AFRICA TO ASIA: TESTING ADAPTATION IN FLOOD-BASED RESOURCE MANAGEMENT PROJECT

CURRICULUM AND DELIVERY METHODS OF KENYA

CURRICULUM REVIEW AND IMPROVEMENT WORKSHOP

BY

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Outline of presentation

- Introduction and objective of presentation
- Needs Assessment – field stakeholder training needs assessment report
- Status of 5 FBLS curriculum development initiatives in Kenya
- Review and improvement of University FBLS Curriculum for Bsc Agriculture Engineering – EU, BSc. Agricultural & Biosystems Engineering-JKUAT
- Way forward
- Conclusions and recommendations
- Question- answer session
Current status on Development of Curriculum for farmers practicing FBLS

FINDINGS OF NEEDS ASSESSMENT DONE IN KENYA -FBLN PROJECT

A needs assessment was done in 4 (Four) counties; Turkana, Tana River, Kajiado, and Busia.

Capacity needs identified:

**TANA RIVER**

- Monitoring the trend or appropriate utilization of the flood waters.
- Appropriate approaches to capacity building to be adopted at different levels.
- Capacity building county staff on policy formulation and development.
- Introduction of flood based farming as a unit under soil and water engineering departments of learning institutions and universities.
FBLF course be offered as refresher course and at post graduate level.

N/B
A multidisciplinary approach to be adopted so that the course is pursued by both engineers and social scientists.

BUSIA
Entrepreneurship
Agronomic practices, - Flood diversion and control
Water rights
……..CONT…..

- Flood farming opportunities
- Flood control methods
- Agronomic practices
- Agronomic practices
- Group dynamics
- Irrigation water use
- Agribusiness
KAJIADO
The training needs identified in Kajiado County were:

- Spate irrigation.
- Sustainability of interventions/projects at both staff and farmer level.
- Water storage structures (pan/dams) designing.
- Youth and women involvement in FBLS.
- Build the capacity of farmers on organization of committees and leadership.
- Pasture establishment and maintenance.
TURKANA
The training needs identified in Turkana county were:

- Spate irrigation
- Technical officers’ (especially engineers) training on technical designing of spate irrigation, maintenance of irrigation schemes, agronomic aspects of production, and appropriate designing of water harvesting structures such as trapezoidal bunds, contour bunds that will ensure maximum water harvesting and utilization.
- Sustainability of interventions/projects at both staff and farmer level.
- Rangeland management/rehabilitation
Youth involvement in FBLS

Build farmers capacity on agronomic practices, goat manure utilization and invasive plant species (Prosobis/Mathenge) management.

Capacity build farmer organization committees on leadership.

Afforestation and dangers of deforestation

Pasture establishment and maintenance (Kibich Sub county has a high potential for pasture production)

Designing Water pans/dams.

N/B: Mainstreaming FBFS in the curriculum is in progress. Farmer groups are not yet trained.
Status of FBLS curriculum development initiatives in Kenya

- The following initiatives are on-going:
- Development of curriculum for farmers practising FBLS
- Review and improvement of curriculum for certificate in irrigation and drainage at KEWI
- Review and improvement of curriculum for diploma in Irrigation and Drainage at KEWI
- Development of curriculum for refresher course for implementers of FBLS at national and county (three weeks)
- Development of two weeks leadership course in FBLS at CETRAD
- Review and improvement of University FBLS curriculum for BSc Agricultural Engineering (AGEN), JKUAT (A&BE)
CURRICULUM / COMPETENCY AREAS FOR FBLS TRAINING

- Farming systems: rain fed, conventional irrigation and flood-based farming
- Flood based farming systems in Kenya, Africa and Asia
- Current status and potential for flood based farming in Kenya
- IWRM, River hydrology, estimation and prediction of floods
- Soil characteristics and fertility in flood farming areas
- Flood water management and use for farming
- Flood water harvesting and distribution techniques in the fields
- Flood soil moisture retention techniques
CURRICULUM / COMPETENCY AREAS FOR FBLS TRAINING

