JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

DEPARTMENT OF AGRICULTURAL ECONOMICS AND AGRIBUSINESS MANAGEMENT

REGULATIONS AND SYLLABUS FOR MASTER OF SCIENCE IN AGRICULTURAL COMMODITIES VALUE CHAIN MANAGEMENT (MACVM)

P.O. BOX 210-40601

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1.0 GENERAL INFORMATION

1.1 Vision, Mission and Core Values of the Institution

a) **Vision**

A beacon of excellence in University Education and Research

b) **Mission**

To provide quality University education that nurtures creativity and innovation through integrated training, research and community outreach for sustainable development.

c) **Core Values**

Customer focus, Impartiality, Professionalism, Integrity and Meritocracy.

1.2 Philosophy of the Institution

A holistic scholarship service to humanity through wisdom, science and technology.

1.3 University Admission Requirements

a) JOOUST criteria for a Doctoral Degree Programme shall apply:

Candidates wishing to pursue a Doctor of Philosophy (PhD) programme at Jaramogi Oginga Odinga University of Science and Technology must meet the following requirements:

(a) Have appropriate preparatory academic training as evidenced by at least one of the following:
(i) Be a holder of a Master's Degree of Jaramogi Oginga Odinga University of Science and Technology

(ii) Be a holder of a Master's Degree or an equivalent academic qualification from any other Recognized institution.

b) JOOUST criteria for a Master's Degree Programme shall apply:

Candidates wishing to pursue a master's degree programme must meet the following requirements:

(i) Holders of at least Upper Second Class Honours Bachelor's degree or equivalent Qualification from recognized Universities.

(ii) Holders of a Lower Second Class Honours degree or postgraduate Diploma in from any Recognized universities and evidence of two years' of relevant work experience.

(iii) In addition to the above, applicants must meet the specific requirements of the Masters Programme as provided by the University Senate.

c) JOOUST criteria for a Bachelor Degree Programme shall apply:

(i) Candidates must satisfy the minimum University requirements of mean grade of C+ in Kenya Certificate of Secondary Education (KACE); OR

(ii) Have two principal passes in biology and chemistry in KACE and at least a credit in Mathematics at Ordinary level; OR

(iii)Holders of a KNEC equivalent diploma from a recognized college; OR (iv) Holders of a related degree from a recognized university.

1.3.1 Procedure of application for admission to the university

(a) Enquiries for a master's degree programme shall be made to the Registrar (Academic Affairs), Jaramogi Oginga Odinga University of Science and Technology, P. O. Box 210-40601, Bondo, Kenya.

(b) The closing date for receiving applications for the Master's Degree Programme shall be as determined by the Senate from time to time.

The application forms may be obtained from the JOOUST website: (http://www.jooust.ac.ke/)

1.4 Academic Resources

1.4.1 Facilities and Equipment

The facilities within the campus are shared among the different departments and include:

a) Lecture Rooms:

The University has adequate lecture rooms, lecture theatres and conference halls in the Main Campus and all its Campuses.

b) Library:

The University libraries have various sources of information, research, reading and instructional materials**.**

(i) Main Campus

The main campus library is a three-floors building accommodating 300,000 volumes. The library is equipped with books, and journals (both hardcover, paperback, and online), for various programmes offered at the University. In addition, plans are already underway to strengthen the teaching and learning resources by providing more books, e-books, journals, e-journals, CDs and DVDs, as well as to establish linkages with other institutions for wider access to academic and research resources. Moreover, the university's integrated library service software enhances access to library resources

(ii) Campuses

At each campus, library resources are purchased and stocked with recommendations and support from the Schools that houses the programme at the Main Campus.

c) Information and Communication Technology (ICT)

The University has a well-established ICT Department and support sections that provide IT services to the Main Campus and other Campuses for teaching and learning. The University website (http://www.jooust.ac.ke/) is operational. The local Area Network (LAN) link enables easy sharing of information and data across the University. The University also has provisions for multi-media facilities for teaching and learning.

d) Laboratories

The University has a Science Complex Building at the Main Campus that houses 26 laboratories for pure and applied sciences.

e) Tuition Farms/Fields

The University has a 50 Acre farm that support teaching and research in various fields of agricultural sciences.

1.4.2 Reference Materials

Core-texts in terms of numbers:

The University library is well stocked with at least three core texts per each unit course being offered:

(a) E-books in terms of subscriptions;

(b) Print journals in terms of subscriptions; and

(c) E-journals in terms of subscriptions and accessible databases.

The University has subscribed to different E-resources which can be used to access both text books and journals. The materials can be accessed through (http://www.lib.jooust.ac.ke/)

1.4.3 Academic Staff

(a) Academic Staff

The school of Agricultural and Food Sciences has established a pool of qualified staff in diverse disciplines both for full and part-time mode of teaching. The School is composed of academic faculty with expertise in different fields of agricultural sciences and related disciplines (Appendix IV). In addition, the School utilizes relevant expertise from other Schools of JOOUST as well as other regional and international institutions. Where necessary, the permanent academic faculty is supported by qualified part-time staff.

(b) Technical and Support Staff

The School of Agricultural and Food Sciences has access to qualified technical support staff including laboratory technicians, coordinators for research, training, and mentorship.

1.5 Programmes Offered by the Institution

1.5.1 List of Academic Programmes Offered in the Institution

1. Bachelor of Arts in Spatial Planning
2. Bachelor of Business Administration with IT
3. Bachelor of Education (Arts) with IT
4. Bachelor of Education (Early Childhood Development)
5. Bachelor of Education (Science) with IT
6. Bachelor of Education (Special Needs) Education) with IT
7. Bachelor of International Tourism Management
8. Bachelor of Logistics and Supply Chain Management
9. Bachelor of Science (Business Information Systems)
10. Bachelor of Science (Information Communication Technology)
11. Bachelor of Science in Actuarial Science with IT
12. Bachelor of Science in Agribusiness Management
13. Bachelor of Science in Agricultural Education and Extension
14. Bachelor of Science in Animal Science
15. Bachelor of Science in Biological Sciences
16. Bachelor of Science in Community Health and Development
17. Bachelor of Science in Computer Security and Forensics

18. Bachelor of Science in Construction Management

19. Bachelor of Science in Food Security

20. Bachelor of Science in Horticulture

21. Bachelor of Science in Public Health

22. Bachelor of Science in Renewable Energy Technology and Management

23. Bachelor of Science in Soil Science

24. Bachelor of Science in Water Resources and Environment Management

25. Master of Science in Food Security and Sustainable Agriculture
26. Master of Science in Agricultural Extension
27. Master of Science in Agribusiness Management
28. Master of Science in Horticulture
29. Master of Science in Animal Science
30. Master of Science in Soil Science
31. Master of Science in Urban Environmental Planning and Management
32. Master of Science in Pure Mathematics
33. Master of Science in Plant Taxonomy
34. Master of Science in Physics
35. Master of Science in Parasitology
36. Master of Science in Microbiology
37. Master of Science in Information Technology Security and Audit
38. Master of Science in Information Technology Management
39. Master of Science in Information Systems
40. Master of Science in Health Informatics
41. Master of Science in Epidemiology and Biostatistics
42. Master of Science in Ecology
43. Master of Science in Biomedical Sciences in Specialization on Medical Entomology, Parasitology, Parasitology or Immunology

44. Master of Science in Biology
45. Master of Science in Applied Statistics
46. Master of Science in Applied Mathematics
47. Master of Science in Food Security and Sustainable Agriculture
48. Master of Science Chemistry
49. Master of Public Health in Epidemiology and Disease Control
50. Master of Public Health (MPH)
51. Master of Logistics and Supply Chain Management
52. Master of Education in Planning and Economics of Education
53. Master of Education in Pedagogy
54. Master of Education in Guidance and Counseling
55. Master of Education in Educational Technology
56. Master of Education in Educational Psychology
57. Master of Education in Curriculum Studies
58. Master of Education in Administration and Management
59. Master of Education in Early Childhood Development and Education
60. Master of Business Administration
61. Master of Arts in Religion
62. Master of Arts in Project Planning and Management
63. Master of Arts in Literature
64. Master of Arts in Linguistics
65. Master of Arts in History
66. Master of Arts in Geography
67. PhD in Food Security and Sustainable Agriculture
68. PhD in Agricultural Extension
69. PhD in Agribusiness Management
70. PhD in Horticulture
71. PhD in Animal Science
72. PhD in Soil Science
73. PhD in Special Needs Education

74. PhD in Religion
75. PhD in Pure Mathematics
76. PhD in Public Health
77. PhD in Plant Taxonomy
78. PhD in Plant Ecology
79. PhD in Planning and Economics of Education
80. PhD in Planning
81. PhD in Physics
82. PhD in Pedagogy
83. PhD in Parasitology
84. PhD in Microbiology
85. PhD in Literature
86. PhD in Linguistics
87. PhD in Information Technology Security and Audit
88. PhD in Information Technology and Management
89. PhD in History
90. PhD in Health Informatics
91. PhD in Guidance and Counseling
92. PhD in Geography
93. PhD in Epidemiology and Biostatistics
94. PhD in Educational Psychology
95. PhD in Educational Administration and Management
96. PhD in Early Childhood Development and Education
97. PhD in Curriculum Studies
98. PhD in Chemistry
99. PhD in Business Information Systems
100. PhD in Business Administration
101. PhD in Applied Statistics
102. PhD in Applied Mathematics
103. PhD in Analytical Chemistry

1.5.2 Total Time for Completing a Lecture/Instruction of Each Programme

List of Programmes	Hours
1. Bachelor of Arts in Spatial Planning	2352
2. Bachelor of Business Administration with IT	2352
3. Bachelor of Education (Arts) with IT	2352
4. Bachelor of Education (Early Childhood Development)	2352
5. Bachelor of Education (Science) with IT	2352
6. Bachelor of Education (Special Needs) Education) with IT	2352
7. Bachelor of International Tourism Management	2352
8. Bachelor of Logistics and Supply Chain Management	2352
9. Bachelor of Science (Business Information Systems)	2352
10. Bachelor of Science (Information Communication Technology)	2352
11. Bachelor of Science in Actuarial Science with IT	2352
12. Bachelor of Science in Agribusiness Management	2352
13. Bachelor of Science in Agricultural Education and Extensions	2352
14. Bachelor of Science in Animal Science	2352
15. Bachelor of Science in Biological Sciences	2352
16. Bachelor of Science in Community Health and Development	2352
17. Bachelor of Science in Computer Security and Forensics	2352
18. Bachelor of Science in Construction Management	2352
19. Bachelor of Science in Food Security	2352
20. Bachelor of Science in Horticulture	2352
21. Bachelor of Science in Public Health	2352
22. Bachelor of Science in Renewable Energy Technology and Management	2352
23. Bachelor of Science in Soil Science	2352
24. Bachelor of Science in Water Resources and Environment Management	2352
25. Master of Science in Food Security and Sustainable Agriculture	720

26. Master of Science in Agricultural Extension	900
27. Master of Science in Agribusiness Management	720
28. Master of Science in Horticulture	720
29. Master of Science in Animal Science	720
30. Master of Science in Soil Science	720
31. Master of Science in Urban Environmental Planning and Management	720
32. Master of Science in Pure Mathematics	720
33. Master of Science in Plant Taxonomy	720
34. Master of Science in Physics	720
35. Master of Science in Parasitology	720
36. Master of Science in Microbiology	720
37. Master of Science in Information Technology Security and Audit	720
38. Master of Science in Information Technology Management	720
39. Master of Science in Information Systems	720
40. Master of Science in Health Informatics	720
41. Master of Science in Epidemiology and Biostatistics	720
42. Master of Science in Ecology	720
43. Master of Science in Biomedical Sciences in Specialization on Medical	720

Entomology, Parasitology, Parasitology or Immunology	
44. Master of Science in Biology	720
45. Master of Science in Applied Statistics	720
46. Master of Science in Applied Mathematics	720
47. Master of Science in Food Security and Sustainable Agriculture	720
48. Master of Science Chemistry	720
49. Master of Public Health in Epidemiology and Disease Control	720
50. Master of Public Health (MPH)	720
51. Master of Logistics and Supply Chain Management	720
52. Master of Education in Planning and Economics of Education	720
53. Master of Education in Pedagogy	720
54. Master of Education in Guidance and Counseling	720
55. Master of Education in Educational Technology	720
56. Master of Education in Educational Psychology	720
57. Master of Education in Curriculum Studies	720
58. Master of Education in Administration and Management	720

59. Master of Education in Early Childhood Development and Education	720
60. Master of Business Administration	720
61. Master of Arts in Religion	720
62. Master of Arts in Project Planning and Management	720
63. Master of Arts in Literature	720
64. Master of Arts in Linguistics	720
65. Master of Arts in History	720
66. Master of Arts in Geography	720
67. PhD in Food Security and Sustainable Agriculture	1,170
68. PhD in Agricultural Extension	1,170
69. PhD in Agribusiness Management	1,170
70. PhD in Horticulture	1,170
71. PhD in Animal Science	1,170
72. PhD in Soil Science	1,170
73. PhD in Special Needs Education	1,170
74. PhD in Religion	1,170
75. PhD in Pure Mathematics	1,170

76. PhD in Public Health	1,170
77. PhD in Plant Taxonomy	1,170
78. PhD in Plant Ecology	1,170
79. PhD in Planning and Economics of Education	1,170
80. PhD in Planning	1,170
81. PhD in Physics	1,170
82. PhD in Pedagogy	1,170
83. PhD in Parasitology	1,170
84. PhD in Microbiology	1,170
85. PhD in Literature	1,170
86. PhD in Linguistics	1,170
87. PhD in Information Technology Security and Audit	1,170
88. PhD in Information Technology and Management	1,170
89. PhD in History	1,170
90. PhD in Health Informatics	1,170
91. PhD in Guidance and Counseling	1,170
92. PhD in Geography	1,170

93. PhD in Epidemiology and Biostatistics	1,170
94. PhD in Educational Psychology	1,170
95. PhD in Educational Administration and Management	1,170
96. PhD in Early Childhood Development and Education	1,170
97. PhD in Curriculum Studies	1,170
98. PhD in Chemistry	1,170
99. PhD in Business Information Systems	1,170
100. PhD in Business Administration	1,170
101. PhD in Applied Statistics	1,170
102. PhD in Applied Mathematics	1,170
103. PhD in Analytical Chemistry	1,170

1.5.3 Definitions

(a) Credit Hours

This is a minimum of three hours of work per week for sixteen weeks in a semester.

(b) Lecture/Instructional Hours

Three hours per week for fourteen weeks under which the students meet with the course instructor.

(c) Contact Hours

One-hour lecture per week per semester or two hour of tutorials/seminars per week per semester, which the instructor meets with the students.

(d) Course Units

A course unit is defined as that part of a semester subject described by coherent syllabus and taught normally over a period of a semester.

1.5.4 Academic organization of the programmes reflecting academic quarters/trimesters/ semesters

(a) The Master's programme will normally take two years undertaken by Coursework, Examination and Thesis. Students shall be required to take two semesters of Coursework in the first year comprising five units per semester. In the second year the students will concentrate on Research and Thesis writing.

(b) Courses shall be offered in units. A course unit is defined as that part of a semester subject described by a coherent syllabus and taught normally over a period of a semester. It is designated as a total of 45 Hours. For this purpose, one 1-hour lecture is equivalent to 2-hour tutorial or 3-hour practical or any combination as may be approved by the Board of the School of Agricultural and Food Sciences.

