

VALIDATION REPORT

for

QUALITY ASSURANCE PROGRAMME OF THE AAU (QAP/AAU)

in

THE DEPARTMENT OF MECHANICAL ENGINEERING

JOMO KENYATTA UNIVERSITY OF

AGRICULTURE AND TECHNOLOGY

KENYA

prepared by

K. SRAKU - LARTEY & BABATUNDE ALABI

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EVALUATORS

_____ **Prof.**

Babatunde Alabi, B.Sc., M.Sc., Ph.D.,D.I.C.(London)

Dean, Faculty of Technology,

University of Ibadan,

Ibadan, Nigeria

Email: b.alabi@mail.ui.edu.ng

b.alabi@skannet.com.ng

Prof K. Sraku-Lartey, B.Sc.(Kumasi), Ph.D.(Camborne)

Prof. Metallurgical Engineering,

School of Engineering,

Kwame Nkrumah University of science and Technology.

Kumasi, Ghana

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Prof. B. Alabi

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Prof. K. Sraku-Lartey

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PREFACE

It is commendable that the Association of African Universities (AAU) has taken the initiative to develop and sustain a culture of self-evaluation in AAU member institutions, under the Quality Assurance Programme (QAP/AAU). This programme will definitely encourage AAU institutions to regularly monitor and evaluate relevant quality indicators.

Under this programme AAU appointed evaluators to carry out quality-audit visit to any participating institution, as part of the AAU validation process.

The QAP/AAU programme could also provide information that may be of interest to international donors for the purpose of providing assistance to African universities.

EXECUTIVE SUMMARY

1. This Report presents the observations and findings of a performance assessment exercise carried out from 30th September – 3rd October 2003 to validate the Self-Evaluation Report of the Department of Mechanical Engineering of the Faculty of Engineering, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya.
2. The first stage of the exercise, focused on the study and analysis of the self-evaluation report submitted by the Department, which was followed by a quality-audit visit to the department and collection of additional statistical data.
3. The Department was established in 1994.
4. The quality of education in mechanical engineering is confirmed to be good.
5. All aspects of the Department's activities offer staff and students

rewarding teaching and learning experiences, conducive for the training of high caliber professional engineers.

7. Several aspects of the education being provided by the Department are distinctly positive. These include: well-planned curriculum, physical facilities, which are generally very good.
8. The report also draws attention to some areas needing consideration, where there remains scope for improvement and performance enhancement.
9. It is essential for the Department to create innovative ways for the provision of additional resources for research.
10. It is also recommended that laboratory equipment be put to use to generate income for the Department.
11. There is also a need to attract international students and scholars.

1. INTRODUCTION

- (1.1) This Report presents the observations and findings of a performance assessment exercise carried out from 30th September – 3rd October 2003 to validate the Self-Evaluation Report of the Department of Mechanical Engineering of the Faculty of Engineering, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya.
- (1.2) The entire evaluation process of the Department, carried out under the Quality Assurance programme of the Association of African Universities (QAP/AAU), was geared towards an informed, knowledge-based, independent and objective assessment of the quality of mechanical engineering education being provided by JKUAT.

- (1.3) Jomo Kenyatta University of Agriculture and Technology started operating as a full-fledged University in 1994. The Institution started as a middle-level college of agriculture and technology under the auspices of a technical cooperation agreement between the governments of Kenya and Japan (Japan International Cooperation Agency, JICA). At the inception of the College in 1981, the Mechanical Engineering Department was among the three departments that made up the Faculty of Engineering. It started by offering a technician and then a diploma programme. The degree programme was introduced in 1990.
- (1.4) Presently, the Mechanical Engineering has 171 and 6 students for undergraduates and postgraduates respectively.
- (1.5) The Department has 26 full time and 11 part time faculty staff members, complemented by 26 Technicians and 7 support staff.
- (1.6) Admission of students into the University as a whole is carried by the Senate in two ways: these are through the Joint Admission Board (JAB) and are based on results of the Kenya

Certificate of Secondary Examinations (KSCE), and students who already have diploma qualifications. There are no international students. The gender distribution is approximately 94% male and 6% Female.

(1.8) The aims and objectives of the Department are in the process of formulation to fit into the overall mission of the University.

(1.9) The medium of instructions is essentially English.