- Risks associated with FBLS and risk management
- Supplementary water for flood based farming
- Farm / Crop enterprises - choices
- Non-farm enterprises, Value addition and income opportunities in FBFS
- Flood Water Governance- farmer networks/ organizations under flood based farming
- Socio-economic and Gender issues in FBLS
- Attracting the Youth to flood based livelihood systems
- Appropriate practical policy, institutional and legal framework for FBLS
<table>
<thead>
<tr>
<th>No</th>
<th>Objective</th>
<th>Curriculum / competency areas</th>
<th>Delivery method</th>
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<tbody>
<tr>
<td>1</td>
<td>Be able to predict and estimate flood events</td>
<td>Estimation and prediction of floods</td>
<td>Lecture and group assignment</td>
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<td>2</td>
<td>Be able to assess soil fertility</td>
<td>Soil characteristics and fertility in flood farming areas</td>
<td>Practical session on Soil testing</td>
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<td>3</td>
<td>Be able to apply modern techniques</td>
<td>Flood water harvesting techniques</td>
<td>Lecture, group discussion, simulation</td>
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<td></td>
<td></td>
<td>Techniques for Flood water distribution in the fields</td>
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<tr>
<td>5</td>
<td>Be able to retain adequate moisture</td>
<td>Flood soil water moisture retention techniques</td>
<td>Lecture, group discussion, simulation</td>
</tr>
</tbody>
</table>

Curriculum Review Workshop (24th - 28th February 2020)- Wad Medani and Kassala, The Sudan
## Objective, content and delivery method

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<tr>
<td>6</td>
<td>Be able to have supplementary water sources</td>
<td>Supplementary water for FBFS</td>
<td>Lecture, group discussion, simulation</td>
</tr>
<tr>
<td>7</td>
<td>Choose high value farm/ crop enterprises</td>
<td>Farm /Crop enterprises - choices</td>
<td>Lecture, group discussion, simulation</td>
</tr>
<tr>
<td>8</td>
<td>Explore non farm and income opportunities</td>
<td>Non- farm enterprises, Value addition, and income opportunities in FBFS</td>
<td>Lecture, group discussion, simulation</td>
</tr>
<tr>
<td>9</td>
<td>Form networks &amp; organizations</td>
<td>Flood Water Governance- farmer Networks / organizations</td>
<td>Lecture and group discussion</td>
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</tbody>
</table>
How evaluation/grading and marking is taken care off

- Practical sessions where farmers do and mark themselves
- *Carry away home practical assignments to be undertaken by farmers in their farms*
- Follow up visits at farmers flood farms by trainers
- *The pathway to continue the strengthening of the curricula*
- Follow up visits for feedback from farmers on challenges being faced
- Research and emerging innovations and knew knowledge
Review and improvement of Curriculum for Certificate in I&D at KEWI

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<tbody>
<tr>
<td>1</td>
<td>Understand uniqueness of FBFS</td>
<td>Introduction to farming systems: rain fed, conventional irrigation and flood-based farming</td>
<td>Lecture, group discussion and presentation</td>
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<tr>
<td>2</td>
<td>appreciate existing huge potential</td>
<td>Current status and potential for flood based farming in Kenya</td>
<td>Lecture, literature review</td>
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<tr>
<td>3</td>
<td>Understand how to estimate and predict flood</td>
<td>IWRM, River hydrology, estimation and prediction of floods</td>
<td>Lecture, group discussion and presentation</td>
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<tr>
<td>4</td>
<td>Understand the soils</td>
<td>Soil characteristics and fertility in flood farming areas</td>
<td>Lecture, soil sampling &amp; test</td>
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<tr>
<td>5</td>
<td>Understand techniques</td>
<td>Flood water harvesting and distribution techniques in the fields</td>
<td>Lecture, discussion and presentation</td>
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<tr>
<td>6</td>
<td>Understand techniques</td>
<td>Flood soil moisture retention techniques</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>7</td>
<td>Identify, assess and manage risks</td>
<td>Risks and risk management under FBLS</td>
<td>Lecture, discussion and presentation</td>
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<tr>
<td>8</td>
<td>Choose high value enterprises</td>
<td>Farm /Crop enterprises - choices</td>
<td>Lecture, discussion and presentation</td>
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<tr>
<td>9</td>
<td>Appreciate non farm enterprises in FBLS</td>
<td>Non- farm enterprises, Value addition and income opportunities in FBFS</td>
<td>Lecture, discussion and presentation</td>
</tr>
</tbody>
</table>
How evaluation/grading and marking is taken care off