2. THE CURRICULUM

2.1 Title of the Proposed Programme

Master of Science in Agricultural Commodity Value Chain Management (MACVM)

2.2 Philosophy of the Programme

The Master of Science in Agricultural Commodities Value Chain Management (MACVM) offers application-oriented training to advance efficient and sustainable agricultural value chain management, fostering economic growth in rural and Peri-urban sectors. Our philosophy emphasizes sustainable and inclusive management to enhance productivity and food security.

2.3 Rationale of the Programme

The programme focuses on meeting the urgent demand for specialized application-based knowledge in the management of agricultural value chains. It enhances the transformative growth of agricultural commodities by training experts in strategic decision-making and innovative portfolio development. Collaborations with leading International Higher Education Institutions (HEIs) and private sector organizations for practical training in the programme, guarantee that the skills learned are directly applicable in real-life situations. Additionally, partnerships with international institutions strengthen academic and research connections on a global scale. The programme equips graduates with the knowledge and skills to promote sustainable agricultural growth, facilitate rural development, and contribute to economic prosperity. The training is in accordance with both national laws and policies, as well as international standards. The programme also aligns with national development agendas and global sustainability goals. The national and international policies span various years. They include the National Agricultural Investment Plan (NAIP) and the Agricultural Sector Transformative Growth Strategy (ASTGS) up to 2024, aligning with the BETA, the Comprehensive African Agricultural Development Programme (CAADP), and the United Nations Sustainable Development Goals (SDGs). MACV also adheres to relevant laws such as the Agriculture Act Chapter 318 (Revised Edition 20212), promoting stable agriculture and sustainable land development. Furthermore, MACV aligns with the National Agricultural Sector Extension Policy (NASEP), emphasizing the pivotal role of extension services in agriculture. Lastly, MACV supports the East African Community (EAC) Strategic Interventions plan, fostering regional agriculture and

rural development initiatives.

2.4 Goal of the Programme

The programme will equip students with advanced expertise in application-based agricultural management, preparing them to lead and innovate in the global agricultural industry, while fostering academic collaborations with partner institutions.

2.5 Expected Learning Outcomes of the Programme

On successful completion of the proposed Masters of Science in Agricultural Commodities Value Chain Management the students should be able to:

(i) Evaluate the global range of responsibilities in the management and guidance of agriculture management businesses;
(ii) Appraise the knowledge acquired in agricultural research, agricultural administration, and agricultural service industry for sustainable agricultural value chain development;
(iii) Identify teaching and mentorship responsibilities in vocational education and training and in professional development;
(iv) Explore practical-based experiences and skills for solving problems associated with management through team-work with researchers as well as decision and policy makers;
(v) Assess the implementation of practical interventions for solving problems in agricultural value chain management;
(vi) Characterize Agribusiness ideas and turn them into versatile business ventures for income and wealth creation
(vii) Examine proficient communication strategies for a diverse group of people through oral and written scientific media.

2.6 Mode of Delivery of the Programme

The proposed Masters of Science in Agricultural Commodities Value Chain Management will be delivered in English at JOOUST. Course units will be conducted in the teaching facilities, including lecture halls, laboratories, greenhouses and fieldwork, through interactions in the form of lectures, seminars, laboratory practical, field activities and group discussions. In addition, students will get the opportunity to visit and do part of their graduate programme with other national, regional and

international institutions with which the School of Agricultural and Food Sciences has joint collaborative projects. In this way, students in the master's degree programme can develop their career and gain real world experience in the field of agricultural management. Overall, the Programme shall adopt Blended mode of Delivery which encompass face-to-face and ODEL modes.

2.7 Academic Regulations for the Proposed Programme

2.7.1 Admission Requirements for the Proposed Prgramme

JOOUST criteria for a Master's Degree Programme shall apply:

Candidates wishing to pursue a master's degree programme in Masters of Science in Agricultural Commodities Value Chain Management at Jaramogi Oginga Odinga University of Science and Technology must meet the following requirements:

(i) Holders of at least Second Class Upper Division (Honours) Bachelor's degree in a relevant discipline. This includes but is not limited to Agricultural Sciences, and related courses or equivalent qualification from recognized Universities.

(ii) Holders of Second Class Lower Division (Honours) Degree in a relevant discipline. This includes but is not limited to Agricultural Sciences, and related courses or equivalent qualifications from recognized Universities. The applicant must in addition provide evidence of two years of relevant work experience.

(iii) In addition to the above, applicants must meet the specific requirements of the Master's Programme as provided by the University Senate.

2.7.2 Regulations on Credit Transfer in a Programme

This does not apply according to the university policy.

2.7.3 Course Requirements

This should include all requirements of the course such as:

(a) Student class attendance, and either relevant industrial attachment, or practicum.

(i) The students will be required to attend at least two thirds of lectures and in all the course units to qualify to sit for the final University examinations.

(ii) Students will be required to undertake practical and/or industrial attachment as planned by the course lecturer.

(b) Obligations of the lecturer should entail aspects of course delivery and facilitation.

(i) The lecturer will develop the course outline to be used in delivery of the course.

(ii) The lecturer will deliver the course according to the prescribed mode.

(iii) The lecturer will evaluate the students.

2.7.4 Student Assessment Policy/Criteria

The University policy on teaching and Examinations management shall apply.

(a) Continuous Assessment Tests (CATs):

The ordinary examination shall be graded on the basis of percentage marks consisting of 40% as continuous assessment tests (CATs).

(b) End-Semester:

The student will undertake university examinations. Examinations shall be held at the end of the semester in which the courses are taught. The ordinary examinations shall be graded on the basis of percentage marks consisting of forty per cent (40%) as CATs and 60% as final examinations. Continuous assessment on research shall be reflected in the candidates' progress reports submitted

by the supervisors.

(c) Practical and industrial attachments:

Where practical and/or industrial attachments are offered, students will be assessed as part of the CAT and will contribute 10% of the totals CAT marks.

(d) Other Assessments:

Where research is undertaken in form of a case study or experiment, students will be expected to Submit a report which will be graded as part of the Continuous assessment Test. This will contribute 10% of the total CAT marks.

2.7.5 Grading System

The grading shall be done as follows:

Grade	**Score**
75- 100%	A
65 – 74%	B
50 – 64%	C
Below 50%	F

Designations related to examinations shall be as follows:

P: Pass

I: Incomplete

K: Course in Progress

Au: Audit

a) The passing grade shall be **C = 50%** in each course taken and examined.

b) A candidate who fails a semester examination shall re-sit the same when next offered. If the candidate fails the re-sit examination, he/she shall be discontinued.

c) Marking and grading of the examinations are done by the course instructor who also enters the grade in the Instructors Grade Sheet. The results are then moderated by the relevant Departmental Examination Board (DEB).

d) The scripts are then forwarded to the external examiner who reviews them and returns them to the Chairman, Department of Agriculture Economics and Agribusiness Management.

2.7.6 Examination Regulations

(a) Written Examinations

(i) Examinations for the proposed master's degree programme shall be conducted under the authority of the University Senate as specified under various rules and regulations.

(ii) Examinations shall consist of:

a. Continuous assessment based on assignments, field practical, laboratory practical/industrial attachments and such other tests as the regulations of the Department may prescribe, which shall constitute forty per cent (40%) of the total marks for each course.

b. The final examinations shall constitute sixty per cent (60%) of the total marks for each course.

(iii) Courses which are purely practical and/or seminars may be assessed entirely by continuous assessment.

(iv) Marks obtained in examinations shall be converted into letter grades as follows:

75 % and above	A
65-74%	B
50-64%	C
Below 50 %	F

(v) Resit Examinations

a. A candidate who fails in twenty-five per cent (25%) or less of the total courses taken in an academic year shall be required to Resit examination once only.

b. Candidates shall be awarded grade "C" (50%) in all courses passed in re-sit examination.

(vi) Discontinuation

A student shall be discontinued for:

a. Failing more than twenty-five percent (25%) of the total courses taken in an academic year;
b. Failing a re-sit examination;
c. Committing serious examination malpractice as defined under Section 6.1 of these regulations; and
d. Failing to register for and attend scheduled lectures for two (2) weeks or longer without the consent of the University Senate.

(vii) Special Examinations

a. Special examinations will be offered to candidates who, due to circumstances acceptable to the University Senate, were unable to sit for the ordinary examinations.
b. Special examinations shall be graded on the same guidelines as those for the ordinary examinations
c. No student shall be permitted to proceed to the next year of study without having satisfied all examination requirements.
d. Examination results shall be processed and approved by the School Board of Examiners and submitted to the Board of Postgraduate Studies for ratification before being presented to University Senate by Dean, School of Agricultural and Food Sciences (SAFS)

(b) Thesis

(i) A candidate will proceed to conduct thesis research upon successful completion of the coursework.

(ii) A candidate will be required to identify a research area and write a thesis on original work.

(iii) A candidate shall prepare and write the thesis according to regulations governing postgraduate studies.

(iv) A candidate must defend the thesis according to supervision and examination guidelines as stipulated in the Board of Postgraduate Studies Rules and Regulations.

(c) Supervision

(i) A candidate shall choose a supervisor(s) in consultation with the Dean, School of Agricultural and Food Sciences or Chairman, Department of Agriculture Economics and Agribusiness Management and the Postgraduate Studies Committee. The candidate shall have a minimum of two supervisors – one of whom shall be the major supervisor.

(ii) One of the supervisors may be from outside the University. However, one of the supervisors must be a member of staff of the University.

(iii) The appointment of the supervisors shall be done within six months from the time of registration.

(iv) The appointment shall be done by the Chairman of the University Senate on recommendation by the Chairman of the Postgraduate Studies Committee.

(d) Consultation and Progress on Thesis

(i) A candidate is required to consult with supervisors regularly. The major supervisor shall submit to the Board of Postgraduate Studies and the Dean, School of Agricultural and Food Sciences, a progress report on the candidate each trimester.

(ii) A candidate is required to exhibit steady progress in the coursework and thesis/project work. If the progress is not satisfactory, the Board of Postgraduate Studies through recommendations of the school will warn the student in writing. If a candidate does not show improvement within one trimester after a warning, he/she shall be recommended to Senate for deregistration.

(iii) If a candidate does not receive adequate supervision, the candidate shall write to the Board of Post Graduate Studies explaining inadequacies in supervision, in which case the Board may change the supervisor(s) upon recommendation by the School.

(e) Defense of Thesis or Project Report

(i) The candidate after successful completion of coursework will be expected to write a thesis.

(ii) The final examination of the thesis will be administered as an oral defense. Successful defense qualifies the candidate for graduation.

(iii) The defense will take place only after the candidate has satisfied all other requirements of the programme.

(iv) The Board of Postgraduate Committee shall constitute a Board of Examiners for the thesis. The Board of Examiners shall include:

1. The Dean of the School – Chair
2. The Director or representative – Secretary, Board of Postgraduate Studies
3. The Dean of the School or representative
4. The supervisor(s) as internal supervisors
5. The External Examiner or his/her written report
6. A Senate representative
7. Administrative Officer, Board of Postgraduate Studies, Secretary
8. Other members may attend to listen to the defense but cannot vote on any matter relating to the defense.

(v) The outcome of the defense shall be communicated to the candidate immediately.

(vi) All members of the Board of Examiners shall sign a certificate to indicate whether the candidate has passed, deferred or failed. If a candidate is requested to make some corrections, a certificate of correction shall be issued.

(vii) The final grade for the thesis shall be graded on a PASS or FAIL basis.

(viii) A candidate who fails in the thesis shall be allowed to resubmit the thesis/project within a period of not more than three months, failing which the candidate will be discontinued.

(ix) On passing the final examination, the candidate will be required to submit six (6) copies of the final thesis and then proceed with preparation for graduation.

(f) Programme Evaluation and Change

The proposed Master of Science in Agricultural Commodity Value Chain Management curriculum is dynamic and requires continuous monitoring and evaluation to ensure that it remains relevant, current, competitive and responsive to the needs of the individual students, country and educational sector.

a. The curriculum shall be evaluated every three years or when need arises.

b. Any recommended or proposed changes shall be presented in the School Board meetings.

c. Course and teaching evaluation shall be conducted at least once a year.

d. Evaluation of teaching staff will be conducted through appraisals by students and the Senate. The evaluation of lecturers will be conducted in line with the University Quality Assurance guidelines.

e. Evaluation of students will be conducted through students' examinations.

For quality assurance students shall evaluate their lecturers based on:

a. Degree of preparedness.

b. Presentation of course content (skills) communication.

c. Punctuality in starting and ending classes.

d. Promptness in returning marked assignments.

2.7.7 Moderation of Examinations

The examinations shall be set by internal examiners and moderated by external examiners. Marking of examinations shall also be done by internal examiners and moderated by external examiners before the final moderated result is taken to the Senate for approval. After the results are approved by the Senate, they will become the official examination results of the university.

2.7.8 Graduation Requirements

a) Successful completion of 10 units of coursework.
b) Publish at least one article in a refereed journal.
c) Successful defense of the thesis.
d) Satisfying all other relevant University requirements

2.7.9 Classification of Degrees

The degree is non-classified.

2.7.10 Description of Thesis

(a) Institutional Definition of Thesis:

An essay or dissertation involving personal research, written by a candidate for a college degree.

(b) Rationale of the Thesis

Thesis will demonstrate scholarship through generation and analysis of data for creation of new knowledge in the field of agricultural management and contributions to the global efforts for enhancing food and nutritional security. Capacity of the student to consolidate Thesis is an output of students' research, and will be demonstrated through logical presentation of ideas.

(c) Facets of the Thesis

The thesis will normally consist of the following key sections: Title page, abstract, introduction, literature review, materials and methods, results and discussion, conclusions, recommendations and references.

(d) Regulations of the Thesis/Dissertation/Project

i) A candidate will proceed to conduct thesis research upon successful completion of the coursework.
ii) A candidate will be required to identify a research area and write a thesis on original work.
iii) A candidate shall prepare and write the thesis according to rules and regulations for postgraduate studies.

iv) A candidate must defend the thesis according to supervision and examination guidelines as stipulated in the Rules and Regulations for Postgraduate Studies.

2.7.11 Course Evaluation

Course evaluation should include the procedures of course evaluation and the evaluation of all aspects of the course including:

Course Content

The course content consists of the scope, theories and main topics including emerging issues to be covered in the course unit.

Instructional Process

Student's registration for the units, class attendance, the course outline, delivery of the course (Lectures, practical, case studies, seminars and guest lectures), CATs, setting and marking of examination and internal and external moderation of examinations.

Infrastructure and Equipment

Lecture rooms, Greenhouses, farms, LCD, laboratories, machinery, furniture, and library.

Instructional and Reference Materials

Core textbooks and other books, reference books, journals and e-resources.

Assessments

ISO students' evaluation form in which the students can evaluate the course and the lecturer at the end of the semester. This is conducted by the Office of Quality Assurance and Enhancement.

Internal and external moderation of examinations and internal and external moderation of results is conducted to ensure quality. The programme has an embedded monitoring and evaluation (M & E) that involves both the student and the supervisor.