2. EVALUATION METHOD

(1.1) A careful study and analyses of the Self-Evaluation Report submitted by the Department of Mechanical Engineering was first carried out, prior to the quality-audit visit; so as to enable familiarity with the data/information provided, and to facilitate the preparation of a comprehensive check-list of relevant things and issues to be raised and discussed during the visit to the Department.

(1.2) Subsequently, the various Units in the Department were visited. There were formal meetings, interviews and discussions with various segments of the students and staff, (academic,

administrative and technical) to facilitate the collection of relevant information in respect of the quality-audit assignment, and to enable on-the-spot verification of the claims in the self-evaluation report. Evidences of good quality assurance practices were collected, along with other practices, which may be classified as sub-standard or likely to compromise quality.

- (1.4) Arrangements were also made to gather additional relevant information, through informal interaction with staff and students of the Department, as a veritable channel for a comprehensive and thorough validation exercise, involving all the multi-dimensional activities of the Department.

3. VISION, MISSION, GOALS AND OBJECTIVES

- (1.1) As stated in the self-evaluation report, the University Mission statement is ‘Training manpower for both managerial and supervisory levels for sustainable economic development in addition to enhancing distinction in training, research and scholarship’. The department is in the process of coming up with its own mission statement. The Department is strongly encouraged to do this in order to have a philosophy in what

it is doing. This must however fit into the overall plans of the University.

(1.3) The multi-dimensional activities of the Department are designed and carried out to enable the realization of the vision, and the accomplishment of the mission of the University.

(1.4) **Table 3.1** provides a checklist and summary of the findings in respect of the vision, mission, goals and objectives.

Table 3.1 : Vision, Mission, Goals and Objectives:

	QUALITY INDICATOR	YES	NO	REMARK
1.	Departmental vision and mission statements exist		No	Highly desirable to have one
2.	Statement is well publicised on-and off-campus		No	
3.	All stakeholders identify with the institution's vision and mission		No	
4.	The department's goals and objectives conform with its vision and mission	-	-	N/A
5.	Department's activities are carried out with deference to its vision and mission	-	-	N/A

4. TEACHING AND LEARNING

(1.1) The mechanical engineering programme has distinctive features and has considerable relevance to industry and agriculture. This is taken into consideration in the curriculum design, content

and organisation.

- (1.3) The Department has 4 lecture-rooms a total seating capacity of 160 students. However the department shares 15 lecture rooms with other departments in the Faculty of Engineering. They are generally spacious, well ventilated. It is however disappointing that there is no provision for modern multi-media projectors. These are expected to reinforce the learning process if and when provided.
- (1.4) Observation of lectures in-progress confirmed that, in all cases, the Lecturers handle their teaching professionally with well-prepared materials. The students' interaction and response to the teaching were also quite good.
- (1.5) Teaching methods include formal lectures using conventional techniques such as chalk/blackboards and printed handouts.
- (1.6) The Department has a library with a reasonable amount of holdings (books, periodicals and reports) in, English. However, there is an urgent need to greatly increase the amount of holdings for a sustained capacity building and to give free access to

students. The main University Library is better endowed in terms of relevant books for the mechanical engineering.

- (1.8) Generally, the provision of learning resources is adequate for the scope of the curriculum. However, improvements are recommended in certain aspects to meet the need and aspiration of students, especially in the area of student-centred independent learning through computer aids and study-packs.
- (1.9) The University is quite conscious of the crucial role of a good library in the provision of an excellent teaching/learning environment. (The library will remains open for 16 hours daily (8a.m-12 midnight). There will be a special section where about 1,000 students can study and review their courses with the aid of state-of-the-art ultra-modern gadgets.)
- (1.10) The Department does not have a University Performance Evaluation and Development Unit (**UPEDU**). Efforts are ongoing to enable the department to administer questionnaires which are designed to assess the extent to which learning outcomes are

achieved. **UPEDU** helps the Department to analyse the data collected from the questionnaires and follows the development prompted by the outcome, for effective monitoring and control.

(1.12) It is confirmed that the standard of the graduation projects is generally good in the department. It is noteworthy that the quality of the projects in the Department is quite high.

(1.13) **Table 4.1** provides a checklist and summary of the findings in respect of the performance of the Department with regards to teaching methods and technologies.

(1.14) **Table 4.2** provides a checklist and summary of the findings in respect of the performance of the Department with regards to teaching and learning resources/activities.

(1.15) **Table 4.3** provides a checklist and summary of the findings in respect of the performance of the Department with regards to assessment process design and validation.

