



UNIVERSITY of
RWANDA

UNIVERSITY OF RWANDA

COLLEGE OF VETERINARY MEDICINE AND ANIMAL SCIENCES

SCHOOL OF ANIMAL SCIENCES AND BIOTECHNOLOGY

DEPARTMENT OF AQUACULTURE AND FISHERIES

PROGRAMME HANDBOOK

Programme of Bachelor of Science in Aquaculture and Fisheries Management

Award: Bachelor of Science with Honours in Aquaculture and Fisheries Management

Programme Code: BH8AFM

NQF Level: 8

Academic Year: 2026 / 2027

Campus: NYAGATARE

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1 Welcome and Introduction

1.1 Welcome message

Welcome to the Bachelor of Science in Aquaculture and Fisheries Management at the University of Rwanda. The programme is designed to develop aquaculture and fisheries specialists and managers able to apply scientific, technical and practical knowledge to aquatic production, management and conservation. Students are expected to engage actively in lectures, practical work, field activities, research, assignments and independent learning throughout the programme.

Dr. Eric HATUNGIMANA

Dean, School of Animal Sciences and Biotechnology

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1.2 Purpose and status of this handbook

This handbook describes the Aquaculture and Fisheries Management program as approved by the University of Rwanda Senate and Rwanda Higher Education Council. It should be read together with the University of Rwanda Academic Regulations for undergraduate programs 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 Aquaculture and Fisheries Management
Exit Award / qualification	Bachelor of Science with Honours in Aquaculture and Fisheries Management
Intermediate Award / qualification	-
Programme code	BH8AFM
College	College of Veterinary Medicine and Animal Sciences
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Campus(es) of delivery	Nyagatare campus
NQF / qualification level	8
Total credits required	520
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

Rwanda's low fish consumption and limited exploitation of aquatic resources demonstrate a need to strengthen sustainable aquaculture and fisheries development. The sector faces shortages of appropriately trained personnel, limited technical capacity, inadequate equipment, and gaps in public understanding of fisheries policies and aquatic-resource management. The proposed programme responds to these skills gaps by developing professionals capable of managing aquatic ecosystems, fish farms, hatcheries, fisheries, and aquatic-resource conservation. It supports Rwanda's NST2 priorities on food security, productive employment, human-capital development, and improving the relevance of education to labour-market needs. The programme is also aligned with Vision 2050, which emphasizes transformation, productivity, food security, modern technologies, and development of professional and market-oriented agriculture. Rwanda's National Aquaculture Strategy identifies the need for technical and administrative capacity to support sustainable aquaculture and achieve the sector's long-term economic, social, and environmental objectives.

Current sector evidence also identifies limited technical competence among smallholder producers and constraints in processing, cold-chain infrastructure, finance, and quality assurance. NST2 targets increased fish production from 46,495 tonnes in 2023/24 to 77,700 tonnes by 2028/29, creating demand for skilled aquaculture and fisheries professionals. The programme will therefore strengthen employability and entrepreneurship while supporting public and private institutions, farmers, research, extension, and fisheries-policy development. Overall, the programme provides the human-resource capacity needed to increase aquatic production, improve resource management, support food and nutrition security, create employment, and contribute to sustainable economic transformation.

3.2 Programme Learning Outcomes

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

Code	Programme Learning Outcome
PLO1	Explain fundamental scientific principles, theories, and methods in aquaculture and fisheries management, including aquatic ecosystems, animal health, genetics and breeding, biotechnology, hatchery management, production, nutrition, conservation, and aquatic product processing and quality control.
PLO2	Distinguish key concepts, methods, and principles of aquaculture production, fisheries biology and conservation, aquatic animal health, fish breeding, hatchery management, feeds and nutrition, and aquatic product processing and quality control.
PLO3	Execute appropriate scientific, technical, practical, digital, and research methods to aquaculture production, fisheries management, aquatic resource conservation, fish health, nutrition, breeding, and related professional activities.
PLO4	Apply quantitative, statistical, digital, and research tools to collect, organize, interpret, and use numerical and graphical information in aquaculture and fisheries contexts.
PLO5	Analyze aquaculture and fisheries problems, research findings, environmental conditions, and relevant data to identify relationships, challenges, and appropriate courses of action.
PLO6	Evaluate aquaculture and fisheries practices, environmental conditions, research evidence, policies, and alternative interventions using scientific evidence, professional judgement, ethical principles, and sustainability considerations.
PLO7	Design sustainable and context-appropriate aquaculture production systems, fisheries management strategies, research interventions, and aquatic resource conservation approaches to address identified challenges.
PLO8	Create innovative solutions and professional approaches for aquaculture production, fisheries development, aquatic resource conservation, processing and commercialization of aquatic products, and emerging societal and environmental challenges.

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 for this programme is 520 credits.