- **Continuous Assessment tests**
- **End of Semester examinations**
- **Term papers**
- **Field practical sessions**
- **The pathway to continue the strengthening of the curricula**
- **Survey on emerging Industry and market needs**
- **Student feedbacks on new areas of interest / concerns- end of course evaluation**
- **Research, emerging innovations and knew knowledge in FBLS**
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<td>Appreciate uniqueness of FBFS</td>
<td>Introduction to farming systems: rain fed, conventional irrigation and flood-based farming</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>2</td>
<td>Appreciate the potential</td>
<td>Current status and potential for flood based farming in Kenya</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>3</td>
<td>Predict flood events</td>
<td>River hydrology, estimation and prediction of floods</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>4</td>
<td>Understand the soil texture and fertility in flood farm areas</td>
<td>Soil characteristics and fertility in flood farm areas</td>
<td>lecture., field visits, samples and tests</td>
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<td>5</td>
<td>Understand and apply techniques</td>
<td>Flood water harvesting and distribution techniques in the fields</td>
<td>Lecture, discussion and practical</td>
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<td>6</td>
<td>Understand and apply techniques</td>
<td>Flood soil moisture retention techniques</td>
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<td>Lecture, discussion and presentation</td>
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<td>8</td>
<td>Able to choose high value crops</td>
<td>Farm/Crop enterprises - choices</td>
<td>Lecture, discussion and presentation</td>
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<td>9</td>
<td>Promote non farm FBLS enterprises</td>
<td>Non- farm enterprises</td>
<td>Lecture, discussion and presentation</td>
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<tr>
<td>10</td>
<td>Understand farmer organizations</td>
<td>Flood Water Governance- farmer organizations</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>11</td>
<td>Identify gender issues</td>
<td>Socio-economic and Gender issues in FBLS</td>
<td>Lecture, discussion and presentation</td>
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<tr>
<td>12</td>
<td>Youth issues</td>
<td>Youth attraction in flood based livelihood systems</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>13</td>
<td>Policy issues for promoting FBLS</td>
<td>Appropriate policy, institutional and legal framework for FBLS</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>14</td>
<td>Apply ICT and remote Sensing</td>
<td>Use of ICT and remote sensing in FBLS</td>
<td>Lecture, discussion and practical</td>
</tr>
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How evaluation/grading and marking is taken care off

- Continuous Assessment tests
- End of Semester examinations
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- Field practical sessions
- The pathway to continue the strengthening of the curricula
- Survey on emerging Industry and market needs
- Student feedbacks on new areas of interest / concerns - end of course valuation
- Research, emerging innovations and knew knowledge in FBLS
- Follow up visits to participants work places
### Development of Curriculum for short refresher course for implementers of FBLS - National and county (three weeks)

