

# College Architecture and Engineering

## School of Arts and Design



*Sheep grazing in the Giken Dumpsite (March 1, 2020)*

### Introduction

The School of The Arts and Design (StAD) is a constituent School of the College of Architecture and Engineering (CAE) and is situated in the ADD Building, off State House Road, Nairobi. The School offers two degree programmes namely Bachelor of Arts in Design and Bachelor of Interior Design. The two degree programmes are offered over a four year period. BA in Design students specialize in one of the four areas of Graphic, Interior, Product,

Fashion and Textiles and Illustration design. The training is offered as a mix of lectures, individual discovery, studio practice and theory. These are complimented by industry exposure and visiting professional persons. StAD has a strong faculty with diverse specializations supported by technical and support staff serving a student population of over 400 that includes postgraduate and PhD students.

Design has experienced increased demand from consumers, the building sector and manufacturing, because it is an enabler for better products, services and systems. People need aesthetic products, universal design in the environments, sustainable design practices and healthy products and services. Design services are crosscutting in every sector of the economy for example, medicine, agriculture, tourism and small, medium and large firms. When combined with other factors of production and distribution, design innovation and entrepreneurship can contribute significantly to the country's industrialization.

The students and staff actively participate in local and international forums. Some of the international collaborators are Loughborough Design School, University Leicester, Zurich School of the Arts, the Oslo School of Architecture and Design and Cape Peninsula University of Technology (CPUT). Within the eastern Africa region, the School has partnered with Makerere University, Kyambogo University and Kwame Nkurumah University of Science and Technology (KNUST). The School has held conferences, workshops and seminars in collaboration with government, alumni, NGOs, and co-hosted the Africa Design Day (February 22, 2021) conference and exhibition.

The StAD strategy is to continue to provide quality services in design training, research, extension and consultancy. It shall continue to expand its scope and networks through opening up of communication channels and increasing use of open and distant learning platform.

## Programmes Offered

The School of the Arts and Design offers the following Programmes:

### Programmes

- |                                       |                               |
|---------------------------------------|-------------------------------|
| i) Bachelor of Arts (Design)          | iii) Masters of Arts (Design) |
| ii) Bachelor of Interior Design (BID) | iv) PhD (Design)              |

## Student Enrollment in 2020

In September 2020, the School admitted 90 students in various programmes as shown below:

Course	Admissible	Admitted	Variance
B.A. (Design) Module I	47	29	18
B.A. (Design) Module II	10	6	4
BID Module I	50	34	16
BID Module II	18	13	5
M.A. Design	12	8	4
<b>Total</b>	<b>137</b>	<b>90</b>	<b>47</b>

## Student Population

The student population at the school in the academic year 2019/2020 was 369 spread as shown in the table.

Year	Course	Module 1	Module II	Total Undergraduates	Masters	PhDs	Int. Students
Year I	BA Design	29	6	35	8	5	Nil
Year II	BA Design	51	15	66	9		1
Year III	BA Design	39	13	51	N/A		Nil
Year IV	BA Design	39	13	52	N/A	N/A	Nil
Year I	BID	34	14	48	N/A	N/A	Nil
Year II	BID	45	15	60	N/A	N/A	4
Year III	BID	N/A	17	17			
Year IV	BID	N/A	18	18			
<b>Total Number of Students in 2020</b>				<b>347</b>	<b>17</b>	<b>5</b>	<b>5</b>

## International Student

- The total number of undergraduate students was 347 and the total number of international undergraduate students was five (5).
- There were no international postgraduate students
- The percentage component of international student at the school is  $5/347 \times 100 = 1.4\%$ .

## Number of Graduates Per Programme

In the year 2020, the School graduated 91 students as indicated in the table below:

Programme	Graduands
Bachelor of Arts (BA - Design)	87
Bachelor of Interior Design (BID)	0
Masters of Arts (MA - Design)	3
PHD	1
<b>Total</b>	<b>91</b>

## Major Achievements

### Research Activities

1. The School won a research grant worth €20,000/- to conduct a research entitled “Informing energy futures through lessons from science-policy-society interactions case studies in Kenya, Uganda and South Africa”. The lead principal researcher is Dr. Lorraine Amollo.
2. The School won a research grant worth Kshs. 13m to conduct a research and provide consultancy services to undertake investigation into local production/manufacture of affordable ceramic fittings to support affordable housing in Kenya. The lead researcher is Dr. Lilac Osanjo.

### Policy Brief

In January 2020, the School produced a policy brief.

**“A case for providing electricity subsidies in urban informal settlements”** January 2020

### Performance Contract

The School emerged number one (1) in performance contract category of Schools without departments.

### Consultancy

The School undertook a consultancy in 2020 with the Export Promotion and Branding Agency (KEPROBA) in product development for Small and medium enterprises focusing on exports. The enterprises included apparel, tea, chilli, avocado producers among others.