Credits per semester (normal load)	60 credits
Credits per academic year	Year 1: 140 credits Year 2: 130 credits Year 3: 130 credits Year 4: 120 credits
Total programme credits	520 credits
Minimum credits for the award	520 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	Basics 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	-
AF80281.	Introduction To Aquaculture and Fisheries Sciences	10	Core	2	AP80183; AP80282; AP80283
AF80282	Introduction To Hydrobiology and Aquatic Conservation	10	Core	2	AP80183; AP80282; AP80283

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	AP80183; AP80282; AP80283
AF80381.	Biological Aspects of Fisheries and Aquaculture	20	Core	3	AP80282
AF80382.	Fish Biology	15	Core	3	AP80282
AF80481	Fish Genetics and Biotechnology	15	Core	4	AP80282
AF80482	Aquatic Ecology	20	Core	4	AF 80382, AF 80381.
AF80483	Fisheries Biology and Conservation	15	Core	4	AP80182, AF80281
AF80484	Fish Nutrition	15	Core	4	AF80281 AF80381 AF80382

5.2.3 Year 3

Module code	Module / unit title	Credits	Type	Semester	Prerequisite
CL80511	English For Academic Purposes	10	None	5 & 6	CL80311
AF80581	Environmental Pollution and Monitoring	10	Core	5	AP80282 AP80283 AP80284
AP 80581	Advanced Entrepreneurship and Innovation	15	Core	5	AP80381
AP 80582	Geo-Science and Land Use Planning	10	Core	5	AP80181
AF 80582	Aquaculture Feeds and Feeding	15	Core	5	AP80282 AP80283 AP80382
AF 80681	Fish Breeding, Reproduction, And Hatchery Management	20	Core	6	AF 80382
AF 80682	Aquaculture Engineering	15	Core	6	AP80182 AP80284 AF80282
AF 80683	Aqua business and Management	15	Core	6	AP80185, AP80285,
AF 80684	Industrial Attachment-I	20	Core	6	Modules Y1-Y3

5.2.4 Year 4

Module code	Module / unit title	Credits	Type	Semester	Prerequisite
AF80781	Industrial / Field Attachment –II	20	Core	7	Modules Y1-Y3
AP80781	Biostatistics And Research Methodology	10	Core	7	AP80182
AP80784	Development Policies and Legislation	10	Core	7	-
AF80782	Individual Development Project in Aquaculture / Fisheries	15	Core	7	-
AP80785	Agriculture Extension	10	None	7	AP80184 AP80185 AF80282 AF80381 AF80683
AF80881	Microbiology and Farmed Fish Diseases Management	10	Core	8	AF80381 AF80382 - AP80282
AF80882	Aquatic Animal Products Processing and Quality Control	20	Core	8	AF80881 AP80282 AF80881
AF80883	Research Project in Aquaculture / Fisheries	20	Core	8	-

5.3 5.3 Elective and specialization options

Specialization / 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	37	460	88.46%
Elective / specialization modules	-	-	-
Research project / dissertation / thesis	1	20	3.85%
Industrial attachment / practicum	2	40	7.69%
Total	40	520	100%

6 Module Descriptions

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

The module is organized into four units: (1) civic education, (2) integrity systems, (3) human rights & citizenship education and (4) peace education. The topics covered are:

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 peace building; local mechanisms for peace (with emphasis on peace education and welfare programme 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, Semesters 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

This module will be taught through the Integrated Skills Approach, i.e., a combination of language skills in one lesson.

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
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:	-

6.3.1 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 note taking. 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 programme 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 AP80184: Rural Development and Professional Ethics

Module code and name	AP80184: 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 precolonial 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
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 AF80281: Introduction to Aquaculture and Fisheries Sciences

Module code and name	AF80281: Introduction to Aquaculture and Fisheries Sciences
School	School of Animal Science and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Sciences in Aquaculture and Fisheries Management
Number of credits	10
Year of study and semester	Year 1, Semester 2
Prerequisites:	AP80183, AP80282, AP80283

6.13.1 Module introduction and aim

To develop students' interest in the science and practice of Fisheries and Aquaculture and their role in socio-economic development of human societies.

6.13.2 Module Indicative content**Unit 1: Introduction to fisheries**

The fisheries will be introduced by the Scope of fisheries (fish, fisherfolk, and habitat, ...), biological overview, then Fisheries resources, diversity and distribution, Fish habitats and fishing grounds, Fishers and the fishing communities, Fish catching, preservation, processing, transportation, marketing, Importance of fisheries in economic development, National and global trends in fisheries production, and Constraints to fisheries production.

Unit 2: Introduction to Aquaculture

The aquaculture will be introduced by the historical perspectives of aquaculture development, the Scope of aquaculture (extensive, semi-intensive, intensive, ...), appropriate environment for aquaculture, basic knowledge of limnology, Role of aquaculture in development, National and global trends in aquaculture production, Systems of aquaculture production, and the Constraints to aquaculture development.

6.13.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge, while discussions and peer interaction through the UR E-Learning platform will promote active learning. Lecturers will guide students to relevant electronic sources, journals, notes, and reference materials to enhance their understanding of module topics. Practical laboratory work, seminars, field visits, and assignments will reinforce learning and provide opportunities to apply acquired knowledge and skills. Students will participate in online forums, complete and submit assignments on time, while lecturers provide guidance, facilitation, and feedback on their work.

6.14 AF80282: Introduction to Hydrobiology and Aquatic Conservation

Module code and name	AF80282: Introduction to Hydrobiology and Aquatic Conservation
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	10
Year of study and semester	Year 1, Semester 2
Prerequisites:	AP80183, AP80282, AP80283

6.14.1 Module introduction and aim

The aim of this module is to equip students with knowledge and skills to understand the relationships between aquatic organisms and their water environment, explain the basic principles of limnology and the physical, chemical, and biological characteristics of different freshwater ecosystems, describe aquatic ecosystems and their functions, and develop a general understanding of aquatic communities, including aquatic plants, invertebrates, and vertebrates.