2.8 Management and Administration

i) The proposed Masters of Science in Agricultural Commodities Value Chain Management Programme is designed to be offered at JOOUST by the School of Agricultural and Food Sciences in collaboration with the other national, regional and international institutions.
ii) In the management of the programme, the School of Agricultural and Food Sciences will supervise the delivery of the proposed programme
iii) Lecturers from the University and partners from other national, regional, and international institutions and networks will provide lectures and monitor progress of students. Where such an approach is inadequate, qualified part time lecturers will be recruited to support the proposed programme. In addition, lecturers from collaborating universities and research institutions both within and outside Kenya, especially from the Consortium Group of Universities, will be engaged in the programme as visiting or exchange staff. Ultimately, this multi-partner and multi- institutional approach to teaching will enhance capacity building at the local level.
iv) The Chairperson, Department of Agriculture Economics and Agribusiness Management in consultation with the Dean, School of Agricultural and Food Sciences shall appoint a qualified Faculty member as the Academic Program Leader.
v) Regular Program review, relevant stakeholders' reviews, departmental and regular School boards, course evaluation, external examiners and moderation during delivery, university policy on quality, CUE standards, ISO standards.

2.9 Courses /Units

The courses/units offered should include:

2.9.1 A distribution table comprising of a summary of the number of courses/units/credit hours/lecture hours allocated to the institution's core courses of the proposed programme, and specialization area of courses

2.9.1.1 Compulsory Courses/Units

Year 1 Semester 1 Internship (Report + Oral Examination)

Course Code	**Course Title**	**Contact Hours**			**Weight (Unit)**
		Lecture	**Internship**	**Total**	
AEB 5101:	Thesis I and Fieldwork Practicum to Agricultural Commodities Value Chain Management	0	225	225	1C
	Total	**0**	**225**	**225**	**1C**

2.9.1.2 Compulsory Courses/Units

Year 1 Semester 2 Introduction and Science of Raw Materials

Course Code	**Course Title**	**Contact Hours**			**Weight (Unit)**
		Lecture	**Practical**	**Total**	
AEB 5111	Food Value Chain Management*	30	15	45	1C
AEB 5112	Research Methods	30	15	45	1C
AFB 5123	Food quality, Safety and Risk Management	30	15	45	IC
AEB 5113	Food processing technology *	30	15	45	IC
AEB 5114	Agripreneurship and product development*	30	15	45	1C
	Total	**150**	**75**	**225**	**5**

KEY: *Compulsory/Common Course Units at each Consortium Partner University

Year 2 Semester 1 Trends and Innovations in Value Chains

Course Code	Course Title	Contact Hours			Weight (Unit)
		Lecture	Practical	Total	
AEB 5211	Crop, livestock and fish value chain management*	30	15	45	1C
AEB 5212	Sustainability for Commodity and food value chains*	30	15	45	1C
AEB 5213	Agricultural Economics	30	15	45	IC
AEB 5214	Digital technology for Agri-food system*	30	15	45	IC
AFB 5121	Statistical Methods	30	15	45	1C
	Total	**15**	**75**	**225**	**5**

Year 2 Semester 2

Course Code	Course Title	Contact Hours			Weight (Unit)
		Lecture	Research	Total	
AEB 5215	Thesis II	0	225	225	1C
	Total	**0**	**225**	**225**	**1C**

A ***matrix*** showing the courses that are covered by each expected learning outcome of the programme and specialization areas. A skeleton of the matrix is hereby provided:

Learning Outcomes	Course Title	YEAR 1	YEAR 2	
Programme Learning Outcomes				
	Courses	**Lecture Hours**	**Courses**	**Lecture Hours**
Gain practical knowledge through fieldwork practicum and conduct preliminary research and proposal development under supervision.	Thesis I and Fieldwork Practicum to Agricultural Commodities Value Chain Management	225		

Explore practical-based experiences and skills for solving problems associated with management through team-work with researchers as well as decision and policy makers;	Thesis I and Fieldwork Practicum to Agricultural Commodities Value Chain Management	225		
Understand management aspects of food value chains, from production to consumption.	Food Value Chain Management	45	Crop, Livestock, and Fish Value Chain Management	45
Evaluate the global range of responsibilities in the management and guidance of agriculture management businesses;	Agricultural Economics	45		
Assess the implementation of practical interventions for solving problems in agricultural value chain management;	Agripreneurship and Product development	45		

Learn about food quality, safety, and risk management in the context of food systems.	Food Quality, Safety, and Risk Management	45		
Acquire knowledge of food processing technology, covering methods, equipment, and industry standards.	Food Processing Technology	45		
Characterize Agribusiness ideas and turn them into versatile business ventures for income and wealth creation	Agripreneurship and Product Development	45		
Appraise the knowledge acquired in agriculture research, agriculture administration, and agriculture service industry for sustainable agricultural value chain development;			Sustainability for Commodity and Food Value Chains	45
Examine proficient communication strategies for a diverse group of people through oral and written scientific			Research Methods Statistical Methods	90

media.				
Understand the role of digital technology in agri-food systems, from precision farming to supply chain management.			Digital Technology for Agri-food Systems	45
Conduct research and produce a thesis under guidance, demonstrating critical thinking and academic writing skills.			Thesis II	225

COURSE OUTLINES

Year 1 Semester 1

AEB 5101:

Course Title: Thesis 1 and Fieldwork Practicum in Agricultural Commodities Value Chain Management

Purpose: The Field Practicum in Agricultural Commodities Value Chain Management is an experiential learning course which is based on hands-on experience and practical skills in managing agricultural commodities throughout the value chain. Students will be required to engage in fieldwork, internships, or industry placements to gain insight into the production, processing, distribution, and marketing of agricultural products, with a view to focusing on value chain optimization and sustainability. This course is designed to develop and enhance students' knowledge and skills to plan independent research and to communicate this in a research proposal and orally to the academic community.

Expected Learning Outcomes

Upon completion of this course, learners will be able to:

1. Analyze Agricultural Value Chains in real world situation

2. Evaluate Production Systems practiced by farmers
3. Assess Post-Harvest Handling Techniques practiced by farmers
4. Optimize Supply Chain Management
5. Identify Market Opportunities in agricultural value chain
6. Implement Quality Assurance in agricultural value chain
7. Address Sustainability Challenges in agricultural value chain
8. Mitigate Risks in farming
9. Communicate Effectively issues of agricultural value chain management
10. Reflect on Fieldwork Experiences
11. Develop a feasible and realistic research concept.

Course content

Fieldwork Engagement - Introduction to Agricultural Commodities Value Chain; Value Chain Mapping and Domestication; Value Chain Governance; Value chain Analysis (Constraint Analysis Matrix): Constraints, Causes, Impact, Intervention Portfolios, and Opportunities; Identification of various agricultural production systems; Evaluation of productivity, efficiency, and sustainability. Post-harvest handling practices, storage techniques, and processing technologies; Evaluation of market trends, consumer preferences, and market opportunities; Identification of strategies to access domestic and international markets; Quality assurance and food safety protocols; Regulatory standards and certification requirements; Sustainability challenges in agricultural commodity value chains; environmental impact assessment, and biodiversity conservation; Assessment and Risk mitigation; Dissemination of findings, oral presentations, written reports; Evaluate fieldwork experiences, learning outcomes, challenges, personal and professional growth; In preparation of the thesis: students will be guided on how to develop a research proposal outlining all aspects of the planned work. The proposals will be discussed in research seminars. The proposal must be approved by the supervisors before planned field work for the thesis can be undertaken. The first part of the course focuses on: Organization of a research project; developing the research question; Literature review and synthesize; understanding the elements of a research proposal; Develop an appropriate and feasible research design; Draft proposals supervised by advisors and the course instructor. Students should expect to work intensively with their advisors during this period.

Instructional Methods

The student will work with the supervisors to dev1`elop the proposal on an agreed topic, theme and title as necessary. The student will maintain at least a two weekly visit and discussion with the supervisor.

Instructional Materials and/or Equipment

The student will use the available referral material and other research materials availed on campus, internet and other sources as directed by the supervisors.

Course Assessment

No marks or grades will be awarded for the thesis proposal. The proposal writing stage will be reported as satisfactory or not satisfactory. The supervisors will consult with each other before advising the student on the performance.

Core Reading Materials for the Course

1. Kornuta, H. M., & Germaine, R. W. (2019). *A concise guide to writing a thesis or dissertation: Educational research and beyond*. Routledge.
2. Science and Technology Facilities Council (2009) "Research Grants Handbook", 09 October 2009. http://www.scitech.ac.uk/rgh/PDFs/rghAll.pdf
3. MLA (2008). Style Manual and Guide to Scholarly Publishing, third edition. Published: ISBN: 9780873522977 (hardcover), ISBN: 9780873522984
4. Galvan, J. L., & Galvan, M. C. (2017). *Writing literature reviews: A guide for students of the social and behavioral sciences*. Routledge.

Recommended Reference Materials

1. Reich, J., Tingley, D., Leder-Luis, J., Roberts, M. E., and Stewart, B. M. (2015). Computer assisted reading and discovery for student generated text in massive open online courses. *Journal of Learning Analytics.*
2. JOOUST Postgraduate Guidelines Handbook.

Course Code: AEB 5111

Course Title: Food Value Chain Management

Purpose of the Course:

The Food Value Chain Management is designed to provide students with a comprehensive understanding of the intricate processes involved in managing the value chain within the food industry. The course will explore key concepts, strategies, and best practices essential for optimizing efficiency, sustainability, and profitability across all stages of the food supply chain.

Expected learning outcomes of the course

Upon completion of this course, learners will be able to:

1. Define and Explain the Food Value Chain.
2. Analyze and Evaluate Value Chain Processes.
3. Apply Strategies for Optimization in food value chain.
4. Utilize Technology and Innovation in food value chain.
5. Assess External Factors and Challenges affecting agricultural food value chain.
6. Make Informed Decisions and Strategic Plans with regard to agricultural value chain management.
7. Communicate Agricultural Value Chain Concepts Effectively.
8. Apply Knowledge to Real-World Scenarios.
9. Demonstrate Ethical and Sustainable Practices.

Course Content:

Introduction to the concept of the food value chain, components of food value chain, including primary production, processing, distribution, and retail. Analysis of the food value chain stages; identifying inefficiencies, bottlenecks, and areas for improvement. Strategies to enhancing efficiency, quality, and sustainability across the food supply chain; management principles, supply chain integration, and sustainability practices. Role of technology and innovation in food value chain management; the applications of IoT, blockchain, and data analytics for streamlining operations and improving traceability. Impact of external factors such as regulations, consumer trends, and globalization on the food value chain, and develop strategies to mitigate risks and capitalize on opportunities. Ethical considerations and sustainability issues within the food value chain and proposal and implementation practices that promote ethical sourcing, environmental responsibility, and social accountability. Emerging trends, technologies, and best practices in food value chain management. Gender dimensions in the food value chain management. Application of theoretical concepts and practical skills learned in the course to analyze real-world case studies,

propose solutions to value chain challenges and opportunities, and make recommendations for improvement.

Instructional Methods:

The course will be delivered through a combination of lectures, case studies, interactive discussions, e-learning and hands-on practical sessions. Guest speakers from the industry and field visits to agri-tech companies may also be included.

Instructional Materials/ Equipment:

PowerPoint presentations, Textbooks, Access to online platforms and digital tools for interactive sessions, Demonstrations of digital farming equipment and sensors, and Simulation software for supply chain management and food processing.

Course Assessment:

CATS	40%
Final Examination	60%
Total	100%
Pass mark	50%

Core reading materials:

1. Pullman, Madeleine, and Zhaohui Wu. (2021). *Food supply chain management: building a sustainable future*. Routledge

2. Bourlakis, Michael A., and Paul W H Weightman (2008) eds. *Food supply chain management*. John Wiley & Sons.

3. Eastham, Jane, Liz Sharples, and Stephen Ball. (2007). eds. *Food supply chain management*. Taylor & Francis.

Recommended Reference Materials

1. Pullman, Madeleine, and Zhaohui Wu. (2012). *Food supply chain management: Economic, social and environmental perspectives*. Routledge,

2. Cucagna, Maria Emilia, and Peter D. Goldsmith. (2018): "Value adding in the agri-food value chain." *International food and agribusiness management review* 21.3 293-316.

3. Narula, Sapna A., and S. P. Raj. "Sustainable Food Value Chain Development."

4. Bourlakis, Michael A., and Paul WH Weightman. (2004). "Food Supply Chain Management."

5. Bijman, Jos, et al., (2006). eds. *International agri-food chains and networks: management and organization*. Wageningen Academic Publishers

Course Code: AEB 5112

Course Title: Research Methods

Purpose of the course

The Research Methods course is intended to provide learners with foundational knowledge and practical skills necessary for designing, conducting, and analyzing research across various disciplines. Through a combination of theoretical concepts, practical exercises, and case studies, students will learn about different research methodologies, data collection techniques, and analytical tools used in academic and professional settings. In addition, students will be exposed to scientific writing (including academic, grant concept and proposal writing) and publication skills for effective research and dissemination. The course emphasizes critical thinking, ethical considerations, and the application of research methods to address real-world problems.

Expected Learning Outcomes of the Course

Upon completion of this course, learners will be able to:

1. Demonstrate an understanding of the research process, including formulating research questions and hypotheses.
2. Identify appropriate research designs and sampling techniques for different research contexts.
3. Select and apply relevant data collection methods, such as surveys, interviews, and observational research.
4. Analyze research data using appropriate statistical and qualitative analysis techniques.
5. Evaluate the validity, reliability, and ethical implications of research studies.
6. Develop research proposals and reports that adhere to academic and ethical standards.
7. Communicate research findings clearly and effectively to diverse audiences.

Course content

Introduction to research: the role of research, overview of the research process and basic research concepts; Problems and Hypotheses: defining the research problem, formulation of the research hypotheses and/or questions; Literature review; Research design: experimental and non-experimental research design, field research, and survey research; Methods of data collection; Sampling techniques; Determination of sample size; Processing and analysis of data; Ethical issues in conducting research; Reporting: Introduction, Methodology, Results, Discussion, References, and Appendices. Role and characteristics of research in the development of scientific knowledge; research approaches, Research process; Principles of scientific writing; scientific writing (including academic, grant concept and proposal writing) and publication skills for effective research and dissemination. Quantitative qualitative and mixed methods research; Development of research proposals and thesis reports; Major areas of research in Agricultural Commodity Value

Chain Management: Agricultural information user studies, Access to agricultural data, information, and knowledge, Agricultural information retrieval research; Agricultural information systems research, Agricultural communications research; Communicating Agricultural Commodity Value Chain Management/agricultural research; Collaborative research project management.

Instructional Methods:

The course will be delivered through a combination of lectures, case studies, interactive discussions, e learning and hands-on practical sessions. Guest speakers from the industry and field visits to agri-tech companies may also be included.

Instructional Materials/ Equipment

PowerPoint presentations, Textbooks, Access to online platforms and digital tools for interactive sessions, Demonstrations of digital farming equipment and sensors, Simulation software for supply chain management and food processing.

Course Assessment:

CATS	40%
Final Examination	60%
Total	100%
Pass mark	50%.

Core Reading Materials for the Course

1. Walliman, Nicholas. (2021). *Research methods: The basics*. Routledge.
2. Patten, Mildred L. (2016). *Understanding research methods: An overview of the essentials*. Routledge.
3. Blumberg, Boris, Donald Cooper, and Pamela Schindler. (2014). *EBOOK: Business research methods*. McGraw Hill.
4. Bryman, Alan. (2013). *Research methods and organization studies*. Routledge.
5. Richards, Keith, Steven Ross, and Paul Seedhouse. (2012). *Research methods for applied language studies: An advanced resource book for students*. New York: Routledge.