Table 4.1: Teaching Methods/Technologies

	YES	NO	REMARK
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1.	Are printed lecture notes handed out in class?	Yes		
2.	Do lecturers use overhead projector for teaching?		No	
3.	Are photocopying facilities available?	Yes		
4.	Do most students have standard textbooks?		No	
5.	Computer simulations/modeling and calculations?		No	

Table 4.2: Teaching and Learning Resources

	QUALITY INDICATOR	YES	NO	REMARK
1.	Process of selecting students to participate in a course ensures quality inputs	Yes		
2.	Each course has well stated aims and expected learning outcomes	Yes		
3.	Aims and expected learning outcomes are compatible	Yes		
4.	Expected learning outcomes compare favorably with international standards	Yes		
5.	Design and organization of course curriculum promote student learning and good performance	Yes		
6.	A thorough process for the design, updating and approval of curriculum exists	Yes		
7.	Student workloads do not impede learning	Yes		
8.	Student-teacher interaction and engagement exist and are encouraged	Yes		
9.	Information about student progression/retrogression exists and is periodically analyses and actions taken to eliminate/reduce the effects of undesirable trends	Yes		
10.	A process of academic guidance and counseling for students exists, and is reviewed from time to time	Yes		
11.	Tutorial support for students exists	Yes		
12.	Facilities exist to enhance teaching and learning	Yes		
13.	Teaching takes new research findings and professional developments into account	Yes		
14.	Mechanisms exist for monitoring and evaluating the effectiveness of teaching	Yes		

15.	Teaching is periodically evaluated	Yes		
16.	Teaching is taking into account for staff promotion	Yes		

Table 4.3: Assessment Process

	QUALITY INDICATOR	YES	NO	REMARK
1.	Assessment process designed to check the extent to which learning outcomes are achieved	Yes		
2.	Assessment process enables students to demonstrate the extent to which they have achieved the expected learning outcomes	Yes		
3.	Stakeholders have confidence in the integrity of the assessment process	Yes		
4.	Assessment is validated by external examiners and/or professional bodies	Yes		

5. RESEARCH

(1.1) There is clear evidence that the Department is committed to research as a potent problem-solving tool, based firmly on the twin principles of selectivity and concentration of effort. The department has to build on the foundation laid by the JICA project

(1.2) The Department has a total of 7 laboratories. These are Metrology,

Materials, Vibrations/Process Control/CAD/CAM, Fluids Mechanics, Thermodynamics,, Drawing room and Computer laboratories. These laboratories also serve as lecture rooms. For the Computer laboratory on the average 15 computers work and only one is connected to the Internet. The main Library has 20 computers connected to the Internet. Thus Internet facility for students is fairly good. This situation however needs to be improved to enable both staff and students to benefit the global knowledge based teaching and learning process. The state of the hardware in the departmental laboratories can be broadly classified as quite good. However both staff and students complained of inadequacy of equipment for research and project work.

- (1.4) It is commendable that the Department has a deliberate research policy, which encourages a good balance between individual research efforts and multi-disciplinary research groups. There is a measure of support from both the main university and the department although these are not adequate.
- (1.5) The research output of both staff and postgraduate students are not regularly published in scholarly technical journals. However

conference proceedings (national) exist. Examination of the research article publication record has shown that Mechanical Engineering Department has a fairly adequate number of publications on the national level.

- (1.7) It is confirmed that the University provides generous study leave and travel grants to enable academic staff to interact with international colleagues and to keep in touch with the latest research techniques and advances. In addition, each departmental member is entitled to a conference travel grant, once in two years, for conference paper presentation.
- (1.8) There is a minimal opportunity for the department to offer consultancy services.
- (1.9) Library support for research in the department comes through the departmental library and the main library. The holdings of the library in the Department are 200 titles. The main library has adequate titles through the assistance of JICA. There are two relevant journals in the main library. However, the main library is on the INASP/PERI Project on electronic access to

international journals.

(1.11) The department is equipped with student computer laboratory and software programs. These are not adequate for the student number. Most staff members do not have computers in their offices and do not easily have access to Internet connectivity. On the whole, the total number of desktop computers in the Department is 25, including those installed in the administrative. It is encouraging to note the desire of the department to double the number of computers, if funds become available.

(1.12) **Table 5.1** provides a checklist and summary of the findings in respect of the performance of the Department with regards to research related activities and resources.