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<tr>
<td>1</td>
<td>Appreciate potential for FBLS</td>
<td>Current status and potential for flood based farming in Kenya</td>
<td>Lecture, discussion and presentation</td>
</tr>
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<td>2</td>
<td>Predict flood events</td>
<td>River hydrology, estimation and prediction of floods</td>
<td>Lecture, discussion and practical</td>
</tr>
<tr>
<td>3</td>
<td>Understand the Soils in flood farms</td>
<td>Soil characteristics and fertility in flooded areas</td>
<td>Lecture, discussion and practical</td>
</tr>
<tr>
<td>4</td>
<td>Understand and apply techniques</td>
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<td>Understand and apply techniques</td>
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<td>Choose high value crops</td>
<td>Crop enterprises - choices</td>
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<td>7</td>
<td>Promote non-farm FBLS enterprises</td>
<td>Non- farm enterprises</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>8</td>
<td>To form farmer networks</td>
<td>Flood Water Governance- farmer networks &amp; organizations</td>
<td>Lecture, discussion and presentation</td>
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<tr>
<td>9</td>
<td>Identify and address gender/youth issues</td>
<td>Gender issues and Youth involvement in flood based livelihood systems</td>
<td>Lecture, discussion and presentation</td>
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How evaluation/grading and marking is taken care off

- Continuous Assessment tests
- End of Course examinations
- Term papers
- Field practical sessions
- The pathway to continue the strengthening of the curricula
- Survey on emerging Industry and market needs
- Student feedbacks on new areas of interest / concerns - end of course evaluation
- Research, emerging innovations and knew knowledge in FBLS
- Follow up visits to participants work places
## Current status on development of two weeks leadership course on FBLS at CETRAD and KEWI

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<tr>
<td>1</td>
<td>Understand concept of FBLS</td>
<td>Flood based farming systems in Kenya, Africa and Asia</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>2</td>
<td>Appreciate the huge potential</td>
<td>Current status and potential for flood based farming</td>
<td>Lecture, discussion and presentation</td>
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<tr>
<td>3</td>
<td>Predict flood events</td>
<td>IWRM, River hydrology, estimation and prediction of floods</td>
<td>Lecture, discussion and practical</td>
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<tr>
<td>4</td>
<td>Identify, assess and manage risks in FBLS</td>
<td>Risks associated with FBLS and risk management</td>
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3/6/2020
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<tr>
<td>6</td>
<td>Promote non farm enterprises in FBLS</td>
<td>Non- farm enterprises, Value addition, income opportunities in FBFS</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>7</td>
<td>Promote and form farmer networks and organizations</td>
<td>Flood Water Governance- farmer networks/ organizations in FBLS</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>8</td>
<td>Mentor, coach and guide young champions</td>
<td>Mentorship &amp; attracting the Youth to flood based livelihood systems</td>
<td>Lecture, discussion and presentation</td>
</tr>
<tr>
<td>9</td>
<td>Identify policy gaps and fill</td>
<td>Appropriate practical policy, institutional and legal framework for FBLS</td>
<td>Lecture, discussion and presentation</td>
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How evaluation/grading and marking is taken care off

- Continuous Assessment tests
- End of course examinations
- Term papers
- Field practical sessions
- The pathway to continue the strengthening of the curricula
- Survey on emerging Industry and market needs
- Student feedbacks on new areas of interest / concerns - end of course evaluation
- Research, emerging innovations and knew knowledge in FBLS
- Follow up visits to participants work places
2. What topics, related to FBLS, are specific for the context in Kenya (Tertiary Institutions and Short courses)

CURICULUM / COMPETENCY AREAS FOR FBLS TRAINING

- Introduction to farming systems: rain fed, conventional irrigation and flood-based farming
- Definition of terms; ASAL, floods, flood-based farming, flood-based livelihoods
- Flood based farming systems in Kenya and Africa- ASALS
- Current status and potential for flood based farming in Kenya
- Flood based farming in East Africa, Africa and Asia
- River hydrology, estimation and prediction of floods
Soil characteristics in flood prone areas
Flood water management
Use of flood water for farming
Flood water harvesting techniques
Flood water distribution in the fields techniques
Flood water moisture retention techniques
Risks and risk management under FBLS
Supplementary water for flood based farming
….cont….  