Recommended Reference Materials

1. Randolph, Justus J. (2008). *Multidisciplinary methods in educational technology research and development*. HAMK Press.
2. Van Dijk, Teun A. (2011). *Discourse studies: A multidisciplinary introduction*. Sage.

3. Tritter, Jonathan. (2007). "Mixed methods and multidisciplinary research in health care." *Researching health: Qualitative, quantitative and mixed methods*.
4. Spencer, Steve, and Gary Taylor (2004). *social identities: Multidisciplinary approaches*. Routledge.

Course Code: AFB 5123

Course Title: Food Quality, Safety, and Risk Management

Course Content: Food Quality, Safety, and Risk Management is a comprehensive course designed to provide students with an in-depth understanding of the principles, practices, and regulations governing the quality and safety of food products. The course explores topics such as food microbiology, hazard analysis, risk assessment, regulatory compliance, and quality assurance systems, equipping students with the knowledge and skills necessary to ensure the production of safe and high-quality food

Expected Learning Outcomes of the course

Upon completion of this course, students will be able to:

1. Understand the Concepts of Food Quality, Safety, and Risk Management
2. Identify and Analyze Food Hazards
2. Apply Hazard Analysis Techniques
3. Evaluate Regulatory Compliance
4. Develop and Implement Quality Assurance Systems
5. Manage Food Safety Incidents and Crises
6. Conduct Risk Assessment and Management
7. Promote Food Safety Culture
8. Implement Traceability and Recall Systems
9. Communicate Effectively on Food Safety Issues
10. Develop skills to investigate problems of substandard food quality
11. Assess the health and safety culture of food processing industry
12. Identify and assess potential risks to health and the environment in the food industry
13. Develop skills for Inspecting different food products (imports or locally produced)

Course Content

Comprehensive information on food safety; Food contamination i.e. microbial, chemical, plant and animal adulterants and radioactive materials; Routes of contamination of major food groups, analysis and control; Fields and concepts of the quality systems of foods; Risk analysis and management of the food chain; Sensory properties of foods and statistical means of quality control; Food standards and regulations; National and international agencies related to food control.

Instructional Methods

The course will be delivered through a combination of lectures, case studies, interactive discussions, e-learning and hands-on practical sessions. Guest speakers from the industry and field visits to agri-tech companies may also be included.

Instructional Materials/ Equipment

PowerPoint presentations, Textbooks, Access to online platforms and digital tools for interactive sessions, Demonstrations of digital farming equipment and sensors, and Simulation software for supply chain management and food processing.

Course Assessment:

CATS	40%
Final Examination	60%
Total	100%
Pass mark	50%

Core Reading Materials for the Course

1. Mohammed K., Rahman P., Ashraf S.A. (2024). *Food Safety: Quality Control and Management*. Taylor & Francis Group. ISBN: 9781032369990, 103236999X
2. Petersen B., Nüssel M. & Hamer M. (2023*). Quality and Risk Management in Agri-food Chains*. Brill. ISBN: 9789086867899, 9086867898
3. Lelieveld H.L.M. & Motarjemi Y. (2018). *Food Safety Management: A Practical guide for the food industry*. Elsevier Science & Technology Books. ISBN: 9780128100189, 0128100184.

Recommended Reference Material

1. Inteaz A. (2004) Food Quality Assurance, Principles and Practices, CRC, First Edition.
2. FAO/WHO, 1996. Proposed draft guidelines for the design, operation, assessment and accreditation of food import and export inspection and certification systems. Sydney, 19 - 23 February. FAO, Rome.

3. FAO/WHO, 1996. Report of the fourth session of the Codex Committee on Food Import and Export Inspection and Certification Systems. ALINORM 97/30. Sydney, 19 – 23 February. FAO, Rome.
4. FAO/WHO, 1995. Report of the twenty-first session of the Joint FAO/WHO Codex Alimentarius Commission. ALINORM 95/37. Rome, 3 - 8 July. FAO, Rome.
5. FAO/WHO, 1995. Report of the twenty-eighth session of the Codex Committee on Food Hygiene. ALINORM 97/13. Washington, D.C., 27 November - 1 December. FAO

Course Code: AEB 5113

Course Title: Food Processing Technology

Purpose of the course

Food Processing Technology explores the principles and practices involved in the transformation of raw agricultural materials into safe, nutritious, and appealing food products. This course covers various aspects of food processing, including unit operations, preservation techniques, quality control, and regulatory requirements.

Expected Course Outcomes

Upon completion of this course, the learners will be able to:

1. Understand Food Processing Principles.
2. Identify and explain Unit Operations.
3. Apply Preservation Methods.
4. Implement Quality Control Measures.
5. Explore Innovation in Food Processing.
6. Operate Food Processing Equipment.
7. Understand Food Packaging.
8. Address Environmental and Sustainability Concerns.
9. Optimize Food Processing Operations.
10. Comply with Regulatory Requirements.
11. Apply Food Processing Knowledge.

Course content:

Fundamental concepts and principles of food processing; role of processing in food safety, preservation, and enhancement of nutritional quality. Operations involved in food processing; cleaning, sorting, grading, heating, and packaging, and their respective roles in food production. Food preservation methods; heat processing, refrigeration, and drying, and application in extending shelf life and maintaining quality of food products. Quality control measures and implementation throughout the food processing chain; monitoring, testing, and maintaining quality parameters. Recent advancements and innovations in food processing technology; emerging technologies (high-pressure processing and nanotechnology), and their applications in food production. Principles of food packaging and its role in preserving food quality and safety, including the selection of packaging materials and technologies. Environmental impacts of food processing operations, sustainable practices to minimize resource consumption, waste generation, and environmental footprint. Optimization of food processing operations through process modeling, simulation, experimentation, and continuous improvement techniques. Regulatory requirements and safety considerations measures in food processing operations, including FDA regulations, food safety standards, and labeling requirements, ensuring compliance with legal and regulatory frameworks. Addressing real-world challenges and opportunities in the food industry; product development, process optimization, and quality assurance. Communicating food processing concepts, findings, and recommendations to diverse stakeholders, including peers, industry professionals, and regulatory authorities. Gender dimensions in food processing.

Instructional Methods

The course will be delivered through a combination of lectures, case studies, interactive discussions, e-learning and hands-on practical sessions. Guest speakers from the industry and field visits to agri-tech companies may also be included.

Instructional Materials/ Equipment:

PowerPoint presentations, Textbooks, Access to online platforms and digital tools for interactive sessions, Demonstrations of digital farming equipment and sensors, and Simulation software for supply chain management and food processing.

Course Assessment:

CATS	40%
Final Examination	60%
Total	100%
Pass mark	50%

Core Reading Materials for the Course:

1. Brennan, J. G., & Grandison, A. S. (2012). *Food processing handbook*. Weinheim, Germany: Wiley-Vch.
2. Fellows, Peter John. (2022). *Food processing technology: principles and practice*. Woodhead publishing.
3. Knorr, D. (1999). Novel approaches in food-processing technology: new technologies for preserving foods and modifying function. *Current opinion in biotechnology*, *10*(5), 485-491.
4. Ravichandran, R. (2010). Nanotechnology applications in food and food processing: innovative green approaches, opportunities and uncertainties for the global market." *International Journal of Green Nanotechnology: Physics and Chemistry* 1.2: P72-P96.

Recommended Reference Materials

1. Smith, J. Scott, and Yiu H. Hui, (2008). *Food processing: principles and applications*. John Wiley & Sons.
2. Misra, N. N., et al. (2017). "Landmarks in the historical development of twenty first century food processing technologies." *Food Research International* 97: 318-339.
3. Priyadarshini, A., Rajauria, G., O'Donnell, C. P., & Tiwari, B. K. (2019). Emerging food processing technologies and factors impacting their industrial adoption. *Critical reviews in food science and nutrition*, *59*(19), 3082-3101.
4. Brunner, G. (2005). Supercritical fluids: technology and application to food processing. *Journal of food engineering*, *67*(1-2), 21-33.
5. Marc, Romina Alina, Antonio Valero Díaz, and Guiomar Denisse Posada Izquierdo, (2020). *Food Processing*. BoD–Books on Demand.
6. Stumbo, C. R. (2013). *Thermobacteriology in food processing*. Elsevier.
7. Jain, A., Ranjan, S., Dasgupta, N., & Ramalingam, C. (2018). Nanomaterials in food and agriculture: an overview on their safety concerns and regulatory issues. *Critical reviews in food science and nutrition*, *58*(2), 297-317.

Course Code: AEB 5114

Course Title: Agri-preneurship and Product Development

Purpose of the Course

To equip learners with skills and knowledge to innovate, create, protect and run successful agricultural enterprises.

Expected Learning Outcomes of the Course:

Upon completion of this course, students will be able to:

1. Understand concepts and principles of Agripreneurship.

2. Identify and evaluate opportunities for Agricultural Enterprise and Product Development.

3. Generate and Evaluate Agri-enterprise and Product Ideas.

4. Develop and Prototype Agricultural Products.

5. Market Agricultural Products.

6. Create Business Plans for Agricultural Ventures.

7. Understand the complexities of risk management in agriculture.

8. Gain insights into the legal and regulatory landscape governing agribusiness operations.

9. Analyze Case Studies and Best Practices and apply key insights and lessons to agricultural enterprise and product development.

Course Content

Introduction to Agripreneurship: Definition and importance of agripreneurship and its role in driving innovation and growth in the agricultural sector, Types of entrepreneurship (intrapreneurship, entrepreneurship), Forms of agr-ienterprises for running agribusiness organizations (small, medium, large), Qualities/skills needed for running the business. Identification and generation of business ideas: Sources of new ideas (research, emerging enterprises, market demand, consumer trends, technological advancements, feasibility studies etc, Ideation process (brainstorming, random association, etc), conceptualization, prototyping, Enterprise selection through product validation, market research and feasibility analysis. Process of setting up an enterprise: Legal requirements, Financial and economic requirements, Personnel requirements, Infrastructural requirements, Business location. Enterprise Management: Financial Management, Man-power/Personnel Management; Human Resource Management, change mgt, partner, network and collaborations management within agripreneurship community, Machinery/Production, Materials. Resource mobilization in an enterprise: funding sources, financing options, and investment strategies available to agripreneurs, develop skills in pitching to investors and securing funding for agricultural ventures. Product development: Impetus to product innovation, new product development process. Marketing and Consumer behaviour: Marketing functions, Marketing institutions, Market research (Types of market information, Marketing mix, Marketing strategies, Market segmentation, Distribution channels, Consumer needs, Types of consumers, Exogenous and endogenous influences on the buyer behaviour, Consumer purchasing process. Legal, regulatory, and intellectual property considerations in agripreneurship and product development. Business Plan/Business Canvas model (proposal). Case Studies.

Instructional Methods:

The course will be delivered through a combination of lectures, case studies, interactive discussions, e-learning and hands-on practical sessions. Guest speakers from the industry and field visits to agri-tech companies may also be included.

Instructional Materials/ Equipment:

PowerPoint presentations, Textbooks, Access to online platforms and digital tools for interactive sessions, Demonstrations of digital farming equipment and sensors, and Simulation software for supply chain management and food processing.

Course Assessment:

CATS	40%
Final Examination	60%
Total	100%
Pass mark	50%

Core Reading Materials for the Course

1. Jean Vasile, A., Subic, J., Grubor, A., & Privitera, D. (2019). *Handbook of research on agricultural policy, rural development, and entrepreneurship in contemporary economies*. IGI Global.
2. Mungai, C. (2018). Innovative Business Models for Smallholder Farmers: A Case Study of Agricultural Entrepreneurs in Africa. FAO.
3. Kumar, D. (2015). *Entrepreneurship in Agriculture.* Satish Serial Publishing House, 1st edition.
4. Casson, M. (2008). *The Oxford handbook of entrepreneurship*. Oxford University Press.

Recommended Reference Materials

1. Marioti, S. (2007*). Entrepreneurship: How to Start & Operate a Small Business*, 10th Edition. Pearson, pp. 660.
2. Scarborough, N. (2011). *Effective Small Business Management*, 10th Edition. Pearson, pp. 888.
3. Spinelli, S. and Adams, R. (2015). *New Venture Creation: Entrepreneurship for the 21st Century (Irwin Management)*, 10th Edition. McGraw-Hill Education, pp. 512.
4. Sutton, G. (2012). Writing Winning Business Plans: How to Prepare a Business Plan that Investors Will Want to Read and Invest In. RDA Press, LLC, pp. 210.
5. Journal of Research in Marketing and Entrepreneurship. Open Access.

6. Journal of The Handbook of Research on Entrepreneurship in Agriculture and Rural Development. Edited by Gry Agnette Alsose, Sara Carter, Elisabet Ljunggren and Friederike Welter.
7. The Journal of Entrepreneurship

Year 2 Semester 1

Course Code: AEB 5211

Course Title: Crop, Livestock and Fish Value Chain Management

Prerequisite: AEB 5111

Purpose of the Course:

The purpose of this course is to provide learners with practical knowledge and skills in value chain management for crops, livestock, and fish. This will enable them to improve productivity, efficiency, and profitability in the agriculture sector.

Expected Learning Outcomes of the Course:

Upon completion of this course, students will be able to:

1. Understand the concept of value chains and their importance in agriculture.
2. Identify the key components of crop, livestock, and fish value chains.
3. Analyze value chain performance and identify opportunities for improvement.
4. Develop strategies for managing value chains effectively.
5. Demonstrate the ability to apply value chain management principles in real-world scenarios.

Course Content:

Principles of crops, livestock and fisheries production and their supply chains; Processing methods of agricultural products; Post-harvest changes taking place in crop products; Estimating the post-harvest losses in crop products; Types of losses in livestock and fisheries products resulting from poor processing and preservations; Post-harvest and processing facilities for crops, livestock and fisheries products; Estimating the viability of different agricultural products processing techniques; Monitoring and evaluation of safety and quality assurance measures in harvesting, transporting, processing, preserving, storage, grading, packaging, standardization and marketing of agricultural products locally and abroad; Agro-logistics requirements of crops, livestock, and fisheries products; Political, environmental, social, technological, legal, and economic (PESTLE) analysis for crop, livestock and fisheries value chain management. Sustainability and Ethics in Value Chain Management; Environmental considerations in value chains, social responsibility and ethical practices.

Instructional Methods:

The course will be delivered through a combination of lectures, case studies, interactive discussions, e-learning and hands-on practical sessions. Guest speakers from the industry and field visits to agri-tech companies may also be included.

Instructional Materials/ Equipment:

PowerPoint presentations, Textbooks, Access to online platforms and digital tools for interactive sessions, Demonstrations of digital farming equipment and sensors, and Simulation software for supply chain management and food processing.

Course Assessment:

CATS	40%
Final Examination	60%
Total	100%
Pass mark	50%

Core Reading Materials for the Course:

1. Black, R. (2019). *Strategic management in the value chain.* Routledge.
2. Gereffi, G. (2017). *Global value chains and development: Redefining the contours of 21st-century capitalism*. Cambridge University Press.
3. Coyle, J. J., Langley, C. J., & Novack, R. A. (2016). *The management of business logistics: A supply chain perspective*. Cengage Learning.