6.14.2 Module Indicative content

Unit 1: The Aquatic Environment

This unit covers the physical, chemical, and biological characteristics of aquatic environments, including water properties, temperature, turbidity, transparency, water movement, oxygen, pH, nutrients, and other key water-quality parameters. It also examines freshwater and marine ecosystems, aquatic communities such as plankton, algae, macrophytes, benthos, invertebrates and vertebrates, as well as the effects of watershed activities on water bodies, energy flow, and nutrient cycling.

Unit 2: Water and Climate

This unit covers climate variation and its effects on aquatic ecosystems and aquatic life, including species behavior, distribution, and reproduction.

Unit 3: Conservation Biology

This unit covers strategies and policies for conserving lakes, rivers, and aquatic organisms, including fishing gear control, protection of spawning areas, oriented fishing, and conservation through aquaculture.

Unit 4: Introduction to Aquatic Ecology

This unit introduces aquatic ecology, the hydrosphere and hydrologic cycle, ecosystem services, water pollution and control, eutrophication, biological indicators of water quality, human impacts, and aquatic ecosystem management.

6.14.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge, supported by class discussions and peer interaction through the UR E-Learning platform. Lecturers will guide students to relevant electronic resources, journals, notes, and reference materials to enhance learning. Practical laboratory work, seminars, field visits, and assignments will reinforce knowledge and facilitate practical application. Students will participate in online forums, complete and submit assignments on time, while lecturers provide guidance and feedback.

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	Department of 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:	AP80183; 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 AF80381: Biological Aspects of Fisheries and Aquaculture

Module code and name	AF80381: Biological Aspects of Fisheries and Aquaculture
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	20
Year of study and semester	Year 2, Semester 3
Prerequisites:	AF80382

6.18.1 Module introduction and aim

The module aims at providing to students' basic knowledge on the biological factors that guide and conditions the production of reared aquatic species under controlled conditions. In addition, the module provides basic knowledge on the biological principles on which fishing and fisheries practices are based.

6.18.2 Module Indicative content

Unit 1: Biological Basis of Aquaculture

This unit introduces the history, basics, scope, objectives, and global status of aquaculture, as well as different aquaculture systems. It covers fish reproductive biology, including reproductive modes, reproductive anatomy, secondary sexual characteristics, sex determination, gonadal maturation cycles, reproductive endocrinology, and artificial reproduction. The unit also introduces genetics, including genotypic sex determination and genetic improvement, and examines the selection and cultivation of major tropical freshwater fish species for aquaculture.

Unit 2: Fishery Biology and Management

This unit introduces fishery biology and its importance in developing effective fisheries management strategies. It covers biological parameters of fishery productivity in aquatic ecosystems and introduces major fishing methods, including harpooning, hooking, trolling, and netting. The unit also examines fisheries management, including political and international objectives, management mechanisms, and catch quotas.

6.18.3 Teaching and Learning Methods

Physical or face-to-face lectures, practical and laboratory works, seminars, and student presentations will be organized. Blended learning will also be used through the UR E-Learning platform to provide learning materials, facilitate online discussions, and support student engagement beyond face-to-face sessions. Group work will give students opportunities to conduct bibliographic searches, synthesize information, and present findings on specific topics. Laboratory sessions will involve demonstrations and observations supported by appropriate laboratory sheets.

6.19 AF80382: Fish Biology

Module code and name	AF80382: Fish Biology
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	15
Year of study and semester	Year 2, Semester 3
Prerequisites:	AP80282

6.19.1 Module introduction and aim

To equip students with the basic knowledge and skills in fish taxonomy, anatomy and physiology for a better appreciation of fisheries dynamics in a more focused fisheries and aquaculture discipline.

6.19.2 Module Indicative content

Unit 1: General Fish Biology

Fish Biology will be introduced by the Respiratory and Circulatory Systems, then, the Osmoregulation and Excretion, Digestive system and fish feeding, Senses (chemoreception, mechanoreception, photoreception, Buoyancy, Locomotion, Fish endocrinology and reproductive biology (maturity stages, gonado-somatic index, spawning and fecundity. Eggs and larval stages and developmental biology of fin fishes), Biology of selected commercially important Rwandan fish species

Unit 2: Fish Taxonomy and Systematics

The student will learn Fish evolution and adaptation, an introduction to taxonomy: a brief history of taxonomy, Rules of nomenclature, Speciation and adaptation, Methods used in taxonomy studies, Phenetics and Cladistics, Technical terms and measurements, Guide to orders, and families of commercially important fish species.

Unit 3: Introduction to Fish Ecology

The student will learn Fish evolution, speciation and adaptive radiation, Zoogeography and distribution, Morphology and adaptation, Feeding/ontogenetic shift and foraging behavior, Bioenergetics , Niche and habitat, Social behavior, Competition and patch use , Food webs and trophic cascades, Fish biodiversity (Tropical versus temperate fishes, marine versus freshwater, estuarine, brackish water etc) , Invasive species , Diadromy, and Threats and aquatic conservation (human dimension and climate change).

6.19.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge, supported by discussions and peer interaction through the UR E-Learning platform. Lecturers will guide students to relevant electronic resources, journals, notes, and reference materials to enhance understanding. Practical laboratory work, seminars, field visits, and assignments will reinforce learning and facilitate application of knowledge. Students will participate in online forums, complete and submit assignments on time, while lecturers provide guidance and feedback.