- Crop enterprises - choices  
- Non- farm enterprises under FBLS  
- Value addition in FBFS  
- Flood Water Governance - farmer organizations under flood based farming  
- Socio-economic and Gender issues in FBLS  
- Youth involvement in flood based livelihood systems  
- Appropriate policy, institutional and legal framework for FBLS
1. CURRENT STATUS ON REVIEW AND IMPROVEMENT OF UNIVERSITY FBLS CURRICULUM FOR BSC AGRICULTURAL (AND BIO-SYSTEMS) ENGINEERING AT JKUAT, EU, UON

General introduction on Program development process in Kenya-Universities

- Guided by The Commission for University Education in Kenya (CUE)
- Commission for University Education was established under section 4 of the Universities Act No 42, 2012.
- CUE has established “standard”, a reference point against which different aspects of the institution and program are compared or evaluated for quality;
- (cited as University Standards for Accreditation and Operations)
Application

- These standards apply to:
  a) All public universities established in Kenya;
  b) All private universities established in Kenya;
  c) All foreign universities operating in Kenya;
  d) All Constituent Colleges established in Kenya;
  e) All campuses of universities operating in Kenya;
  f) All learning centres of universities operating in Kenya.
A university shall carry out its operations in line with and be guided by the national values and principles of governance as set out in Article 10 of the Constitution and as spelt out in the Universities Act No. 42, 2012.

1. FIRST SCHEDULE: INSTITUTIONAL STANDARDS
2. SECOND SCHEDULE: STANDARDS OF PHYSICAL RESOURCES
3. THIRD SCHEDULE: STANDARDS AND GUIDELINES FOR AN ACADEMIC PROGRAMME
4. FOURTH SCHEDULE: STANDARDS AND GUIDELINES FOR OPEN, DISTANCE AND E-LEARNING
5. FIFTH SCHEDULE: STANDARDS AND GUIDELINES FOR UNIVERSITY LIBRARIES
6. SIXTH SCHEDULE: STANDARDS FOR TECHNICAL UNIVERSITIES
7. SEVENTH SCHEDULE: STANDARDS FOR SPECIALIZED DEGREE AWARDING INSTITUTIONS
8. EIGHTH SCHEDULE: COMMISSION FORMS
THIRD SCHEDULE
STANDARDS AND GUIDELINES FOR AN ACADEMIC PROGRAMME

These standards are intended for use by universities in Kenya in the development, implementation, quality assurance and review of academic programmes.

Interpretation

The following terms are applied in the context provided:

“academic programme” means the design of learning content, which is multi-dimensional and includes intentions, structure of content, delivery modes, academic resources and assessment modes;

“course” means a single unit in a programme of study;

“curriculum” means any documented programme of study;
1. What is the needs assessment for the spate curriculum at the national/local institutions
This is guided by program standard from CUE (PROG/STD/07) as follows:
The rationale of the programme shall be convincing and evidence-based.

Guidelines
1) The justification of the need for the programme shall be realistic;
2) The rationale of the programme shall be informed by a:
   ▶ a) needs assessment, market survey or situation analysis; and
   ▶ b) stakeholders’ requirements.
2. What topics, related to FBLS, are specific for the context in Kenya

KENYA – Example of topics related to FBLS in Kenyan programmes (JKUAT-BSC.ABE; Egerton -Bsc.Agen; UON-Bsc. Biosystems Engineering; Dryland Farming

JKUAT
- Engineering Hydrology
- Irrigation and Drainage Engineering
- Remote Sensing and GIS
- Soil and Water Conservation
- Computer Modeling and Simulation
- Drainage systems Design and Management
- Watershed and Water Resources Engineering
- Design of Rainwater Harvesting Systems
- Design and Construction of Hydraulic Structures
- Design of Soil and Water Conservation Structures
3. What is already offered and where are gaps

KENYA - Example of topics already being offered
- Engineering Hydrology
- Irrigation and Drainage Engineering
- Remote Sensing and GIS
- Soil and Water Conservation
- Computer Modeling and Simulation
- Drainage systems Design and Management
- Watershed and Water Resources Engineering
- Design of Rainwater Harvesting Systems
- Design and Construction of Hydraulic Structures
- Design of Soil and Water Conservation Structures

Gaps: Need for a broader coverage of hydrogeology and a specific course on soil physics
4. What is the actual structure of the curriculum, including an example of the program/curricula developed for the specific country

**PROG/STD/02-KENYA**

Each level of academic programme shall be differentiated by specific attributes. Higher levels of academic programmes shall require more complex attributes according to Bloom's Taxonomy.