Recommended Reference Materials:

1. Fuglie, K. O., & Rada, N. E. (2013). Resource productivity, competitiveness, and the global food system. *International Food and Agribusiness Management Review, 16*(B).
2. Porter, M. E., & Kramer, M. R. (2011). Creating shared value. *Harvard business review, 89*(1-2), 62-77.
3. Talalwe, M., & Morrison, A. (2017). *Effective agricultural supply chain management*. Springer.
4. Christopher, M. (2016). *Logistics & supply chain management*. Pearson UK.
5. Van Der Meer-Kooistra, J., Vosselman, E. G. J., & Ven, B. V. D. (2019). Management control of inter-organizational relationships: *Analysis of a new flexible organizational form*. Springer.
6. Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of international political economy, 12*(1), 78-104.

Course Code: AEB 5212

Course Title: Sustainability for Commodity and Food Value Chains

Purpose of the Course

The purpose of this course is to equip participants with the knowledge and skills necessary to address the critical challenges facing commodity and food value chains in the context of sustainability. Through a multidisciplinary approach, the course aims to explore the intricate interplay between environmental, social, and economic factors within these chains, fostering a deeper understanding of sustainable practices, supply chain management, and ethical considerations. By examining case studies, industry best practices, and emerging trends, participants will develop strategies to promote resilience, reduce waste, enhance transparency, and create value across the entire value chain, ultimately contributing to the creation of more sustainable and equitable systems within the global commodity and food sectors**.**

Expected Learning Outcomes

Upon completion of this course, learners will be able to:

1. Define Sustainability and its relevance
2. Identify Environmental Impacts
3. Analyze Social Impacts of Agricultural Value Chains.
4. Examine Sustainable Practices affecting Agricultural sector
5. Assess Certification Standards Agricultural sector
6. Integrate Sustainability into Management of Agricultural Value Chains.
7. Understand Consumer and Retailer Perspectives Agricultural Value Chains.
8. Analyze Policy and Governance and their impacts on Agricultural Value Chains.
9. Explore Emerging Trends and Innovations in Agricultural Value Chains.
10. Apply Sustainability Assessment Tools on Agricultural Value Chains.
11. Develop Solutions for Sustainability of Agricultural Value Chains.

Course Content:

Introduction to Sustainability and Food Systems: Definition of sustainability, overview of the food value chain, and importance of sustainable food production. Sustainable Energy and the Food Value Chain: Exploring energy consumption in agriculture, greenhouse gas emissions from food systems, production of solar, wind, and biomass energy in agriculture, and energy-efficiency in production, processing, and transportation. Sustainable Practices in the Food Value Chain: Covering agroecology, organic farming techniques, water usage, and pollution in food production, precision agriculture, smart farming technologies, cold chain management and food preservation, and sustainable packaging and distribution systems. Food Waste Reduction and Resource Management: Discussing causes and consequences of food waste, strategies for reducing food loss and waste, and resource recovery and circular economy approaches. Ethical and Social Considerations in Food Production: Addressing fair trade and ethical sourcing, labor rights and

social justice in agriculture, environmental standards, cost-benefit analysis of sustainable practices, and market incentives for sustainability. Case Studies and Best Practices: Identifying cases where sustainable food production has been practiced, and incorporating assignments such as excursions and seminars/paper presentations.

Instructional Methods

The course will be delivered through a combination of lectures, case studies, interactive discussions, e-learning and hands-on practical sessions. Guest speakers from the industry and field visits to agri-tech companies may also be included.

Instructional Materials/ Equipment

PowerPoint presentations, Textbooks, Access to online platforms and digital tools for interactive sessions, Demonstrations of digital farming equipment and sensors, Simulation software for supply chain management and food processing

Course Assessment:

CATS	40%
Final Examination	60%
Total	100%
Pass mark	50%

Core Reading Materials

1. Developing Sustainable Food Value Chains: Guiding Principles (2024). FAO.
2. Terry Marsden, Adrian Morley, and Fiona Morgan. (2014). *Sustainable Food Systems: Building a New Paradigm.* Routledge.
3. Margaret A. Oliver, Thomas F.A. Bishop and Ben P. Marchant (2013). *Precision Agriculture for Sustainability and Environmental Protection.* Routledge.

Recommended Reading Materials

1. Sustainable Supply Chain Management: Practical Ideas for Moving Towards Best Practice" by David B. Grant and Alexander Trautrims
2. Food Supply Chain Management and Logistics: From Farm to Fork" by Ioannis Minis and Vasileios Zeimpekis.
3. The New Food Activism: Opposition, Cooperation, and Collective Action" by Alison Alkon and Julie Guthman.
4. Sustainability in Food Supply Chain Management" edited by Usha Jindal.
5. Developing sustainable food supply chains. Philosophical Transactions of the Royal Society B: Biological Sciences, 363 (1492): 849–861.

6. https://openknowledge.fao.org/server/api/core/bitstreams/35fc8778-32c8-49e9-8b54-e923cdd07647/content

Course Code: AEB 5213

Course Title: Agricultural Economics

Course Purpose

The program is designed for graduates to acquire knowledge and skill for problem solving applications for up-scaling agricultural productivity, value chain management and enhanced marketing of agricultural products on both small and large-scale farms.

Expected Learning Outcomes of the course

Upon completion of this course, students will be able to:

1. Understand the Foundations of Agricultural Economics
2. Analyze Factors Influencing Agricultural Production
3. Evaluate Market Structures and Pricing Mechanisms
4. Assess Agricultural Policy Impacts on Agricultural value chains
6. Explore International Trade in Agriculture
7. Apply Economic Modeling and Analysis Techniques
8. Critically Examine Sustainability in Agriculture
9. Communicate Economic Concepts Effectively
10. Engage in Interdisciplinary Approaches
11. Apply Economic Principles to Real-World Agricultural Issues

Course content

The scope of the course unit include - Introduction: The subject matter of Agricultural Economics, The nature of Agricultural systems, The role of Agriculture in Economic Development, Influence of Agriculture in Poverty Reduction and Economic Development, Emerging perspectives in Agricultural Development (Paradigm Shifts); Agricultural Production Theory: Economics of Agricultural Production, Overview of Production Functions, The Profit Maximization (and duality – cost minimization), Efficiency in Resource Use, and Allocation, Behaviour under Risk and Uncertainty; Supply Response: Output Supply Functions, Estimation Methods (nature of Farm household decision making), Categories of Models, Empirical Applications and Case studies; Status of Science and Technology Policy in Agriculture: Technology transformation in Agriculture, Technology Transfer Pathways and Intellectual Property Rights, Enhanced Investment in Agricultural Science and Technology Advancement in Africa; Policy Analysis Matrix: Rationale and Objectives of Agricultural Policy, Policy Making processes, Identification of Stakeholders in Agricultural Policy making, Approaches to Agricultural Policy Analysis, Policy Reforms and Modernization in the Agricultural Sector in Africa, Food Policy Analysis; Contributions of Infrastructure and Rural Institutions to Agricultural Development: Land Markets and Tenure Systems, Communication Systems; Market Infrastructure; Agricultural Commodities Value Chain Analysis: Mapping and Domestication of the Chain Actors, Governance,

Coordination and Distribution along the Value Chain, Improved Efficiency for Profit Maximization, The role of international trade in agricultural economics and its implications for global food security.

Instructional Methods

The course will be delivered through a combination of lectures, case studies, interactive discussions, e-learning and hands-on practical sessions. Guest speakers from the industry and field visits to agri-tech companies may also be included.

Instructional Materials/ Equipment:

PowerPoint presentations, Textbooks, Access to online platforms and digital tools for interactive sessions, Demonstrations of digital farming equipment and sensors, and Simulation software for supply chain management and food processing.

Course Assessment:

CATS	40%
Final Examination	60%
Total	100%
Pass mark	50%

Core Reading Material

14. Kengo D. M. et. al (2021). Agriculture and Economic Development. *International Journal of Agriculture* Vol. 6 No. 1

15. Kenneth A. Reinert (2022). *Introduction to International Economics*, 2nd Edition: New Perspectives of the World Economy

16. John W. Mellor. (2017). *Agricultural Development and Economic Transformation: Promoting Growth with Poverty Reduction* (Palgrave Studies in Agricultural Economics and Food Policy) 1st Ed. Edition

Recommended Reference Materials

1. Reed, M.M. (2016). *International Trade in Agricultural products.* Prentice Hall
2. Norton, G.W., Alwang J. and Masters, W.A. (2014*). Economics of Agricultural Development: World Food System and Resource Use* (3rd Edition), New York Routledge
3. Hopkin P. (2017). *Fundamentals of Risk Management: Understanding, Evaluating, and Implementing Effective Risk Management*, 4th Edition. The Institute of Risk Management, New York USA
4. H. German. (2015). *Agricultural Finance: From Crop to Land, Water and Infrastructure*. John Wiley and Sons, West Sussex, England

5. T.Y. Sawyer. (2014). Financial Modelling for Business Owners and Entrepreneurs: Developing Excel Models to Raise Capital, Increase Cash Flows, Improve Operations, Plan Projects and Make Decisions. Apress.
6. Journal of Agricultural Policy. https://carijournals.org/shop/journal-agricultural-policy/
7. International Journal of Agricultural Policy and Research. https://journalissues.org/ijapr/
8. Food Policy. https://www.journals.elsevier.com/food-policy
9. American Journal of Agricultural Economics. https://onlinelibrary.wiley.com/journal/14678276
10. European Review of Agricultural Economics. https://academic.oup.com/erae
11. Journal of Agrarian Change. https://onlinelibrary.wiley.com/journal/1471036
12. Applied Economic Perspectives and Policy. https://onlinelibrary.wiley.com/journal/20405804
13. Global Food Security. https://www.journals.elsevier.com/global-food-security
14. Journal of Agriculture & Food Information. https://www.tandfonline.com/toc/wafi20/current

Course Code: AEB 5214
Course Title: Digital Technology for Agri-food Systems

Purpose of the Course:

The purpose of this course is to provide learners with cutting-edge knowledge and practical skills in applying digital technologies in the agri-food sector, fostering innovation, sustainability, and efficiency in agricultural practices and food systems across Africa. Learners will be prepared to drive digital transformation in agriculture, enhance food security, and contribute to economic development while addressing the challenges posed by climate change.

Expected Learning Outcomes of the Course:

Upon completion of this course, learners will be able to:

1. Understand the role of digital technologies in modern agri-food systems.
2. Analyze the impact of digital innovations on agricultural practices and food production.
3. Evaluate the benefits and challenges of adopting digital technologies in agri-food systems.
4. Demonstrate proficiency in utilizing various digital tools for farming, supply chain management, and food processing.
5. Develop strategies for integrating digital technologies into agricultural and food businesses.

Course Content:

Introduction to Digital Technologies in Agri-food Value Chain Systems; Overview of digital technologies in agriculture, Digital transformation in agri-food systems, Challenges and

opportunities in African agriculture Data Science and Analytics for Agri-food Value Chain Systems; Principles of data science in agri-food value chain systems, Remote sensing and GIS for precision agriculture, Big data analytics and its application in crop forecasting and pest management, IoT and Sensor Technologies in Agri-food Value Chain Systems; Introduction to IoT and sensors in farming, Design and deployment of sensor networks for soil, climate, and crop monitoring, Data management and analysis for informed decision-making, Smart Farming and Precision Agriculture; Principles of precision agriculture, Digital tools and technologies for site-specific crop management, Case studies: Success stories of precision farming, Agricultural Robotics and Automation; Overview of robotics in agriculture, Drones in crop monitoring and spraying, Autonomous tractors and robotic harvesters, Blockchain for Traceability in the Agri-Food Chain; Introduction to blockchain technology, Applications of blockchain for food safety and traceability, Case studies on blockchain adoption in agri-food systems, Digital Extension Services and Farmer Digital Literacy; Digital platforms for agricultural extension services, Strategies for enhancing digital literacy among farmers, Role of mobile technologies in reaching remote farmers, Digital Platforms for Market Access and Agri-Finance, Digital marketplaces for enhancing access to markets for smallholder farmers, Digital financial services (DFS) in agriculture: Opportunities and challenges, The role of mobile technology in providing agricultural advisory services, Innovation and Entrepreneurship in Agri-Tech; Ecosystem for agri-tech startups, Funding and scaling agri-tech solutions, Policy and regulatory environment for agri-tech innovation

Instructional Methods

The course will be delivered through a combination of lectures, case studies, interactive discussions, e learning and hands-on practical sessions. Guest speakers from the industry and field visits to agri-tech companies may also be included.

Instructional Materials/ Equipment:

PowerPoint presentations, Textbooks, Access to online platforms and digital tools for interactive sessions, Demonstrations of digital farming equipment and sensors, Simulation software for supply chain management and food processing

Course Assessment:

CATS	40%
Final Examination	60%
Total	100%
Pass mark	50%

Core Reading Materials for the Course:

1. Zhang, Q., Li, B., & Wang, L. (2018) *Precision Agriculture Technology for Crop Farming.* CRC Press

2. Klerkx, L., Jakku, E., & Labarthe, P. (2019) *A review of social science on digital agriculture, smart farming and agricultural innovation systems.* Elsevier Publications
3. Schroeder K., Lampietti J. and Elabed G. (2021). *What is cooking: Digital Transformation in Agri-Food Systems.* World Bank Publications.
4. Wolfert, S., Ge, L., Verdouw, C., & Bogaardt, M.-J. Y (2017) *Big Data in Smart Farming*. Elsevier Publications.
5. Lioutas, E. D., & Charatsari, C. (2020) *Smart Farming and Sustainable Agriculture.* Springer Publications.

Recommended Reference Materials:

1. Gelb, E., & Maru, A. (2018) *ICT in Agriculture: Perspectives of Technological Innovation.* World Bank Publications
2. Wong, K.-C., Zhang, D., & Jiang, T. (2017). *Big Data Analytics in Genomics.* Elsevier
3. Chatterjee, J. M., & Das, D. (2019). *Internet of Things in Agriculture*. The New Frontier. Publisher.
4. Singh, U. K., & Agrawal, D. P. (2016). *Wireless Sensor Networks for Agriculture.* CRC Press.
5. Zhang, Q., & Zhu, H. (2019). *Precision Agriculture Technology for Crop Farming.* CRC Press
6. Kumar, A., & Mishra, A. (2013). *Smart Farming Technologies for Sustainable Agricultural Development.* Springer Publisher.
7. Zhang, D., Li, Y., & Patnaik, S. (2014). *Robotics in Agriculture and Forestry.* Elsevier Publications.
8. Tapscott, D., & Tapscott, A. (2017). *Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World.* Elsevier Publisher.
9. Fredriksson, T. (2008). *Digital Technologies for Agricultural and Rural Development in the Global South.* Springer Publications.
10. Arner, D. W., Barberis, J., & Buckley, R. P. (2004). *Digital Finance: The New Frontier.* Springer Publications..
11. Koller, M. (2006). *Digital Marketing in the Food Sector.* CRC Press
12. Bronson, K.(2019). Looking through a responsible innovation lens at uneven engagements with digital farming. *NJAS - Wageningen Journal of Life Sciences*. Vol 90-91.Pgs: 90-94
13. Van der Burg, S., Bogaardt, M.-J., & Wolfert, S. (2019). Ethics of smart farming: Current questions and directions for responsible innovation towards the future. *NJAS - Wageningen Journal of Life Sciences.*Volume: 90-91Pages: 100289
14. Wolfert, S., Ge, L., Verdouw, C., & Bogaardt, M.-J. (2017). Big Data in Smart Farming - A review *Agricultural Systems Journal,* Vol 153 Issue 15 Pages 69-80

Course Code: AFB 5121

Course Title: Statistical Methods

Purpose of the course

Statistical Methods is a foundational course designed to introduce students to the principles and techniques of statistical analysis. The course covers a range of statistical methods commonly used in research and data analysis across various disciplines. Students will learn how to apply statistical techniques using statistical software (e.g. SPSS, R, STATA, and Python) for data analysis to summarize data, make inferences, and draw conclusions, preparing them for further study and research in their respective fields.