6.20 AF80481: Fish Genetics and Biotechnology

Module code and name	AF80481: Fish Genetics and Biotechnology
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	15
Year of study and semester	Year 2, Semester 4
Prerequisites:	AP80282

6.20.1 Module introduction and aim

To enable students, understand the basic principles of molecular biology and biotechnology as they apply to aquaculture and fisheries.

6.20.2 Module Indicative content

Learning Unit 1: Genetics and Molecular Biology

This unit covers the fundamentals of molecular biology, genes and chromosomes, nucleic acids, DNA and RNA structure, DNA replication, and transcription, including their roles in cell function and protein synthesis.

Learning Unit 2: Molecular Biology and Biotechnology Techniques in Fisheries and Aquaculture

This unit covers molecular and biotechnology techniques used in fisheries and aquaculture, including PCR, gel electrophoresis, DNA hybridization, genetic manipulation, recombinant DNA technology, cloning, reproductive control, and transgenic fish production.

6.20.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge, supported by discussions and peer interaction through the UR E-Learning platform. Lecturers will guide students to relevant electronic resources, journals, notes, and reference materials to enhance understanding. Practical laboratory work, seminars, field visits, and assignments will reinforce learning and facilitate application of knowledge. Students will participate in online forums, complete and submit assignments on time, while lecturers provide guidance and feedback.

6.21 AF80482: Aquatic Ecology

Module code and name	AF80482: Aquatic Ecology
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	20
Year of study and semester	Year 2, Semester 4
Prerequisites:	AF80382, AF80381

6.21.1 Module introduction and aim

The aim of this module is to enable students to understand the relationships between aquatic organisms and their water environment, including the services provided by aquatic ecosystems. It provides students with knowledge and skills to understand the functioning of aquatic ecosystems and equips them with basic knowledge and skills for studying aquatic macroorganisms and microorganisms.

6.21.2 Module Indicative content

Unit 1: Limnology

This unit introduces limnology, water properties, lake formation and classification, morphometry, physical and chemical characteristics, zonation, stratification, mixing, optical properties, and trophic dynamics. It also covers aquatic productivity and biodiversity, lotic ecosystems, reservoirs, wetlands, watersheds and land use, ecological succession, pollution, and human impacts on aquatic ecosystems.

Unit 2: Aquatic Communities and Food Web (Microbiology)

This unit covers aquatic microbial communities, their role in eutrophication, study methods, growth and survival factors, and contribution to biogeochemical cycles. It also addresses microorganisms in extreme environments, wastewater treatment, disease transmission, sewage and effluent purification, industrial waste treatment, recalcitrant molecules, and drinking-water microbiology.

Unit 3: Conservation and Management of Aquatic Ecosystems (Wetlands and Aquatic Wildlife)

This unit covers strategies for the conservation and restoration of aquatic ecosystems and the management of lakes, rivers, wetlands, and their functions. It also examines conservation strategies and methods applied to aquatic ecosystems in Rwanda.

Unit 4: Introduction to Marine Ecology

This unit introduces marine and freshwater aquatic ecosystems, oceanic zones and biodiversity, coral reefs, estuaries, and mangroves. It also covers aquatic ecosystem services, abiotic factors, aquatic communities, energy and nutrient cycling, water pollution and eutrophication, biological indicators of water quality, human impacts, and management of aquatic ecosystems.

6.21.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge, supported by discussions and peer interaction through the UR E-Learning platform. Lecturers will guide students to relevant electronic sources, journals, notes, and reference materials. Practical laboratory work, seminars, field visits, and assignments will reinforce learning and application. Students will participate in online forums and submit assignments on time, with lecturer feedback.

6.22 AF80483: Fisheries Biology and Conservation

Module code and name	AF80483: Fisheries Biology and Conservation
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	15
Year of study and semester	Year 2, Semester 4
Prerequisites:	AP80182, AF80281

6.22.1 Module introduction and aim

The aim of this module is to enable students to use catch and effort data to assess the status of fish stocks and determine sustainable levels of exploitation. It equips students with knowledge and skills to assess fish stock status using population growth parameters, modern ecological models, surplus yield models, and quick and dirty methods. The module also introduces holistic and analytical models for fish stock assessment and provides students with a general understanding of fisheries management.

6.22.2 Module Indicative content

Unit 1: Fish Population Dynamics and Stock Assessment

This unit covers the concept of fish stocks and principles of stock assessment, including assessment models, population growth parameters, age, growth and mortality estimation, analytical and holistic models, surplus production and age-structured models, gear selectivity, stock-recruitment relationships, and the use of catch and effort data in stock assessment.

Unit 2: Fishing and Gear Technology

This unit covers fishing gear materials, their selection, classification, construction, fishing methods and techniques, and passive and active fishing gears. It also introduces fishing gear design, mesh selectivity, boat design and construction, hydraulic and deck equipment, fishing accessories, remote sensing, and echo-sounder systems used in fishing operations.

Unit 3: Fisheries Management and Environment

This unit covers the importance, status, and management challenges of fisheries, including strategic and operational management approaches, policies, legislation, input and output controls, technical measures, enforcement, and major fisheries management paradigms. It also examines management systems, property rights, fisheries management planning, ecosystem-based management, uncertainty and risk, adaptive management, and management of specific resources such as tilapia restoration.

6.22.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge, supported by discussions and peer interaction through the UR E-Learning platform. Lecturers will guide students to relevant electronic sources, journals, notes, and reference materials to enhance understanding. Practical laboratory work, seminars, field visits, and assignments will reinforce learning and facilitate application of knowledge. Students will participate in online forums, complete and submit assignments on time, while lecturers provide guidance and feedback.