Table 5.1: Research (Funding, Facilities/Extension Services etc)

	QUALITY INDICATOR	YES	NO	REMARK
1.	Department is committed to research	Yes		
2.	A well articulated research policy exists and is known to all stakeholders		No	
3.	Research funds are available annually from the department's budget		No	Inadequate
4.	Credible and transparent criteria exist for the disbursement of research funds and are known to all stakeholders		No	

5.	Laboratories and libraries are equipped to support the type of research in which staff and students are engaged		No	Inadequate journals
6.	A large percentage of staff is engaged in research activities		No	
7.	Staff members compete for and attract external funds for research		No	
8.	Research output (papers, inventions, patents, etc) is high		No	
9.	Researchers are involved in international networking and collaboration		No	
10.	Postgraduate research and supervision exist and are well established	Yes		
11.	Extension activities are undertaken by department to disseminate practical research findings to the community		No	
12.	Consultancy services linked to research capability are undertaken and generate funds for further research		No	

6. ORGANISATIONAL AND MANAGEMENT STRUCTURES

(1.1) From the series of meetings, interviews and discussions with the Vice Chancellor, three Deputy Vice Chancellors, the Dean of Engineering, Chairman of the Mechanical Engineering Department and other members of the Department, it is evident that the Department leaders and the assistants are eminently capable, credible and transparent.

(1.2) The Department is headed by a Chairman. The roles of all administrative staff are clearly defined. They discharge their duties and responsibilities cheerfully and enthusiastically.

- (1.3) The Department management structure and distribution of duties is evenly spread. There is evidence of team spirit and esprit-de-corp. The working environment is neat, spacious and well furnished.
- (1.4) A 23-member Statutory Board supervises the academic matters and policies of the Department, with the Chairman as the Chairman. All interest groups in the Department are adequately represented on the Board, which is also under the guidance of the Faculty Board.
- (1.5) **Table 6.1** provides a checklist and summary of the findings in respect of the performance of the Department with regards to organisational and management structures.

Table 6.1: Organisational and Management Structures

	QUALITY INDICATOR	YES	NO	REMARK
1.	A credible, capable and transparent leadership is in place	Yes		
2.	A well-developed organizational structure, incorporating relationships and functions, is in place and is well publicized to all stakeholders	Yes		
3.	Management structure and activities enhance the realization of department's vision and mission, as well as its aims and objectives	-	-	N/A

4.	There is a good channel of communication between management, staff, students and other stakeholders	Yes		
5.	Organizational and management structures are periodically reviewed to ensure that they meet departmental needs	Yes		

7. STRATEGIC PLANNING AND HUMAN RESOURCES

(1.1) The Department has a plan for resource allocation to meet the Department needs. There is however no strategic plan.

(1.2) Budgeting is taken seriously and is handled realistically and systematically. It is carried out bottom-up, with the different units originating their own budgets, however, always being mindful of the abiding constraints of the Department, Faculty and University budgets.

(1.3) Measures are in place to check and minimize budgeting malpractice at all levels in the Department.

(1.4) The staff strength in some sections is not adequate, as stated by some staff who complained of being over-stretched and over-worked.

(1.5) **Table 7.1** provides a checklist and summary of the findings in respect

of the performance of the department with regards to strategic planning, budgeting and human resources.

Table 7.1: Planning, Budgeting and Human Resources

	QUALITY INDICATOR	YES	NO	REMARK
1.	Department has a strategic plan, or plans to develop or is developing, a strategic plan		No	
2.	Units of the department have their own strategic plans which are compatible with the departmental strategic plan		No	
3.	Physical planning is carried out in consonance with departmental strategic plan		No	
4.	Financial planning is carried out in consonance with departmental strategic plan		No	
5.	Academic planning is carried out in consonance with departmental strategic plan		No	
6.	Information on expenditure, balances, etc is readily available on request to units	Yes		
7.	Measures are in place to reduce or eliminate any budgeting malpractice at all levels	Yes		
8.	Recruitment of staff ensures high quality inputs	Yes		
9.	Management appreciates the importance of human capital and its continual development	Yes		
10.	Staff members are well motivated and treated fairly	Yes		
11.	The staff strength in every unit is adequate for the tasks to be performed		No	
12.	Staff and student discipline is upheld fairly and firmly	Yes		
13.	Staff development policy and process exist and are implemented with transparency	Yes		

8. FACULTY AND COMMUNITY LIFE

(1.1) There is evidence that both students and staff see themselves as partners-in-progress. Students however do not have a chance

to carry out a formal statutory evaluation of teaching and laboratory resources and activities.