Expected Learning Outcomes of the Course

Upon completion of this course, students will be able to:

1. Understand Fundamental Statistical Concepts
2. Apply Descriptive Statistics
3. Analyze Probability Distributions
4. Perform Statistical Inference
5. Conduct Parametric and Nonparametric Tests
6. Utilize Correlation and Regression Analysis
7. Design and Evaluate Experiments
8. Apply Sampling Methods
9. Utilize Statistical Software
10. Critically Evaluate Statistical Findings

Course content

Organization, description and presentation of data; Design of experiments and surveys; Random variables, probability distributions, the binomial, Poisson, and the normal distributions; Statistical inference, tests of significance, confidence intervals; Inference for means and proportions, one-sample tests, two independent samples, paired data, t-tests, contingency tables; Analysis of variance and covariance; correlation analysis (Pearson and Spearman), Linear regression, least squares estimation, residuals and data transformations, Inference for regression coefficients, prediction, sampling, statistical computing skills and data management using statistical software (e.g. SPSS, R, STATA, and Python) for data analysis.

Instructional Methods

The course will be delivered through a combination of lectures, case studies, interactive discussions, e-learning and hands-on practical sessions. Guest speakers from the industry and field visits to agri-tech companies may also be included.

Instructional Materials/ Equipment:

PowerPoint presentations, Textbooks, Access to online platforms and digital tools for interactive sessions, Simulation software for supply chain management and food processing

Course Assessment:

CATS	40%
Final Examination	60%
Total	100%
Pass mark	50%

Core Reading Materials for the Course

1. Panter A.T. and Sonya K. Sterba. (2011). *Handbook of Ethics in Quantitative Methodology*. New York, NY: Routledge
2. C.Y. Joanne Peng. (2009). *Data Analysis Using SAS*. Los Angeles, CA: SAGE,
3. Leonard C. Onyiah. (2009). *Design and Analysis of Experiments: Classical and Regression Approaches with SAS*. Boca Raton, LA: CRC
4. Bartholomew D J., Steele, F., IriniMoustaki, and Jane Galbraith. (2008). *Analysis of Multivariate Social Science Data,* 2nd edition. Boca Raton, FL: CRC Press

Recommended Reference Materials

1. Menard, SW. (2002). *Applied Logistic Regression Analysis*, 2nd edition. Thousand Oaks, CA: Sage Publications
2. George Henry Dunteman and Moon-Ho R. Ho. (2006*). Introduction to Generalized Linear Models*. Thousand Oaks, CA: Sage Publication.
3. EunSul L and Ronald N. (2006). *Analyzing Complex Survey Data,* 2nd edition. Thousand Oaks, CA: Sage Publications.

Year 2 Semester 2

AFB 5221: Research Thesis II

Purpose of the course

This course is designed to enhance students' capacity to conduct independent field research and to communicate this in a research thesis and orally to the target community

Expected Learning Outcomes of the Course

Upon completion of the course the students should be able to:

1. Apply relevant designs for the process of research in agricultural commodity value chain management.

2. Conduct independent research for contribution to the body of knowledge in agricultural commodity value chain management.
3. Identify appropriate skills to effectively communicate research to target audience

Course Content

This course offers a capstone experience in which students conduct a research project and produce a thesis in a field related to their area of study. With guidance from an academic mentor, the student will conduct primary and secondary research which includes an academic literature search, research design, data analysis and discussion. The course allows the student to undertake advanced level research and produce a substantial piece of writing which advances knowledge in the selected field of research.

Instructional methods

The student will work with the supervisors to develop the proposal on an agreed topic, theme and title as necessary. The student will maintain at least a two weekly visit and discussion with the advisor

Instructional Materials and/or Equipment

The student will use the available referral material and other research materials availed on campus, internet and other sources as directed by the supervisors.

Course Assessment

No marks or grades will be awarded for the thesis proposal.

The proposal writing stage will be reported as satisfactory or not satisfactory. The supervisors will consult with each other before advising the student on the performance observed.

Core Reading Materials for the Course

1. Smith, I., & Felix, M. S. (2019). *A practical guide to dissertation and thesis writing*. Cambridge Scholars Publishing.

2. Committee on the Conduct of Science, National Academy of Sciences. (1995). On Being a Scientist. Washington, D.C.: National Academy Press. Also downloadable in pieces at https://books.nap.edu/books/0309051967/html/index.html
3. BBSRC (2009) "BBSRC Research Grants: The Guide", Research, Innovation and Skills Directorate BBSRC August 2009. http://www.bbsrc.ac.uk/funding/apply/grants_guide.pdf
4. Science and Technology Facilities Council (2009) "Research Grants Handbook", 09 October 2009. https://www.scitech.ac.uk/rgh/PDFs/rghAll.pdf

Recommended Reference Materials

1. Murray R. (2017). *How to write a thesis.* McGraw-Hill Education (UK)
2. Eco, U. (2015). *How to write a thesis*. MIT Press.

Appendix I: Facilities

Item		**Number**	**Capacity in (sq. m) and no. of students**	**Usage**	
				Specific to Department	**Shared**
Conference Halls		1	100		√
Lecture Room/Lecture Theatres		16	50	4	
Lecture Theatre	Auditorium	1	1000		√
	Assembly Hall	1	800		
Lecturer's Offices		20	20	4	
Postgraduate Research Laboratories		1	20		√
Library		1	400		√
Postgraduate Seminar room		1	15		√
Computer Lab		2	40		2
Studios		1	10		√
Examination rooms		2	5		√
Admissions Office		1	7		√
Academic leader's offices		2	4		√
Insect repository		1	20		√
Insect farm		1			√
Board of postgraduate office		3	6		√
Internet Access points		8	800		√

4.2 Appendix II: Equipment and Teaching Materials

Item	Type	Number	Capacity	Usage	
				Specific to Department	Shared
Desk Top Computers (PCS)	HP	480	60	50	430
Laptops/Note Books	HP	22		2	20
Projectors Power Point-Projectors	Epson, Sony, Benq	22		3	19
Smart boards	Smart	4		0	√
Scanner	HP, Kyocera	10			10
Printers	HP, Kyocera	80		2	78
Computer Software	Win 7, 8, 10				√
	Jaws				√
	Ms Office				√
	ARC GIS software				√
	ERDAS				√
Others(specify)	Wireless network	8	30 bandwidth		√
	LAN	8			√

Appendix III: Core-texts and journals

S/No	Subject Area	No. of Titles	Volumes	Journals (No. of titles)	Remarks
1.	Thesis I and Fieldwork Practicum to Agricultural Commodities Value Chain Management	**Core Reading Materials for the Course** 5. Kornuta, H. M., & Germaine, R. W. (2019). *A concise guide to writing a thesis or dissertation: Educational research and beyond*. Routledge. 6. Science and Technology Facilities Council (2009) "Research Grants Handbook", 09 October 2009.			

		http://www.scitech.ac.uk/rgh/PDFs/rghAll.pdf 7. MLA (2008). Style Manual and Guide to Scholarly Publishing, third edition. Published: ISBN: 9780873522977 (hardcover), ISBN: 9780873522984 8. Galvan, J. L., & Galvan, M. C. (2017). *Writing literature reviews: A guide for students of the social and behavioral sciences*. Routledge. **Recommended Reference Materials** 3. Reich, J., Tingley, D., Leder-Luis, J., Roberts, M. E., and Stewart, B. M. (2015). Computer assisted reading and discovery for student generated text in massive open online courses. *Journal of Learning Analytics.* 4. JOOUST Postgraduate Guidelines Handbook.	3		
2.	Food Value Chain Management	**Core reading materials:** 4. Pullman, Madeleine, and Zhaohui Wu. (2021). *Food supply chain management: building a sustainable future*. Routledge 5. Bourlakis, Michael A., and Paul W H Weightman (2008) eds. *Food supply chain management*. John Wiley & Sons. 6. Eastham, Jane, Liz Sharples, and Stephen Ball. (2007). eds. *Food supply chain management*. Taylor & Francis. **Recommended Reference Materials** 12. Pullman, Madeleine, and Zhaohui Wu. (2012). *Food supply chain management: Economic, social and environmental perspectives*. Routledge,			

		13. Cucagna, Maria Emilia, and Peter D. Goldsmith. (2018): "Value adding in the agri-food value chain." *International food and agribusiness management review* 21.3 293-316. 14. Narula, Sapna A., and S. P. Raj. "Sustainable Food Value Chain Development." 15. Bourlakis, Michael A., and Paul WH Weightman. (2004). "Food Supply Chain Management." 16. Bijman, Jos, et al., (2006). eds. *International agri-food chains and networks: management and organization*. Wageningen Academic Publishers,			
3.	Agricultural Economics	**Core Reading Material** 17. Kengo D. M. et. al (2021). Agriculture and Economic Development. *International Journal of Agriculture* Vol. 6 No. 1 18. Kenneth A. Reinert (2022). *Introduction to International Economics*, 2nd Edition: New Perspectives of the World Economy 19. John W. Mellor. (2017). *Agricultural Development and Economic Transformation: Promoting Growth with Poverty Reduction* (Palgrave Studies in Agricultural Economics and Food Policy) 1st Ed. Edition. 20. T.Y. Sawyer. (2014). Financial Modelling for Business Owners and Entrepreneurs: Developing Excel Models to Raise Capital, Increase Cash Flows, Improve Operations, Plan Projects and Make Decisions. Apress. **Recommended Reference Materials** 21. Reed, M.M. (2016). *International Trade in Agricultural products.* Prentice Hall. 22. Norton, G.W., Alwang J. and Masters, W.A. (2014). *Economics of Agricultural Development: World*			

		Food System and Resource Use (3rd Edition), New York Routledge 23. Hopkin P. (2017). *Fundamentals of Risk Management: Understanding, Evaluating, and Implementing Effective Risk Management*, 4th Edition. The Institute of Risk Management, New York USA 24. H. German. (2015). *Agricultural Finance: From Crop to Land, Water and Infrastructure*. John Wiley and Sons, West Sussex, England Journal of Agricultural Policy. https://carijournals.org/shop/journal-agricultural-policy/ International Journal of Agricultural Policy and Research. https://journalissues.org/ijapr/ 3.FoodPolicy. https://www.journals.elsevier.com/food-policy 4.American Journal of Agricultural Economics. .https://onlinelibrary.wiley.com/journal/14678276 5.European Review of Agricultural Economics. https://academic.oup.com/erae 6.Journal of Agrarian Change. https://onlinelibrary.wiley.com/journal/1471036 7.Applied Economic Perspectives and Policy. https://onlinelibrary.wiley.com/journal/20405804 8.Global Food Security. https://www.journals.elsevier.com/global-food-security 9. Journal of Agriculture & Food Information. https://www.tandfonline.com/toc/wafi20/current			

4	Food quality, Safety and Risk Management	**Core Reading Materials for the Course** 1. Hathaway, S. C. (1993). Risk assessment procedures used by the Codex Alimentarius Commission and its subsidiary and advisory bodies. ALINORM 93/97. Codex Alimentarius Commission. Geneva, 28 June - 7 July. FAO, Rome. 2. Inteaz A. (2004) Food Quality Assurance, Principles and Practices, CRC, First Edition. 3. FAO/WHO. (1995). Application of risk analysis to food standards issues. Report of the Joint FAO/WHO Expert Consultation. Geneva, 13 - 17 March. WHO, Geneva. 4. FAO/WHO. (1995). Codex Alimentarius Commission: Procedural Manual. (Ninth Editin). FAO, Rome. 5. FAO/WHO, (1996). Report of the twelfth session of the Codex Committee on general principles. Paris, 25 - 28 November. ALINORM 97/33. Codex Alimentarius Commission. FAO, Rome. 6. FAO/WHO, (1995). Statements of principle concerning the role of science in the codex decision-making process and the extent to which other factors are taken into account. **Recommended Reference Materials**			

		1. FAO/WHO, 1996. Proposed draft guidelines for the design, operation, assessment and accreditation of food import and export inspection and certification systems. Sydney, 19 -23 February. FAO, Rome. 2. FAO/WHO, 1996. Report of the fourth session of the Codex Committee on Food Import and Export Inspection and Certification Systems. ALINORM 97/30. Sydney, 19 – 23 February. FAO, Rome. 3. FAO/WHO, 1995. Report of the twenty-first session of the Joint FAO/WHO Codex Alimentarius Commission. ALINORM 95/37. Rome, 3 - 8 July. FAO, Rome. 4. FAO/WHO, 1995. Report of the twenty-eighth session of the Codex Committee on Food Hygiene. ALINORM 97/13. Washington, D.C., 27 November - 1 December. FAO			
5.	Food processing technology	**Core Reading Materials for the Course:** 5. Brennan, J. G., & Grandison, A. S. (2012). *Food processing handbook*. Weinheim, Germany: Wiley-Vch. 6. Fellows, Peter John. (2022). *Food processing technology: principles and practice*. Woodhead publishing. 7. Knorr, D. (1999). Novel approaches in food-processing technology: new technologies for preserving foods and modifying function. *Current opinion in biotechnology*, *10*(5), 485-491.			

		8. Ravichandran, R. (2010). Nanotechnology applications in food and food processing: innovative green approaches, opportunities and uncertainties for the global market." *International Journal of Green Nanotechnology: Physics and Chemistry* 1.2: P72-P96. **Recommended Reference Materials** 8. Smith, J. Scott, and Yiu H. Hui, (2008). *Food processing: principles and applications*. John Wiley & Sons. 9. Misra, N. N., et al. (2017). "Landmarks in the historical development of twenty first century food processing technologies." *Food Research International* 97: 318-339. 10. Priyadarshini, A., Rajauria, G., O'Donnell, C. P., & Tiwari, B. K. (2019). Emerging food processing technologies and factors impacting their industrial adoption. *Critical reviews in food science and nutrition*, *59*(19), 3082-3101. 11. Brunner, G. (2005). Supercritical fluids: technology and application to food processing. *Journal of food engineering*, *67*(1-2), 21-33. 12. Marc, Romina Alina, Antonio Valero Díaz, and Guiomar Denisse Posada Izquierdo, (2020). *Food Processing*. BoD–Books on Demand. 13. Stumbo, C. R. (2013). *Thermobacteriology in food processing*. Elsevier. 14. Jain, A., Ranjan, S., Dasgupta, N., & Ramalingam, C. (2018). Nanomaterials in food and agriculture: an overview on their safety concerns and regulatory issues. *Critical reviews in food science and nutrition*, *58*(2), 297-317.			