6.23 AF80484: Fish Nutrition

Module code and name	AF80484: Fish Nutrition
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	15
Year of study and semester	Year 2, Semester 4
Prerequisites:	AF80281, AF80381, AF80382

6.23.1 Module introduction and aim

The module aims at providing to students' basic knowledge on digestive physiology, the digestibility and the uptake of nutrients in fish, and on various anti-nutritional factors in fish nutrition. Besides, the module provides learners with an understanding of feed formulation and manufacture.

6.23.2 Module Indicative content**Learning unit 1: Introduction to fish nutrition**

The Introduction to fish nutrition will cover following topics: Anatomy and Physiology of the digestive system of Fish, and Digestibility of nutrients in Fish.

Learning unit 2: Fish nutritional requirements

Fish nutritional requirements will cover following topics: Energetic nutrition, Protein nutrition, Lipid nutrition, Glucid nutrition, Vitamin and mineral nutrition. Ingredients and additives used in fish nutrition, Antinutritional factors, and Fish feed manufacturing

6.23.3 Teaching and Learning Methods

Physical or face-to-face lectures, practical and laboratory works, seminars, and student presentations will be organized. Blended learning will be used through the UR E-Learning platform to provide learning materials, facilitate online discussions, and support student engagement beyond face-to-face sessions. Group work will give students opportunities to conduct bibliographic searches, synthesize information, and present findings on specific topics. Laboratory sessions will involve demonstrations and observations supported by appropriate laboratory sheets.

6.24 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

6.24.1 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.

6.24.2 Module Indicative content

The module will cover the following 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.

6.24.3 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.

6.25 AF80581: Environmental Pollution and Monitoring

Module code and name	AF80581: Environmental Pollution and Monitoring
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	15
Year of study and semester	Year 3, Semester 5
Prerequisites:	AP80282, AP80283, AP80284

6.25.1 Module introduction and aim

This module aims to provide students with theoretical and practical knowledge of environmental management systems in aquaculture and fisheries industries. It also equips students with theoretical and practical knowledge of environmental impact assessment to support sustainable development.

6.25.2 Module Indicative content

Unit 1: Aquatic Microbiology

This unit covers the role of microorganisms in eutrophication, methods for studying aquatic microbial communities, classification of microorganisms in freshwater and marine environments, nutrients in water, factors influencing microbial growth and survival, biogeochemical cycles and global element cycling, extreme aquatic environments, wastewater disposal and disease transmission, sewage and effluent treatment, treatment of selected and trade wastes, recalcitrant molecules, and the microbiology of drinking water.

Unit 2: Ecotoxicology of Freshwater Ecosystems

This unit introduces the main objectives and components of ecotoxicology, the content of environmental toxicology, and examples of ecotoxicology in freshwater ecosystems.

Unit 3: Environmental Impact Assessment

This unit covers Environmental Impact Assessment (EIA), including its processes, evaluation, methodologies, Social Impact Assessment (SIA), and EIA of aquaculture, fisheries, coastal industries, and other development activities. It also addresses Environmental Management Systems, pollution, ozone depletion, global warming, ecosystem degradation, environmental concerns from physical, chemical, and microbiological sources, environmental auditing, environmental quality monitoring, international and national environmental protection standards, and ISO 14000 Environmental Management Systems.

6.25.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge, supported by discussions and peer interaction through the UR E-Learning platform. Lecturers will guide students to relevant electronic sources, journals, notes, and reference materials to enhance understanding. Practical laboratory work, seminars, field visits, and assignments will reinforce learning and facilitate application of knowledge. Students will participate in online forums, complete and submit assignments on time, while lecturers provide guidance and feedback.

6.26 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

6.26.1 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.

6.26.2 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

6.26.3 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.

6.27 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

6.27.1 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.

6.27.2 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.

6.27.3 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.

6.28 AF80582: Aquaculture Feeds and Feeding

Module code and name	AF80582: Aquaculture Feeds and Feeding
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	20
Year of study and semester	Year 3, Semester 5
Prerequisites:	AP80282, AP80283, AP80382

6.28.1 Module introduction and aim

To develop students' practical skills and theoretical capabilities in fish nutrition and feeding

6.28.2 Module Indicative content

Unit 1: Aquaculture feeds

The unit will be introduced by Natural foods, Artificial feeds then will follow Physiology of digestion in fish: food and feeding habits; morphology of alimentary canal; digestion; absorption of food, Nutritional requirements of cultured fish: proteins, lipid and energy requirements of fish; gross energy metabolism; protein nutrition; lipid nutrition; carbohydrate nutrition, Introduction to nutritional energetic, Non-conventional feed stuffs, Nutritional requirements of cultured fish: vitamin and mineral requirements of fish; vitamins requirements (water soluble vitamins, fat soluble vitamins) and deficiency syndromes; mineral requirements and deficiency syndromes, Nutritional diseases

Unit 2: Feed production techniques (Applied production methodologies)

The unit will be introduced by feed conversion ratio (FCR); protein efficiency ratio (PER); net protein utilization; then continue with specific growth rate (SGR); chemical assessment of amino acid profile of proteins, Digestibility of feeds and nutrients in fish. Formulation of feeds according to aquatic animal species and ages requirements. Fish feed formulation: selection of ingredients; least-cost technique and will end with balancing nutrient levels. The unit shall also cover Feed processing and production technology, processing of feed ingredients; grinding; mixing; pelleting; extrusion; drying; packing; incorporation of special additives; quality control; storage.