- (1.3) The Department has a student tutoring arrangement, whereby each class of students is given an advisor for the year. A typical class comprises 30-40 students (male/female).
- (1.4) There is evidence that both staff and students are actively involved in Departmental decision-making using well laid-out processes and procedures on the Departmental Committee. There are also class representatives serve as liason between the students and staff and administration.
- (1.5) The Department publishes annually good quality scientific proceedings of the annual seminars. These do not appear to have any wide circulation.
- (1.6) The Department staff and students have direct access to the sporting and recreational facilities provided by the university. These facilities are in the developmental stages.
- (1.7) The university on-campus living conditions for both staff and students

are satisfactory, and they are conducive to learning, teaching and research. Almost all the students from the Department and some staff members are accommodated. There are three university restaurants offering various meals per day to students at reasonable cost.

- (1.9) **Table 8.1** provides a checklist and summary of the findings in respect of the performance of the Department with regards to community relations.

Table 8.1: Faculty and Community Relations

	QUALITY INDICATOR	YES	NO	REMARK
1.	The different categories of staff work as a team and in harmony	Yes		
2.	A student-staff partnership exists and thrives	Yes		
3.	Staff and students are actively involved in decision-making and the formulation of departmental programmes through adequate representation in appropriate decision making organs	Yes		
4.	Staff and students are encouraged to interact with the community at large		No	
5.	Outcomes of department's activities are periodically disseminated to the community at large through publications, seminars, conferences, workshops, exhibitions, etc	Yes		
6.	Good service to all categories of the department's customers (staff, students, members of the community at large) is entrenched through training and practice		No	

7.	Department possesses a website where information about it, as well its range of activities, is globally available		No	
8.	Staff and students are aware of global trends and work towards taking advantage of, or adjusting, to them		No	
9.	Living conditions for staff and students on campus are conducive to learning, teaching and research	Yes		
10.	Facilities exist for sports and recreation	Yes		
11.	Department strives to build a multicultural campus through diverse cultural activities and services		No	
12.	Department possesses and implements a credible environmental policy	-	-	N/A

9. FACILITIES

(1.1) There are a number of noteworthy features of the physical facilities, in terms of office space, for staff and lecture--rooms for students. They are reasonably adequate. There are no seating areas enabling greater interaction of students in-between lecture/laboratory activities.

(1.2) Laboratory equipment in the department are of high standard and quite modern. There remains scope for improvement in terms of provision of some laboratory equipment, audio-visual teaching-aids and computers. Equipment requirement in the department include: polishing equipment and modern microscopes in the Materials Lab., more advanced computer

simulators and smoke tunnel for the Fluid Mechanics Lab.
and optical and laser equipment for temperature measurement for the Thermodynamics Lab.

- (1.4) The Department has already identified the need to expand available office/classroom/laboratory space in view of the possible increase in student and staff numbers.
- (1.5) Table 9.1 provides a checklist and summary of the findings in respect of the performance of the Department with regards to general facilities.

Table 9.1: Facilities

	QUALITY INDICATOR	YES	NO	REMARK
1.	Facilities, such as office/classroom/laboratory space, equipment, etc, are in adequate supply to support the department's range of activities	Yes		
2.	Physical structures and other facilities are well maintained	Yes		
3.	Efforts are ongoing to periodically replace obsolete equipment and to expand available office/classroom/laboratory space	Yes		
4.	Staff and students are aware of their responsibilities to avoid the abuse of available facilities	Yes		

10. NORMS, VALUES AND ETHICS

- (1.1) The University as a whole values high ethical standards in all aspects of teaching, research and administrative activities. Its expectations with regards to the way in which staff and students discharge their duties, as responsible stakeholders, are evident and clearly stated in the Statutes. However there are no stated ethics policy on research or on inappropriate relationship among staff and students. There are no Handbooks for the students or staff.
- (1.2) Evidently, the Department is committed to standards and quality assurance. There is a recently created Quality Assurance Committee in the Department that is to regularly monitor teaching and the achievement of learning outcomes. It will be advantageous to empower and expand the mandate of the unit, to include monitoring of non-teaching activities of the Department.
- (1.3) It is confirmed that the Department has a culture of involving relevant segments of its stakeholders in decision-making, especially in curriculum development.
- (1.4) **Table 10.1** provides a checklist and summary of the findings, in

respect of the performance of the Department with regards to norms, values and ethics.