**Guidelines**

1) Bachelor's degree programmes

a) A bachelor’s academic programme shall:

   i. Provide a broad knowledge base within a discipline involving critical and analytical understanding of the major theories, principles and concepts in the discipline;

   ii. Provide the learner with a comprehensive range of cognitive and analytical skills and their application to various situations;

   iii. Entail demonstration of adequate problem solving skills;

   iv. Enhance society consciousness and contributions to the general development of the society.
b) A bachelors’ academic programme shall carry a minimum number of total instructional hours:

i. Applied Sciences - 2240 [Against -3645 for JKUAT]
ii. Arts and Humanities - 1680
iii. Medical and Allied Sciences - 3960
iv. Pure and Natural Sciences - 1785
v. Social Sciences - 1680

**Guidelines**

1) Each academic programme structure consists of:
   a) The university’s background information, which includes:
      i. the vision, mission and philosophy of the university;
      ii. the university’s minimum admission requirements;
      iii. academic resources for the support of the programme; and
      iv. academic organization of the programmes.
   b) Information on the various facets of the programme including:
      i. the title;
ii. philosophy;

iii. rationale including market survey implications;

iv. goal;

v. expected learning outcomes of both the programme and the specialization areas (if any);

vi. mode of delivery;

vii. academic regulations comprising of admission requirements, regulations on credit transfer, programme requirements, student assessment policy/criteria, grading system, examination regulations including moderation of examinations, graduation requirements, classification of degrees and regulations for thesis/dissertation/projects (where applicable);
viii. course evaluation;
ix. management and administration;
x. list of courses/units;
xi. duration and structure;
xii. course distribution table; and
xiii. course descriptions for each course including, course title, purpose, expected learning outcomes, content, mode of delivery, instructional materials and/or equipment, assessment, (reference materials including textbooks, journals and e-materials).

c) Appendices of the academic resources for the support of the programme comprising of the facilities; equipment and teaching materials; core-texts and journals; academic staff; and the University Policy on Curriculum Development.
5. How is evaluation/grading and marking taken care of

- **JKUAT-KENYA**
- (a) Ordinary University examinations shall normally be at the end of every semester.
- (b) All units shall be examined during the semester in which they are taken except projects which shall normally be examined at the end of the second semester.
- (c) The examination pass mark in each unit shall be 40% of the total marks.
- (d) No candidate shall be allowed to sit for examinations without attending at least two thirds of the lectures and practicals.
- (e) No candidate shall be deemed to have passed in examinations unless the candidate has passed practicals.
- (f) (i) Continuous Assessments shall contribute 30% and written University examinations shall contribute 70% of the total marks; except where a course consists solely of practical work, in which case it shall be assessed 100% by continuous assessment. The continuous assessment shall consist of continuous assessment tests, coursework and/or laboratory assignments. A candidate shall satisfactorily complete such coursework/practical assignments as may be required for each course unit. The composition for continuous assessment shall be as follows:

  15% Practical/lab assignments/Class Projects
  5% Assignments
  10% Tests
6. What is the pathway to continue strengthening of the curricula

- Develop a common course description and pilot amongst the partner universities.
- Should initially be offered as a short course/module
- Later, to be mainstreamed in the curriculum
- Offer a course/unit on spate Irrigation (Electives) to Masters students
- Develop a 4 weeks short course (3 weeks online and 1 week face to face)
END OF PRESENTATION

Ahsante!

Thank You!

Shukran!