Unit 3: Feeding techniques and the production environment.

This unit will provide learners with knowledge about Broodstock nutrition and feeding, Larvae nutrition requirement and feeding, relationship between feeding and production; feed quantity; feeding rate; schedule and frequency; Feed utilization, feed efficiency; indices of feed utilization and end with the impact of feeding techniques on the rearing environment.

6.28.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge, supported by discussions and peer interaction through the UR E-Learning platform. Lecturers will guide students to relevant electronic sources, journals, notes, and reference materials to enhance understanding. Practical laboratory work, seminars, field visits, and assignments will reinforce learning and facilitate understanding of the topics. Students will participate in online forums, access learning materials, complete assignments on time, and receive guidance and feedback from lecturers.

6.29 AF80681: Fish Breeding, Reproduction, and Hatchery

Module code and name	AF80681: Fish Breeding, Reproduction, and Hatchery
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	20
Year of study and semester	Year 3, Semester 6
Prerequisites:	AF80382

6.29.1 Module introduction and aim

To equip students with the basic knowledge and skills in principles of fish breeding, including selective breeding and hatchery management, as they apply to fisheries and aquaculture.

6.29.2 Module Indicative content

Learning unit 1: Fish Breeding and Hatchery Management

The unit will be introduced by practicals on Sexuality and reproduction in fishes, then will follow Mendelian inheritance, Quantitative genetics, Chromosomes of fish, Sex determination, Hybridization, A typical modes of sexuality, Selective breeding, Control of sex ratios, Chromosome Engineering, then end with Gene manipulation.

Learning unit 2: Principles of Aquaculture

The unit will be introduced by an overview of aquaculture, then will follow an Overview of reproduction, grow out, and harvesting of Tilapia, Catfish, Trout , Salmon , Common carp, Ornamentals, Effect of water quality parameters (e.g. temperature, salinity, pH, turbidity, oxygen, hardness) on fish production performance, Aquatic weed and predation control, Transportation and handling of live fish, Ways of increasing productivity in culture facilities , Identification of suitable aquaculture candidate species, Introduction of alien species in aquaculture: Benefits and constraints.

6.29.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge, supported by discussions and peer interaction through the UR E-Learning platform. Lecturers will guide students to relevant electronic sources, journals, notes, and reference materials to enhance understanding. Practical laboratory work, seminars, field visits, and assignments will reinforce learning and facilitate understanding of the topics. Students will participate in online forums, access learning materials, complete assignments on time, and receive guidance and feedback from lecturers.

6.30 AF80682: Aquaculture Engineering

Module code and name	AF80682: Aquaculture Engineering
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	15
Year of study and semester	Year 3, Semester 6
Prerequisites:	AP80182, AP80284, AF80282

6.30.1 Module introduction and aim

The aim of the module is to give the student a basic knowledge of technical equipment, methods and systems that are necessary for aquaculture production. The course provides an overview on constructing and installing common aquaculture rearing systems (ponds, raceways, floating cages and Aquaponics, recirculating aquaculture systems; RAS etc.) and the understanding of the functioning of these systems.

6.30.2 Module Indicative content

Unit 1: Introduction to Aquaculture Engineering

This unit introduces water transport and hydrodynamics, including pipes and water pumps, as well as water quality and treatment. It covers key water quality parameters such as temperature, dissolved oxygen, pH, nitrogenous compounds, and dissolved gases, together with water purification methods including mechanical and biological filtration, disinfection, heating, and cooling.

Unit 2: Aquaculture Rearing Systems

This unit covers the construction and functioning of major aquaculture rearing systems, including ponds, raceways, floating cages, Recirculating Aquaculture Systems (RAS), and aquaponics.

Unit 3: Bioindicators of Water Pollution

This unit introduces biological indicators used to assess water pollution and quality, including plant and fungal indicators, animal indicators and toxins, frogs and toads, crustaceans, microbial indicators, microalgae, macroinvertebrates, and benthic indicators for water quality testing.

6.30.3 Teaching and Learning Methods

Physical or face-to-face lectures, practical and laboratory works, seminars, and student presentations will be organized. Blended learning will be used through the UR E-Learning platform to provide learning materials, facilitate online discussions, and support student engagement. Group work will give students opportunities to conduct bibliographic searches, synthesize information, and present findings on specific topics. Field visits to aquaculture rearing systems in fish farms will involve demonstrations and observations, followed by student reporting.

6.31 AF80683: AQUABUSINESS AND MANAGEMENT

Module code and name	AF 80683: Aqua business and Management
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	15
Year of study and semester	Year 3, Semester 6
Prerequisites:	AP80185, AP80285

6.31.1 Module introduction and aim

The module aims to equip the students with theoretical and practical skills on how to create their own agricultural enterprises

6.31.2 Module Indicative content

Unit 1: Aquaculture Farm Management

This unit introduces the definition, importance, scope, and principles of farm management, including management functions, farm decision-making, managerial approaches, production and economic principles, costs, resource inventory, and physical and financial farm planning. It covers crop and livestock production planning, labor, machinery and animal draft power planning, input requirements, farm planning tools, financial planning and budgeting, farm performance analysis, financial statements, resource and labor management, machinery and capital management, farm information systems, and the farm business environment. It also examines farmer problems in Rwanda, macroeconomic factors affecting farm performance and agricultural production, and the role of government in farm production and management.