Table 10.1: Norms, Values and Ethics

	QUALITY INDICATOR	YES	NO	REMARK
1.	A statement of the department's values exist and is well publicized to all stakeholders		No	
2.	Staff actualize department's values in the performance of their duties	-	-	N/A
3.	Department is committed to standards, quality assurance and high ethical values	Yes		
4.	Department takes concrete measures to uphold or improve standards and ethical values	Yes		
5.	Department has a culture of involving relevant segments of its stakeholders in decision-making	Yes		
6.	Staff are periodically reminded of department's values		No	

11. GENDER EQUITY

(1.1) The Department is genuinely interested in gender equity as a policy.

But there is no formal gender equity unit yet.

(1.2) Although there is no evidence whatsoever of gender-bias

discrimination, nevertheless the number of students and staff

(academic and non-academic) who are female is

significantly low.

- (1.3) It is noteworthy and impressive that there have been no complaints, to date, from students for having low grades as a result of religion or sex-discrimination, or any other form of prejudice.
- (1.4) However, there is a need for the Department to deliberately introduce, practice and monitor affirmative action, so as to increase female representation in its engineering education programmes and personnel.
- (1.5) **Table 11.1** provides a checklist and summary of the findings, in respect of the performance of the Department with regards to gender equity.

Table 11.1: Gender Equity

	QUALITY INDICATOR	YES	NO	REMARK
1.	A gender equity unit exists and is active		No	
2.	A blueprint on the department's commitment to gender equity and affirmative action exists, and well publicized		No	
3.	Mainstreaming gender equity in department's activities is ongoing and constantly monitored		No	
4.	Affirmative action is practiced and regularly monitored		No	
5.	Women staff members are involved in decision-making and implementation	Yes		
6.	Mentoring and role-modeling for female students and staff members are encouraged	-	-	N/A

7.	Success of gender equity measures is periodically assessed		No	
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12. NEW TECHNOLOGIES

- (1.1) The Department is endowed with modern technology obtained through the JICA project and uses these for teaching, learning and research. The use of this equipment for consultancy services is very limited. The Department has the set up to use its facilities to generate income, which often lie idle.
- (1.2) The Department is building capacity by training staff on new technology. There is innovation in the use of the equipment. Staff also manufacture some essential research equipment to augment what is available.
- (1.3) Local Area Network is now being developed in the Department. Staff and students however have access to the Internet to augment teaching, learning and research.
- (1.4) **Table 12.1** provides a checklist and summary of the findings, in respect of the performance of the Department with regards to new technologies.

Table 12.1: New Technologies

	QUALITY INDICATOR	YES	NO	REMARK
1.	Department is committed to the use of new technologies for teaching, learning, research, and management, as well as information storage, retrieval, processing, and dissemination	Yes		
2.	Overall approach to acquisition and deployment of new technology is sound and cost-effective	Yes		
3.	Capacity building for technology utilization is ongoing	Yes		
4.	Department is making progress with the adaptation of new technologies	Yes		
5.	Department uses new technology innovatively	Yes		
6.	Department networks and exchanges good practices with other institutions		No	
7.	Students and staff have access to the new technologies relevant to their activities	Yes		
8.	A campus-wide intranet exist and is well configured		No	
9.	There is an adequate number of access points to the internet		No	
10.	Department has a web-site		No	
11.	Staff and students have e-mail addresses and access to the Internet	Yes		
12.	Staff and students utilize the Internet to access remote resources for teaching, learning and research	Yes		
13.	Department has an adequate computer density that facilitates teaching, learning and research		No	
14.	The computer literacy level of staff and students is high and rising	Yes		
15.	Department is the enterprise of technology innovation and has patented inventions		No	

13. INTERNATIONALISATION

(1.1) The Department sees itself as part of the global academic community.

There are however no formalized links with industrial and research institutions in other countries.

- (1.3) It is confirmed that the Department has a systematic internationalization plan and process, which is directly linked to the university policies, geared towards staff development. Academic staff members are regularly sponsored to participate in overseas international conferences. In addition, the Department organizes national seminars.
- (1.4) Department members are also eligible to take “sabbatical-leave” to go overseas and carry out joint advanced research work with their overseas counterparts.
- (1.5) However, it is noteworthy that the number of international students in the Department is nil. A deliberate effort needs to be made to attract some good international students.
- (1.6) It will also be useful and advantageous to introduce a process whereby international scholars are also attracted and encouraged to spend their “sabbatical-leave” in the department.