6.	Agripreneurship and product development	**Core Reading Materials for the Course** 5. Jean Vasile, A., Subic, J., Grubor, A., & Privitera, D. (2019). *Handbook of research on agricultural policy, rural development, and entrepreneurship in contemporary economies*. IGI Global. 6. Mungai, C. (2018). Innovative Business Models for Smallholder Farmers: A Case Study of Agricultural Entrepreneurs in Africa. FAO. 7. Kumar, D. (2015). *Entrepreneurship in Agriculture*. Satish Serial Publishing House, 1st edition. 8. Casson, M. (2008). *The Oxford handbook of entrepreneurship*. Oxford University Press. **Recommended Reference Materials** 8. Marioti, S. (2007*). Entrepreneurship: How to Start & Operate a Small Business*, 10th Edition. Pearson, pp. 660. 9. Scarborough, N. (2011). *Effective Small Business Management*, 10th Edition. Pearson, pp. 888. 10. Spinelli, S. and Adams, R. (2015). *New Venture Creation: Entrepreneurship for the 21st Century (Irwin Management)*, 10th Edition. McGraw-Hill Education, pp. 512.			

		11. Sutton, G. (2012). Writing Winning Business Plans: How to Prepare a Business Plan that Investors Will Want to Read and Invest In. RDA Press, LLC, pp. 210. 12. Journal of Research in Marketing and Entrepreneurship. Open Access. 13. Journal of The Handbook of Research on Entrepreneurship in Agriculture and Rural Development. Edited by Gry Agnette Alsose, Sara Carter, Elisabet Ljunggren and Friederike Welter. 14. The Journal of Entrepreneurship			
7.	Crop, livestock and fish value chain management	**Core Reading Materials for the Course:** 4. Black, R. (2019). *Strategic management in the value chain.* Routledge. 5. Gereffi, G. (2017). *Global value chains and development: Redefining the contours of 21st-century capitalism*. Cambridge University Press. 6. Coyle, J. J., Langley, C. J., & Novack, R. A. (2016). *The management of business logistics: A supply chain perspective*. Cengage Learning. **Recommended Reference Materials:** 7. Fuglie, K. O., & Rada, N. E. (2013). Resource productivity, competitiveness, and the global food system. *International Food and*			

		Agribusiness Management Review, 16(B). 8. Porter, M. E., & Kramer, M. R. (2011). Creating shared value. *Harvard business review, 89*(1-2), 62-77. 9. Talalwe, M., & Morrison, A. (2017). *Effective agricultural supply chain management*. Springer. 10. Christopher, M. (2016). *Logistics & supply chain management*. Pearson UK. 11. Van Der Meer-Kooistra, J., Vosselman, E. G. J., & Ven, B. V. D. (2019). Management control of inter-organizational relationships: *Analysis of a new flexible organizational form*. Springer. 12. Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of international political economy, 12*(1), 78-104.			
8.	Sustainability for Commodity and food value chains	**Core Reading Materials** 4. Developing Sustainable Food Value Chains: Guiding Principles (2024). FAO. 5. Terry Marsden, Adrian Morley, and Fiona Morgan. (2014). *Sustainable Food Systems: Building a New Paradigm.* Routledge. 6. *Margaret A. Oliver, Thomas F.A. Bishop and Ben P. Marchant* (2013). *Precision Agriculture for Sustainability and Environmental Protection.* Routledge. **Recommended Reading Materials** 7. Sustainable Supply Chain Management: Practical Ideas for Moving Towards Best Practice" by David B. Grant and Alexander Trautrims			

		8. Food Supply Chain Management and Logistics: From Farm to Fork" by Ioannis Minis and Vasileios Zeimpekis. 9. The New Food Activism: Opposition, Cooperation, and Collective Action" by Alison Alkon and Julie Guthman. 10. Sustainability in Food Supply Chain Management" edited by Usha Jindal. 11. Developing sustainable food supply chains. Philosophical Transactions of the Royal Society B: Biological Sciences, 363 (1492): 849–861. 12. https://openknowledge.fao.org/server/api/core/bitstreams/35fc8778-32c8-49e9-8b54-e923cdd07647/content			
9.	Research Methods	**Core Reading Materials for the Course** 6. Walliman, Nicholas. (2021). *Research methods: The basics*. Routledge. 7. Patten, Mildred L. (2016). *Understanding research methods: An overview of the essentials*. Routledge. 8. Blumberg, Boris, Donald Cooper, and Pamela Schindler. (2014). *EBOOK: Business research methods*. McGraw Hill. 9. Bryman, Alan. (2013). *Research methods and organization studies*. Routledge. 10. Richards, Keith, Steven Ross, and Paul Seedhouse. (2012). *Research methods for applied language studies: An advanced resource book for students*. New York: Routledge. **Recommended Reference Materials**			

		1. Randolph, Justus J. (2008). *Multidisciplinary methods in educational technology research and development*. HAMK Press. 2. Van Dijk, Teun A. (2011). *Discourse studies: A multidisciplinary introduction*. Sage. 3. Tritter, Jonathan. (2007). "Mixed methods and multidisciplinary research in health care." *Researching health: Qualitative, quantitative and mixed methods*. 4. Spencer, Steve, and Gary Taylor (2004). *social identities: Multidisciplinary approaches*. Routledge.			
10.	Digital technology for Agri-food system	**Core Reading Materials for the Course:** 6. Zhang, Q., Li, B., & Wang, L.(2018) *Precision Agriculture Technology for Crop Farming.* CRC Press 7. Klerkx, L., Jakku, E., & Labarthe, P. (2019) *A review of social science on digital agriculture, smart farming and agricultural innovation systems.* Elsevier Publications 8. Schroeder K., Lampietti J. and Elabed G. (2021). *What is cooking: Digital Transformation in Agri-Food Systems.* World Bank Publications. 9. Wolfert, S., Ge, L., Verdouw, C., & Bogaardt, M.-J. Y (2017) *Big Data in Smart Farming*. Elsevier Publications. 10. Lioutas, E. D., & Charatsari, C. (2020) *Smart Farming and Sustainable Agriculture.* Springer Publications. **Recommended Reference Materials:**			

		1. Gelb, E., & Maru, A. (2018) *ICT in Agriculture: Perspectives of Technological Innovation.* World Bank Publications 15. Wong, K.-C., Zhang, D., & Jiang, T. (2017). *Big Data Analytics in Genomics.* Elsevier 16. Chatterjee, J. M., & Das, D. (2019). *Internet of Things in Agriculture*. The New Frontier. Publisher. 17. Singh, U. K., & Agrawal, D. P. (2016). *Wireless Sensor Networks for Agriculture.* CRC Press. 18. Zhang, Q., & Zhu, H. (2019). *Precision Agriculture Technology for Crop Farming.* CRC Press 19. Kumar, A., & Mishra, A. (2013). *Smart Farming Technologies for Sustainable Agricultural Development.* Springer Publisher. 20. Zhang, D., Li, Y., & Patnaik, S. (2014). *Robotics in Agriculture and Forestry.* Elsevier Publications. 21. Tapscott, D., & Tapscott, A. (2017). *Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World.* Elsevier Publisher. 22. Fredriksson, T. (2008). *Digital Technologies for Agricultural and Rural Development in the Global South.* Springer Publications. 23. Arner, D. W., Barberis, J., & Buckley, R. P. (2004). *Digital Finance: The New Frontier.* Springer Publications.. 24. Koller, M. (2006). *Digital Marketing in the Food Sector.* CRC Press 25. Bronson, K.(20190 Looking through a responsible innovation lens at uneven engagements with digital farming. *NJAS - Wageningen Journal of Life Sciences.* Vol 90-91.Pgs: 90-94 26. Van der Burg, S., Bogaardt, M.-J., & Wolfert, S. (2019). Ethics of smart farming: Current questions and directions for responsible innovation			

		towards the future. *NJAS - Wageningen Journal of Life Sciences.*Volume: 90-91Pages: 100289 27. Wolfert, S., Ge, L., Verdouw, C., & Bogaardt, M.-J. (2017). Big Data in Smart Farming - A review *Agricultural Systems Journal,* Vol 153 Issue 15 Pages 69-80			
11.	Statistical Methods	**Core Reading Materials for the Course** 5. Panter A.T. and Sonya K. Sterba. (2011). *Handbook of Ethics in Quantitative Methodology*. New York, NY: Routledge 6. C.Y. Joanne Peng. (2009). *Data Analysis Using SAS*. Los Angeles, CA: SAGE, 7. Leonard C. Onyiah. (2009). *Design and Analysis of Experiments: Classical and Regression Approaches with SAS.* Boca Raton, LA: CRC 8. Bartholomew D J., Steele, F., IriniMoustaki, and Jane Galbraith. (2008). *Analysis of Multivariate Social Science Data*, 2nd edition. Boca Raton, FL: CRC Press **Recommended Reference Materials** 4. Menard, SW. (2002). *Applied Logistic Regression Analysis*, 2nd edition. Thousand Oaks, CA: Sage Publications 5. George Henry Dunteman and Moon-Ho R. Ho. (2006*). Introduction to Generalized Linear Models*. Thousand Oaks, CA: Sage Publication. 6. EunSul L and Ronald N. (2006). *Analyzing Complex Survey Data,* 2nd edition. Thousand Oaks, CA: Sage Publications.			
12.	Research Thesis II	**Core Reading Materials for the Course** 5. Smith, I., & Felix, M. S. (2019). *A practical guide to dissertation and*			

		thesis writing. Cambridge Scholars Publishing. 6. Committee on the Conduct of Science, National Academy of Sciences. (1995). On Being a Scientist. Washington, D.C.: National Academy Press. Also downloadable in pieces at https://books.nap.edu/books/0309051967/html/index.html 7. BBSRC (2009) "BBSRC Research Grants: The Guide", Research, Innovation and Skills Directorate BBSRC August 2009. http://www.bbsrc.ac.uk/funding/apply/grants_guide.pdf 8. Science and Technology Facilities Council (2009) "Research Grants Handbook", 09 October 2009. https://www.scitech.ac.uk/rgh/PDFs/rghAll.pdf **Recommended Reference Materials** 3. Eco, U. (2015). *How to write a thesis*. MIT Press. 4. Murray, R. (2017). *How to write a thesis*. McGraw-Hill Education (UK).			

Appendix IV

LIST OF ACADEMIC STAFF AND QUALIFICATIONS

S/No.	Name	Grade	Qualification	Specialization
1	Prof. Christopher O. Gor- Course Leader	Associate Professor	PhD	Agricultural Economics
2	Prof. Stephen Gaya Agong	Professor	PhD	Horticulture
3	Prof. Dennis Ochuodho	Professor	PhD	Ecology
4	Prof. Reuben O. Mosi	Professor	PhD	Animal Breeding
5	Prof. Monica A. Ayieko	Emeritus	PhD	Consumer Economics
6	Prof. Adrian W. Mukhebi	Emeritus Professor	PhD	Agricultural Economics
7	Prof. Maria Onyango	Associate Prof.	PhD	Entrepreneurship Development
8	Prof. Arnold O. Watako	Associate Professor	PhD	Horticulture
9	Prof. Darius O. Andika	Associate Professor	PhD	Environmental Horticulture
10	Prof. Felix Ngetich	Associate Prof.	PhD	Soil Science
11	Prof. Erick Okuto	Associate Prof.	PhD	Statistics
12	Dr. Michael Nyagol	Senior Lecturer	PhD	Economics
13	Dr. Mary Orinda – Deputy Course Leader	Senior Lecturer	PhD	Agribusiness Management
14	Dr. ArvinLucy Onditi	Senior Lecturer	PhD	Marketing
15	Dr. Dorothy Onyango	Senior Lecturer	PhD	Food Technology
16	Dr Edwins Baraza	Senior Lecturer	PhD	Business Administration
17.	Dr. Vitalis Mogwambo	Senior Lecturer	PhD	Finance
18.	Dr. Calleb O. Olweny	Senior Lecturer	PhD	Plant Breeding and Biotechnology
19.	Dr. Peter Bulli	Senior Lecturer	PhD	Plant Genetics
20.	Dr. Elijah Museve	Senior Lecturer	PhD	Finance
21.	Dr. Alice N. Muriithi	Lecturer	PhD	Horticulture
22.	Dr. Walter Akuno	Lecturer	PhD	Agricultural Extension
23.	Dr. Lydia Nyambok	Lecturer	PhD	Agricultural, Environmental

				and Food Economics
24.	Dr. Matilda Ouma	Lecturer	PhD	Agricultural and Rural Innovation
25.	Dr. Romana Mbinya	Lecturer	PhD	Agricultural Extension
26.	Prof. Barack Owuor	Adjunct	PhD	Crop Science
27.	Prof. Chris Ojiewo	Adjunct	PhD	Seed Systems
28.	Prof. William Ogara	Adjunct	PhD	Plant Science

4.5 Appendix V: University Procedures on Curriculum Design and Review

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

DOCUMENT : PROCEDURE FOR CURRICULUM DESIGN AND REVIEW

DOC. NO : JOOUST/AA/OP 10

AUTHORIZED BY : VICE-CHANCELLOR SIGN:

ISSUED BY : DEPUTY VICE-CHANCELLOR SIGN:

ACADEMIC AFFAIRS

0.1 DOCUMENT DISTRIBUTION

S. NO	TYPE	OFFICE
(ii)	Copy	VC

(iii)	**Copy**	**DVC, AA**
(v)	**Copy**	**Principal, Deans, Directors and CoDs**

0.2 DOCUMENT CHANGES

DATE	CHANGES	AUTHORIZED BY
……	……	……..

1.0 Purpose: To ensure effective curriculum design and review for academic programmes in JOOUST

2.0 Scope: It covers effective design, development, review and implementation of

3.0 References: 4.1 ISO 9001:2015 Standard

4.3 KEBS Academic Quality Standards

4.5 JOOUST Statutes

4.0 Abbreviations/Acronyms and Definitions

4.1 JOOUST: Jaramogi Oginga Odinga University of Science and Technology

4.2 CUE Commission for University Education

4.2 QMR: Quality Management Representative

4.3 VC: Vice-Chancellor

4.4 DVC AA: Deputy Vice-Chancellor, Academic Affairs

4.5 RAA: Registrar Academic Affairs

4.6 COD: Chairman of Department

4.7 Curriculum: The academic content of a given programme.

4.8 School Board: Decision organ in a School or Faculty with similar

4.9 Senate Top academic organ of the University

5.0 Principal responsibility: DVC AA shall be responsible for the implementation of this procedure.

6.0 Method

6.1 Dean/CoD shall ensure collection and collation of interested parties views on the need to design new curriculum every two years or/and as need arise.

6.2 Dean/CoD shall ensure collection and collation of interested parties views on the need to review existing programmes which have been implemented for a full cycle or/and as need arise.

6.3 Dean/CoD shall ensure interested parties views are collected using appropriate data collection methods such as surveys, administration of questionnaires, interested parties forums, media contacts, research reports, commissioned studies, customer feedback among others.

6.4 The Dean/CoD shall ensure collected and collated views are used to design new or review the existing programme.

6.5 The Dean/CoD shall present the proposed new/reviewed programmes to the School/Departmental Boards for consideration and recommendation.

6.6 The Dean shall forward the new/reviewed programme to DVC, AA for tabling in the Deans Committee.

6.7 The Dean shall present the proposed new/reviewed programme to the Deans Committee for consideration and recommendation.

6.8 The DVC, AA shall present the proposed new/reviewed programme to the Senate for consideration and approval.

6.9 The VC shall forward the approved programme to the Commission for University

Education (CUE) and/or professional body for accreditation.

6.10 If the programme is not approved at any stage, it shall be reverted to the proposer to incorporate and implement the views/decisions as suggested.