Unit 2: Fisheries and Aquaculture Economics

This unit covers the principles of fisheries and aquaculture economics, including consumer behavior, demand and supply, elasticities, price determination, market structures, production and cost theories, and economic factors of production. It also addresses financial planning, break-even and gross margin analysis, total farm budgeting, performance measurement, profit and loss accounts, balance sheets and financial ratios, market functions, and profit maximization.

Unit 3: Project Planning and Management

This unit introduces project management concepts, the project management context, project phases and life cycle, stakeholders, and project management processes. It covers integration, scope, time, cost, quality, human resource, communications, procurement, and risk management, including project planning and execution, scope definition and control, activity scheduling, cost estimation and control, organizational and team development, information distribution and performance reporting, procurement processes, and risk management planning.

6.31.3 Teaching and Learning Methods

Physical or face-to-face lectures, practical works, laboratory works, and seminars (student presentations) will be organized. Blended learning will be used through the UR E-Learning platform to provide learning materials, facilitate online discussions, and support student engagement. Group work will give students opportunities to conduct bibliographic searches, synthesize information, and present findings on specific topics. Field visits to aquaculture rearing systems in fish farms will involve demonstrations and observations, followed by student reporting.

6.32 AF80684: Industrial Attachment-I

Module code and name	AF80684: Industrial Attachment-I
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	10
Year of study and semester	Year 3, Semester 6
Prerequisites:	Modules Y1-Y3

6.32.1 Module introduction and aim

The module aims to enable students to develop vocational competencies and professional skills through apprenticeship at stations conducting fisheries-related activities. It also equips students with basic skills in designing and implementing research projects, collecting research data, and preparing data for subsequent analysis and interpretation.

6.32.2 Module Indicative content**Unit 1: Professionalism at work**

In this learning unit, the student will demonstrate: Observation of professionals at work, Reading and synthesis of what professionals' report about their work, doing what professionals do at work under their supervision and Documentation and self-evaluation.

Unit 2: Selection of research topic/ project

In this learning unit, the student will demonstrate: Selection of research topics, Development of objectives and selection of materials and methods, setting up of research hypotheses, Literature review, setting up and implementing a research project and Collection of research data.

6.32.3 Teaching and Learning Methods

Physical or face to face lectures, practical works, laboratory works, Seminars (presentations by students) will be organized. Group work will give students opportunity to conduct bibliographic searches and synthesize and present information on a specific topic. Field visits to the aquaculture rearing/ fisheries systems in fish farms, lakes or rivers will involve demonstrations and observations and then reporting.

6.33 AF80781: Industrial / Field Attachment –II

Module code and name	AF80781: Industrial / Field attachment –II
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	20
Year of study and semester	Year 4, Semester 7
Prerequisites:	Modules Y1-Y3

6.33.1 Module introduction and aim

This module is the continuity of the module AF80684 Industrial Attachment-I conducted at the end of Year 3. It also aims to enable students to develop vocational competencies and professional skills through apprenticeship at stations conducting fisheries-related activities, while equipping them with basic skills in designing and implementing research projects, collecting research data, and preparing data for subsequent analysis and interpretation.

6.33.2 Module Indicative content**Unit 1: Professionalism at work**

In this learning unit, the student will demonstrate: Observation of professionals at work, Reading and synthesis of what professionals' report about their work, doing what professionals do at work under their supervision and Documentation and self-evaluation.

Unit 2: Selection of research topic/ project

In this learning unit, the student will demonstrate: Selection of research topics, Development of objectives and selection of materials and methods, setting up of research hypotheses, Literature review, setting up and implementing a research project and Collection of research data.

6.33.3 Teaching and Learning Methods

Physical or face to face lectures, practical works, laboratory works, Seminars (presentations by students) will be organized. Group work will give students opportunity to conduct bibliographic searches and synthesize and present information on a specific topic. Field visits to the aquaculture rearing/ fisheries systems in fish farms, lakes or rivers will involve demonstrations and observations and then reporting.

6.34 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

6.34.1 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.

6.34.2 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.

6.34.3 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.

6.35 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:	-

6.35.1 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.

6.35.2 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.

6.35.3 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.

6.36 AF80782: Individual Development Project in Aquaculture / Fisheries

Module code and name	AF80782: Individual Development Project in Aquaculture / Fisheries
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	15
Year of study and semester	Year 4, Semester 7
Prerequisites:	-

6.36.1 Module introduction and aim

To equip students with knowledge and skills of project formulation, implementation, monitoring and evaluation

6.36.2 Module Indicative content**Learning Unit 1: Introduction to Project Management**

This unit introduces the elements of a project, the role of project managers, key knowledge areas in project management, relationships among project processes, and the role of quality management in project planning and control.

Learning Unit 2: Individual Project Writing (Planning Techniques)

This unit covers project concepts and definitions, the project cycle, project identification, planning and design, project appraisal and preparation, and key project planning techniques, including logical framework analysis, capital investment appraisal, and sensitivity analysis.

Learning Unit 3: Programme Evaluation and Review Techniques (PERT)

This unit covers the Critical Path Method (CPM), Project Implementation Plan (PIP), plan of operation, project monitoring and evaluation, ethical and legal considerations in project management, professional codes of practice and conduct in project planning and execution, and human resource management.