(1.7) **Table 13.1** provides a checklist and summary of the findings, in respect of the Department performance with regards to internationalization.

Table 13.1: Internationalisation

	QUALITY INDICATOR	YES	NO	REMARK
1.	Department has an internationalization plan and process	Yes		
2.	Stakeholders are aware of the internationalization plan/process and their own responsibilities	Yes		
3.	Department activities are designed and implemented, taking international dimensions into account		No	
4.	Exposure of staff and students to international experiences is given priority		No	
5.	Campus is academically, culturally and socially conducive for international students	Yes		
6.	Design and implementation of Academic programmes accommodate the concerns of international students	-	-	N/A

14. RESPONSE TO CHANGING SOCIAL DEMANDS

(1.1) It is confirmed that the Department has put in place a mechanism to monitor and evaluate the changing needs of society, and how best to meet these needs; in order to remain relevant and to maintain competitive advantage.

(1.2) It is also confirmed that the Department has reliable mechanisms to periodically review and adjust academic services in the light of

changing societal preferences and needs, based on feedbacks from groups such as alumni, industries, employers, government agencies and professional bodies.

(1.4) Table 14.1 provides a checklist and summary of the findings, in respect of the Department's performance with regards to response to changing social demands.

Table 14.1: Response to Changing Social Demands

	QUALITY INDICATOR	YES	NO	REMARK
1.	Institution keeps abreast of the changing needs of society	Yes		
2.	Mechanisms are in place to periodically review and adjust academic and consultancy services in the light of societal preferences/needs		No	
3.	Avenues for dialogue with society exist and are thriving	Yes		

15. CONCLUSIONS AND RECOMMENDATIONS

(1.1) The overall quality of education in the Mechanical Engineering Department at the Faculty of Engineering, Jomo Kenyatta University of Agriculture and Technology, Kenya is adjudged to be good, based upon the observations and findings during the quality-audit visit, together with a careful analysis of the self-evaluation and additional relevant statistical data provided.

(1.2) It is confirmed that in general, all aspects of the Department activities offer staff and students, a stimulating and rewarding teaching/learning experiences, conducive for the training and production of high caliber professional engineers.

(1.3) There are several aspects of education and training in the Department of Mechanical Engineering, which are quite positive, noteworthy and merit acknowledgement. These include the following:

- Well-planned curriculum, along with the appropriate mechanism for periodical review, exists.
- Staffs are well qualified academically and professionally, and they handle their duties responsibly.
- Physical facilities are generally very good with regards to space standards.
- The standard of project work and design portfolios is good and they are on display.
- There is good and dedicated leadership at the

Department and University levels. Avenues are also provided for staff and students to participate actively in the decision-making process.

- There is a good team spirit, “*esprit-de-corp*”, in the Department, with staff and students seeing themselves as partners-in-progress.
- The tutoring arrangement whereby staff is assigned to students for mentoring is note-worthy.
- The living conditions for both staff and students, on campus, are fairly good and conducive to learning, teaching and research.
- The sporting and recreational facilities are satisfactory.

(1.4) There remains scope of improvement in certain performance areas.

The department could build on the excellent aspects listed above, by considering the following recommendations, which can be readily grouped into **essential, desirable and advisable** categories:

- Resources for research are limited and relatively small. It

is **essential** to find a way to increase the present level of research resource-base. One way is to set up a Research Grants Unit to actively source and attract research grants locally and overseas, as well as the endowment of professorial chairs.

- Although there is no evidence whatsoever of gender-bias discrimination, it is **essential** to start practicing and monitoring affirmative action, in order to deliberately increase female representation and participation, in all aspects of the Department's activities and programmes. International donor agencies and foundations, which could assist the department with funds and equipment are always interested in gender equity.
- Adequate access to computers and Internet nodes can significantly aid the quality of teaching and laboratory activities. It is **advisable** that the Department should increase the present number of computers and Internet nodes. International Foundations can be approached with this request.
- To enhance the international standing of the Department

it is advantageous and **desirable** to make a deliberate effort to attract international students.

- It is also **desirable** to encourage and attract international scholars to spend their “sabbatical-leave” in the Department.
- It is **advisable** to make full utilization of equipment for consultancy and for income generation.