercises, assignments, discussions, and supplementary resources. Lecturers will guide activities, emphasize key concepts, evaluate students' work, and provide feedback through classroom, group, practical, and online learning activities.

6.42 AP80882: Industrial Attachment II

Module code and name	AP80882: Industrial Attachment II
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Science in Animal Production
Number of credits	20
Year of study and semester	Year 4, Semester 8
Prerequisites:	All modules of the Y1-Y4, AP

6.42.1 Module introduction and aim

This module provides students with an opportunity to gain professional experience through off-campus training in Animal Production. It also enables students to evaluate their career objectives and allows host institutions to assess their employment potential.

6.42.2 Module Indicative content

- Internship must be in the field of Animal Production. During this internship, the students will carry out activities related to Animal Production and other related activities. The student will work closely with the local supervisor and ensure enhancement in his knowledge and skills.
- Before the commencement of Internship, each student must be given a **Logbook** which will be detailing all the activities done per day. The student and field supervisor must sign. Students need to participate in day-to-day activities of the selected institution either chosen by the institute or themselves
- The students will be encouraged to ensure that they gain experience in all the sections in the selected institution to broaden their knowledge and ability.

6.42.3 Teaching and Learning Methods

The course will use a student-centred approach, with students undertaking most activities under the guidance and facilitation of the supervisor. Independent study and practical work will reinforce field training, support preparation for assessments, and develop students' knowledge, programming productivity, and practical skills. Students will prepare daily reports documenting the work undertaken and the knowledge and skills acquired.

6.43 AP80883: Research Project

Module code and name	AP80883: Research Project
School	School of Animal Sciences and Biotechnology
Department	Department of Animal Production
Programme	Bachelor of Honours in Animal Production
Number of credits	20
Year of study and semester	Year 4, Semester 8
Prerequisites:	All modules of the Y1-Y3, AP

6.43.1 Module introduction and aim

The aim of the module is to equip the students with research skills and knowledge that will enable him/her to carry out field surveys and analyze available data for a science based informed decision in his field of specialization of veterinary medicine or in related fields. This module is designed to provide the student with practice, attitudes research skills and empirical knowledge that help him/her to design a research proposal, carry out data collection and analysis and be able to complete and submit a quality research thesis. The student will be enabled to make a presentation of his/her research work in front of department panel for approval.

6.43.2 Module Indicative content

This course has been developed to provide theoretical and practical information on all aspects of research methods and biostatistics. More specifically, the content are as follow:

1. Research topic and supervisor selection
2. Development of research proposal from research problem identification, research objectives, and proposed methods to being able to limit the project within its scope.
3. Data collection tools: Development, testing, and validation
4. Data collection practices
5. Good practice for data entry and cleaning
6. Data analysis tools and practices
7. Thesis write-up techniques and practices
8. Research finding communication techniques and practices (Including Presentation)

6.43.3 Teaching and Learning Methods

The course will emphasize practical application, self-directed work, feedback, and limited lectures on general research principles, with guidance from supervisors, senior researchers, librarians, and academic and data analysis support teams. Students will work with peers, mentors, and supervisors to identify research problems, develop proposals, select appropriate topics and methodologies, and progressively refine their research plans. Field and laboratory activities will support valid and reliable data collection, with regular meetings and consultations with the supervisory team to monitor research progress. Students will incorporate feedback and corrections from supervisors, thesis examiners, and committees throughout the research process until completion of the final thesis.

7 Academic Calendar and Attendance requirements

7.1. Academic calendar — Academic Year [2026/2027]

UR Academic calendar is available at this link: <https://ur.ac.rw/?-Academic-Calendar-217->

The number of teaching weeks per semester is 15. Examination and assessment weeks per semester are 6.5.

7.2. Attendance requirements

Students are required to attend at least 85% of the scheduled sessions for each module. A student who falls below the minimum attendance without approved cause may be barred from the end-of-module assessment, in line with the University of Rwanda Academic Regulations. Absence must be reported to the Programme Leader in writing with supporting evidence.

8 Assessment

8.1 Assessment strategy

Assessment combines continuous assessment and end-of-semester examinations. The standard weighting is 50% continuous assessment and 50% final examination, unless a different weighting is approved for a module and stated in its description.

Assessment method	Purpose	Typical weighting
Written examination	Summative: tests breadth of knowledge	50%
Coursework/assignment	Formative	10%
Continuous assessment test	Formative: checks progress	20%
Practical / laboratory report	Formative: applied skills	10%
Group project/presentation	Formative: teamwork and communication	10%
Dissertation/thesis	Summative: independent research	100% of the component

8.2 Grading scale

Mark range (%)	Grade	Grade point	Descriptor
80-100	A	-	First class
70-79.99	B	-	Second Class-Upper Division
60-69.99	C	-	Second Class-Lower Division
50-59.99	D	-	Pass
0-49.99	F	-	Fail

Pass mark per module: 50%. Minimum weighted average for progression: 50%.

8.3 Feedback to students

Students receive written feedback on assessed work. Marks are released after confirmation by the relevant University organs at college level.

8.4 Academic integrity

All submitted work must be the student's own. Plagiarism, collusion, falsification of data and examination misconduct are academic offences under the UR Academic Regulations and are subject to disciplinary action. Submissions may be screened using similarity-detection software.

9 Progression, Graduation and Completion Requirements

9.1 Progression from one year to the next

To progress to the next year of study, a student must meet requirements set by the academic regulations available at <https://ur.ac.rw/spip.php?page=key-documents>. Where a student does not meet these conditions, the student may carry the modules in the following year, repeat the year, or discontinue in line with UR Academic Regulations

9.2 Graduation and completion requirements

A student is eligible to graduate from the Bachelor of Veterinary Medicine after satisfying all of the requirements as set by the University Academic Senate:

#	Requirement	Standard
1	Total credits accumulated	As per programme requirements
2	Modules passed	As per academic regulations
3	Financial and property clearance	All fees paid; library and laboratory items returned (As per academic regulations)
4	Approval	Results confirmed by the College Academic Committee and approved by the University Academic Senate

9.3 Award of the qualification and graduation ceremony

Awards are conferred upon the satisfaction of requirements set by the University of Rwanda and the Academic Senate of the University of Rwanda. Eligible students are presented at the annual graduation ceremony. The Office of the Registrar issues transcripts and certificates following Senate approval.

10 Approval and Key contact

Role	Name	Email
Dean, School of Animal Sciences and Biotechnology (SASB)	Dr. Eric HATUNGIMANA	dean.sasb@ur.ac.rw
Director of Teaching and Learning Enhancement (DTLE)	Dr. Valentin MUJYAMBERE	dtle.cvas@ur.ac.rw
Principal, College of Veterinary Medicine & Animal Sciences (CVAS)	Assoc. Prof. Martin NTAWUBIZI	principal.cvas@ur.ac.rw

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