6.36.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge, supported by discussions and peer interaction through the UR E-Learning platform. Lecturers will guide students to relevant electronic sources, journals, notes, handouts, and reference materials to enhance understanding. Practical laboratory work, seminars, field visits, and assignments will reinforce learning and facilitate application of knowledge. Students will participate in online forums, access learning materials and journals, complete assignments on time, and receive guidance and feedback from lecturers.

6.37 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	10
Year of study and semester	Year 4, Semester 7
Prerequisites:	AP80184, AP80185, AF80282, AF80381, AF80683

6.37.1 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.

6.37.2 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.

6.37.3 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.

6.38 AF80881: Microbiology and Farmed Fish Diseases Management

Module code and name	AF80881: Microbiology and Farmed Fish Diseases Management
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	10
Year of study and semester	Year 4, Semester 8
Prerequisites:	AF80381, AF80382, AP80282

6.38.1 Module introduction and aim

This module will enable students to identify and control common parasites and diseases found on fish.

6.38.2 Module Indicative content**Unit 1: Fish Health Management**

The unit will cover following topics: Definition of the concepts of parasitism, symbiosis and parasitism, Relationship between the host, pathogen and the environment, Classification of parasites (algae, protozoa, roundworms, tapeworms, crustaceans), General Classification of fish and Isolation and Culturing of fish bacteria

Unit 2: Genetic characterization of fish bacteria -10 credits

The unit will cover following topics: Morphological and Genetic characterization of fish bacteria, Methods of control (Culture, chemical and biological control), General Classification of viral diseases of fish, Symptoms of viral diseases in fish. Cell culture and Isolation of viral agents and testing of cell-lines (through deliberate infection).

6.38.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge and facilitate discussions on each learning unit. Lecturers will moderate peer discussions through forums on the UR E-Learning platform. Students will be guided to relevant electronic sources, journals, notes, handouts, and reference materials. Practical laboratory work, seminars, field visits, and assignments will reinforce understanding of the topics. Students will use the UR E-Learning platform to access materials, participate in discussions, and exchange knowledge with peers. Students will access relevant journals, complete assignments on time, and receive guidance and feedback from lecturers.

6.39 AF80882: Aquatic Animal Products Processing and Quality Control

Module code and name	AF80882: Aquatic Animal Products Processing and Quality Control
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	20
Year of study and semester	Year 4, Semester 8
Prerequisites:	AF80881, AP80282, AF80881

6.39.1 Module introduction and aim

To equip students with basic techniques and skills of dealing with post-harvest fish losses: Fish handling, processing, preservation, packaging and marketing, as well as other aquatic animal products

6.39.2 Module Indicative content**Unit 1: Fish Processing and Preservation**

This unit covers the biology of fish muscle, rigor mortis, and fish spoilage, as well as materials and analytical techniques used in fish processing. It also addresses fish processing and preservation methods, fresh fish handling, and determination of freshness and quality using sensory, chemical, and microbiological methods.

Unit 2: Fish Quality and Food Safety – 10 Credits

This unit covers fish quality, processing hygiene, food safety, HACCP systems, and traceability of fish and fish products. It also addresses food poisoning and infection, types of toxicity and their biochemical aspects, nutritional quality analysis of fish and seafood, protein and nitrogen content, non-protein components, fat, fat-soluble vitamins, ash and major minerals, protein, fatty acid and amino acid profiles, effects of heat on fish muscle proteins and other seafood, as well as transportation, distribution, and marketing of fish products.

6.39.3 Teaching and Learning Methods

Formal lectures will provide foundational knowledge, supported by discussions and peer interaction through the UR E-Learning platform. Lecturers will guide students to relevant electronic sources, journals, notes, handouts, and reference materials to enhance understanding. Practical laboratory work, seminars, field visits, and assignments will reinforce learning and facilitate understanding of the topics. Students will access learning materials and discussion forums, participate in peer learning, complete assignments on time, and receive guidance and feedback from lecturers.

6.40 AF80883: Research Project in Aquaculture / Fisheries

Module code and name	AF80883: Research Project in Aquaculture/ Fisheries
School	School of Animal Sciences and Biotechnology
Department	Department of Aquaculture and Fisheries
Programme	Bachelor of Science in Aquaculture and Fisheries Management
Number of credits	20
Year of study and semester	Year 4, Semester 8
Prerequisites:	-

6.40.1 Module introduction and aim

To equip students with the basic knowledge and skills in designing, implementing a research project as well as in the collection, analysis and interpretation of data including scientific write up and presentation of results

6.40.2 Module Indicative content

Learning unit 1: the unit will cover knowledge of developing a research proposal, implement a research project, Collect, analyse and interpret data related to aquaculture and fisheries

Learning unit 2: Write up on research results and Present scientific results to a wide and diverse audience

6.40.3 Teaching and Learning Methods

The Research Project will be conducted through supervised individual research in aquaculture and fisheries, from problem identification and proposal development to data collection, analysis, and interpretation. Students will be guided by supervisors and supported through seminars and conferences to develop and communicate their research findings. Students will use the UR E-Learning platform to access research resources, relevant journals, and learning materials, and to participate in academic discussions. The project will culminate in the preparation and submission of a research report based on the findings and appropriate academic standards.

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 of breadth of knowledge	50%
Coursework/assignment	Formative and summative	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 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 and Animal Sciences (CVAS)	Assoc. Prof. Martin NTAWUBIZI	principal.cvas@ur.ac.rw

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