6.11 The VC shall communicate the decision of the CUE and/or professional body to the

DVC, AA

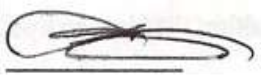
6.12 The DVC, AA shall communicate the results to the Dean/CoD.

1.13 The Dean/CoD shall mount the new/revised programme if accredited.

4.6 Appendix VI: University Procedures on Teaching

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

DOCUMENT: **PROCEDURE FOR TEACHING**
DOC. NO: **JOOUST/VC/AA/OP 12**

AUTHORIZED BY : VICE-CHANCELLOR **SIGNATURE:** 

ISSUED BY : DEPUTY VICE-CHANCELLOR **SIGNATURE:** 

ACADEMIC AFFAIRS

0.1 DOCUMENT DISTRIBUTION

S. NO	TYPE	OFFICE
ii.	Copy	VC
iii.	Copy	DVC, AA

0.2 DOCUMENT CHANGES

DATE	CHANGES	AUTHORIZED BY
……..	……..	……..

…….. …… ……..

…..... ……... ……..

1.0 Purpose:

To ensure effective teaching.

2.0 Scope :

It covers all aspects of teaching in the University.

3.0 References:

i. ISO 9001:2015 Standard ii.
JOOUST Quality Manual iii.
JOOUST Statutes

iv. JOOUST Service Charter

v. Statutory & Regulatory Requirements vi.

JOOUST Student Rules & Regulations

4.0 Abbreviations /Acronyms and Definition of terms:

i. **CoD:** Chairperson of Department

iii. **JOOUST**: Jaramogi Oginga Odinga University of Science and Technology

v. **R (AA):** Registrar, Academic Affairs

vii. **VC:** Vice-Chancellor

5.0 Responsibility: DVC, AA shall be responsible for the implementation of this procedure.

6.0 Method

6.1 Course Distribution

6.1.1 The Dean/CoD shall convene a School/Departmental board meeting to allocate courses to lecturers at least one month before the beginning of each Semester.

6.1.2 School/Departmental Board shall recommend engagement of part-time lecturers for courses where there are shortfalls in full time staff at least three

weeks before the beginning of each Semester.

6.1.3 The Dean shall forward part-time lecturer requirements to the DVC,AA for processing of appointments.

6.2 Course Outline

6.2.1 The lecturer shall develop and submit the course outline to the Dean/CoD for approval two weeks to the beginning of the semester.

6.2.2 The lecturer shall ensure course outline contains the Course title, code, objectives, subject matter, mode of evaluation and references.

6.2.3 The lecturer shall distribute duly approved course outline to the students at the beginning of lectures.

6.3 Delivery of Lectures

6.3.1 The Timetabling Coordinator shall forward teaching time table to the Schools/departments and post the same on the student's notice boards at the beginning of each semester.

6.3.2 The lecturer shall give the lecture and/or administer practical lessons as timetabled

6.3.3 The lecturer shall administer an attendance register in each session.

6.3.4 Lecturer shall ensure all the practical lessons are performed according to the relevant procedures.

6.4 Evaluation

Class Attendance

6.4.1 The R,AA shall develop and distribute a standard class attendance register to

Schools/Departments at least one week before the lectures begin.

6.4.2 The lecturer shall submit the duly filled registers and analysis monthly to the Dean/CoD

6.4.3 The Dean/CoD shall submit the analysis to R, AA two weeks before examinations for necessary action. (Refer to **JOOUST/AA/R/OP 13**: Procedure for Examinations).

Course Evaluation

6.4.4 The Director Quality Enhancement and Assurance shall develop and distribute course evaluation forms to the Deans/CoD two weeks to the beginning of examinations.

6.4.5 SA shall administer the forms to the students.

6.4.6 School Administrators shall submit the duly filled forms to the Director Quality Enhancement and Assurance through the Deans/CoD at the end of each semester.

6.4.7 The Director QEA shall analyse the forms, compile a report and submit it to the VC for action.

Examination

6.4.8 The lecturers shall administer Continuous Assessment Tests (CATs) and end of semester examination as per *procedure **JOOUST/AA/R/OP 13**: Procedure for Examinations*

4.7 Appendix VII: University Procedures on Management of Examinations

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

DOCUMENT : PROCEDURE FOR MANAGEMENT OF EXAMINATIONS DOC.
NO : JOOUST/AA/R /OP 11

AUTHORIZED BY : DEPUTY VICE-CHANCELLOR SIGN: .....

ACADEMIC AFFAIRS

ISSUED BY : REGISTRAR SIGN: .....

ACADEMIC AFFAIRS

0.1 DOCUMENT DISTRIBUTION

S. NO	TYPE	OFFICE
ii.	Copy	VC
iii.	Copy	DVC AA
v.	Copy	Principal, Deans and Directors (v)

0.2 DOCUMENT CHANGES

DATE	CHANGES	AUTHORIZED BY
…….	…….	…….…….
……..	……...	……..……

1.0 Purpose: To ensure proper, efficient and effective process for managing examinations.

2.0 Scope: It covers the administration of examinations, issuance of examination results and academic transcripts and certificates.

3.0 References:

i. ISO 9001:20015 Standard
ii. ii. JOOUST Quality Manual iii. JOOUST Statutes
iii. JOOUST Service Charter
iv. JOOUST Examination Policy

v. JOOUST Examination Rules and Regulations

4.0 Abbreviations /Acronyms and Definition of terms

i **CoD:** Chairperson of Department.
ii **Dean**: Head of School
iii **DVC, AA:** Deputy Vice Chancellor, Academic Affairs
iv **EO:** Examination Office
v **JOOUST**: Jaramogi Oginga Odinga University of Science and Technology
vi **QMR**: Quality Management Representative
vii **R,AA:** Registrar Academic Affairs
viii. **VC:** Vice-Chancellor

5.0 Responsibility:

R, AA shall be responsible for the implementation of this procedure**.**

6.0 Method

6.1 Setting examinations

week before commencement of the semester.

after commencement of the Semester.

6.1.2.1 Course lecturers shall forward examination question papers in soft and hard copies and marking Schemes to the Deans a week after receiving the notice.

6.2 Appointment of External Examiners

1.2.1 Deans shall identify External Examiners and forward their names to R,AA, one week after commencement of semester.

1.2.2 R,AA shall table the names of External Examiners at Deans Committee for discussion one month after commencement of the semester.

1.2.3 Deans Committee shall recommend to Senate the names of External Examiners for appointment.

1.2.4 DVC, AA shall table the names at Senate for approval one week after the Deans Committee meeting.

6.2.5 DVC, AA shall prepare and release appointment letters to External examiners within one week after Senate approval.

6.3 Moderation

6.3.1 Deans shall organize for internal moderation one week after receiving the examinations.

6.3.2 Deans shall forward internally moderated examination question

papers to External Examiners for further moderation one week after internal moderation.

6.3.4 Deans shall receive back moderated examination papers from the External Examiners one week after moderation.

6.3.5 Deans shall submit the externally moderated examination question papers (both soft and hard copies) to R,AA within one week after receiving them from the External Examiners.

6.4 Examination Processing

6.4.1 R,AA shall oversee the printing, collation, stapling and packaging of the examinations.

6.4.2 R,AA shall ensure safe and proper storage of examination question papers.**6.5 Registration for Examinations**

6.5.1 R,AA shall prepare registration schedules

6.5.2 R,AA shall release a circular to students informing them of the examination registration dates at least five weeks before the start of examinations.

6.5.3 R,AA shall register students at least four weeks before the start of examination

6.5.4 R,AA shall issue examination cards to fully registered students.

6.5.5 Teaching and Examination Time-Table Coordinator shall release examination time-tables to students and invigilators at least two weeks before the examinations begin.

6.6 Examination Security

6.6.1 R,AA shall receive examination question papers from the Deans at least five weeks before the examinations begin.

6.6.2 R,AA shall register and pack individual examination question papers and store them in a

secure safe.

6.7 Conduct and Invigilation of Examinations

6.7.1 RAA shall coordinate and supervise the conduct of examinations.

6.7.1 EO shall release examinations to Chief Invigilators at least half an hour before the start of all respective examinations.

6.7.2 Invigilators shall administer examination attendance registers during each session and ensure that all students have legitimate examination cards.

6.7.3 Invigilators shall supervise the students while writing the examinations.

6.7.4 The invigilator shall forward the students examination scripts to the course lecturer.

6.8 Marking of Examinations

6.8.1 Course lecturers shall mark the examinations within two weeks after the end of examinations.

6.8.2 Course lecturers shall forward the marksheets, scripts and marking schemes to the Deans of

Schools within two weeks after the end of the examinations

6.9 Processing Examination Results

6.9.1 Director, Quality Assurance and Enhancement shall invite External Examiners for moderation of examination results one week after the end of marking.

6.9.2 External Examiners shall moderate results and forward their reports to the VC immediately after moderation.

6.9.3 CoDs shall convene Departmental Boards of Examiners to consider the results one week after external moderation.

6.9.4 Deans shall convene School Boards of Examiners to discuss the results one week after receiving results from Departmental Boards.

6.9.5 Deans shall forward provisional results to Deans Committee for consideration and recommendation to Senate.

6.9.6 DVC,AA shall forward provisional results to Senate for final approval.

6.9.7 DVC,AA shall release provisional results after Senate's approval.

6.9.8 Deans shall issue provisional academic transcripts to students two weeks after approval of results by Senate.

6.9.9 DVC,AA shall release final transcripts to students within two weeks after graduation.

6.10 Examination Irregularities, Leakage, Remarking

Invigilators/Lecturers shall handle irregularities, leakages and remarking as provided for in the Student Rules and Regulations.

6.11Replacement of Transcripts

6.11.1 The student shall pay requisite fees and fill in a transcript replacement form.

6.11.2 RAA shall receive the dully filled form and forward to respective Deans for recommendation within two days of receipt.

6.11.3 RAA shall inform the students within three days to collect their transcripts.

6.11.4 Students shall sign a transcript receiving form.

APPENDIX VIII: NEEDS ASSESSMENT REPORT

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

ERASMUS CHAIN PROJECT

REPORT ON THE ERASMUS NEEDS ASSESSMENT FIELDWORK

REPORT COMPILED BY

MR. SAMUEL OHANGA

PROJECT MANAGER

EXECUTIVE SUMMARY

The Erasmus CHAIN project conducted comprehensive needs assessment fieldwork between Thursday, 7th December, and Wednesday, 29th December 2023 in eight Kenyan counties, namely Siaya, Kisumu, Kericho, Homa Bay, Migori, Bungoma, and Busia. The project aimed to understand the challenges faced by farmers and stakeholders in the agricultural value chain, with a focus on training, postgraduate education, and curriculum innovation. The findings are synthesized below:

KEY FINDINGS:

1. Regional Specifics:

- **Unique Agricultural Characteristics:** Each county exhibited unique agricultural challenges. For instance, Kisumu faced issues related to inadequate infrastructure, whereas Kericho grappled with rocky terrain and poor network coverage.

2. Postgraduate Education:

- **Dissatisfaction with Training:** Stakeholders expressed dissatisfaction with the quality of training and caliber of graduates in agriculture-related disciplines across various institutions.

3. Curriculum Recommendations:

- **Practical Training:** Stakeholders recommended an increased emphasis on practical, hands-on training, including extended farm internships to bridge the gap between theoretical knowledge and real-world application.

- **Innovation and Technology:** Integration of innovative modules, including digital agriculture and precision farming, was suggested. Collaboration with industry professionals for insights and guest lectures was deemed essential.

4. Industry Collaboration:

- **Enhanced Partnerships:** Stronger collaboration between educational institutions and agricultural industries was recommended to align curricula with the evolving needs of the sector. Continuous follow-up activities during student attachments were emphasized.

5. Entrepreneurial Skills:

- **Business and Entrepreneurship:** Participants stressed the importance of incorporating entrepreneurship and business skills into the curriculum. Understanding and optimizing value chains were seen as critical for preparing students for diverse roles in the agricultural sector.

6. Common Challenges:

- **Language Barrier:** Across counties, enumerators encountered challenges related to a language barrier during data collection, affecting effective communication with farmers.

- **Weather Conditions:** Adverse weather conditions, particularly heavy rains, posed challenges during fieldwork, impacting the movement of enumerators.

Recommendations:

1. Curriculum Enhancement:

- **Practical Emphasis:** Educational institutions should prioritize practical training, including extended internships, to provide students with hands-on experience.
- **Innovation Integration:** Curricula should be updated to include innovative modules, focusing on technology, digital agriculture, and entrepreneurship.

2. Industry-Academia Collaboration:

- **Partnership Development:** Educational institutions should foster stronger partnerships with agricultural industries, facilitating guest lectures, workshops, and continuous collaboration.

3. Standardization and Certification:

- **Standardized Curriculum:** A standardized curriculum for agriculture-related courses is recommended to ensure consistency and quality across institutions.
- **Certification Programs:** Consideration of certification programs, such as through a professional agriculture body, to ensure graduates meet industry standards.

4. Youth Involvement:

- **Encouragement of Clubs:** Encouraging 4k clubs and farmers' clubs at the primary and secondary school levels can nurture a passion for agriculture among the youth.

CONCLUSION:

The Erasmus CHAIN project unveiled valuable insights into the challenges faced by farmers and stakeholders in the Kenyan agricultural sector. The findings underscore the need for a holistic approach to curriculum development, emphasizing practical skills, technological integration, and collaboration between academia and industry. Standardization of curricula and certifications, along with youth engagement initiatives, are crucial for fostering sustainable growth in the agricultural sector.

The project expresses gratitude to all participants, enumerators, and stakeholders for their contributions, and recommends that these findings guide future initiatives aimed at enhancing agricultural education and sustainable development in Kenya.

APPENDIX IX: STAKEHOLDER'S REPORT

STAKEHOLDERS REPORT ON CURRICULUM DEVELOPMENT MEETING HELD ON 20TH TO 22ND MAY 2024 AT WIGOT GARDENS HOTEL, KISUMU

List of Stakeholders:

1. Dr. Chrispine Omondi, - KALRO
2. Mr. Isaac Munyendo, - County Government of Siaya – Ministry of Agriculture, Livestock and Fisheries
3. Mr. John Odidi, - Farmer in Agricultural Extension, Animal Health and Production, and Horticulture
4. Prof. Mathews M Dida – Maseno University – Plant Breeding and Genetics

Review of MSc. Programme on Agricultural Value Chain Management

We reviewed the programme including the course contents. In overall the proposed programme looked well done. However, we suggest the following to help improve the course structure and content.

1. AEB 5213: In this course a section should be dedicated to scientific writing and presentations.
2. AEB 5114: Agripreneurship and Product development.

The purpose of the course should be revised to: To equip learners with skills and knowledge to create, **protect** innovations and run successful agricultural enterprises.

3. AEB 5112: Agricultural Economics. The content may need to be relooked at. The content appears heavy in content such as Economics, Farm management, Policy and rural management etc.
4. AEB 5113: In course contents, repackage the last sentence on gender dimensions in food processing.
5. AEB 5212: Sustainability for Commodity and Food Value Chains

Please, align the course content and title or vice versa.

6. AEB 5214: Digital Technology for Agri-food Systems

The content has suit of the current new technologies. It should be emphasized that locally available resources or appropriate technologies should be emphasized.

7. AFB 5121: Statistical Methods

There is no mention of use or proficiency in use of Statistical software (e.g. SSPS, R, SAS, etc). These need to be infused into the content.