Institution(s)	Detail
Export Promotion and Branding Agency	Training Micro enterprises on product development by Dr. Lilac Osanjo, Ms. Julia Kamuiru and Ms Nkatha Kiruki.

## International Links and Collaborations

The School established three links with other institutions.

Link	Type
University of West Indies, Barbados	Established academic relations in order to promote direct co-operation and communication in the field of Art and Design and related disciplines. The School shared with them the Graphic design syllabus.
Science Council	Informing energy futures through lessons from science-policy-society interactions
Ministry of Transport, Infrastructure, Housing and Public works. State Department of Public Works.	Consultancy Services in affordable ceramic fittings for affordable housing

## Publications for the Year

In 2020, the School had eleven (11) journal publications produced.

Author	Title	Journal	Month & Year
Ms. Betty Mwit	Bottom-up approach: A community intervention in fighting non communicable diseases in urban informal settlement in Kenya	East Africa medical journal	April, 2020
Dr. Lorraine Amollo	Exploring the dynamic of social networks in urban informal settlement: The case of Mathare valley, Kenya	Springer	June, 2020
Dr. Lilac Osanjo	Thinking Through the Growth of The Fashion Design Industry in Kenya	Africa Habitat review	August, 2020
Mr. Mike Kemboi Chesaro	Waste Minimization Strategy for Sustainable Interior Design	Africa Habitat review	August, 2020
Mr. Daniel Munyaga Macharia	Enhancing Visual Aids in Training of Child Caregivers in Daycares Within Nairobi's Urban Informal Settlements	Africa Habitat review	August, 2020
Mr. Ignatius Wambugu Rukwaro	Graffiti Artists in East Africa	Africa Habitat review	August, 2020
Dr. Samuel Maina	Graffiti Artists in East Africa	Africa Habitat review	August, 2020
Mr. Collins Makunda	Waste Minimization Strategy for Sustainable Interior Design	Africa Habitat review	August, 2020
Dr. Samuel Maina	Waste Minimization Strategy for Sustainable Interior Design	Africa Habitat review	August, 2020

Author	Title	Journal	Month & Year
Dr. Lilac Osanjo	Enhancing Visual Aids in Training of Child Caregivers in Daycares Within Nairobi's Urban Informal Settlements	Africa Habitat review	August, 2020
Dr. Betty Mwiti	Enhancing Visual Aids in Training of Child Caregivers in Daycares Within Nairobi's Urban Informal Settlements	Africa Habitat review	August, 2020

## Corporate and Community Outreach Activities

The School designed the logo for “University of Nairobi@50”, logos and branded packaging materials for various tea factories around the country.

The School is undertaking a research on renewable energy in Mathare slums led by Dr. Lorraine Amollo.

## Staff Portfolio

The following is the staff portfolio for the School:

Designation	No. of Staff
Senior Lecturer	2
Lecturer	3
Tutorial Fellow	5
Asst. Lecturer	1
Graduate Assistant	2
Technologists	8
Senior Administrative Assistant	1
Secretary	2
Registry Clerk	1
<b>Total</b>	<b>25</b>

## Strategic Projections

The strategic projection of the School includes:

1. Attracting grants projects to support the growth of the School.
2. Continue to grow the School journal as an avenue for disseminating research findings and innovations.
3. Attract professionals and industry to participate in the implementation of the syllabuses.
4. Grow the numbers of students especially in the postgraduate programmes.
5. Empower the School community in adoption of online teaching and management.

## School of the Built Environment

### Department of Architecture and Building Science

#### Introduction

The Department of Architecture & Building Science is the Leading Centre of Professional Training in Architecture in East and Central Africa. Our mission is to train high caliber professionals in the discipline of Architecture through teaching, research and consultancy.

Founded in 1956, the Department of Architecture was at first the only Department of the Faculty of Architecture, which later became the Faculty of Art and Architecture of the Royal Technical College of East Africa.

#### Programs Offered:

- |  |                                |
|--|--------------------------------|
| i) Bachelor of Architectural Studies (BAS) | iv) Master of Urban Management |
| ii) Bachelor of Architecture (BArch)       | v) PhD                         |
| iii) Master of Architecture (MArch)        |                                |

#### Enrollment

- |   |                                      |
|---|--------------------------------------|
| i) Bachelor of Architectural Studies (BAS)? | iv) Master of Architecture (M.Arch)? |
| ii) Bachelor of Architecture (B.Arch)?      | v) PhD?                              |
| iii) Master of Urban Management (MUM)?      |                                      |

#### Strategic Issues

##### 1. Degree Programmes/Curriculum

##### Bachelor of Architectural Studies (BAS)/Bachelor of Architecture (B.Arch)

Currently the Department of Architecture offers a two-tier degree programme. The 6 year Bachelor of Architecture course was replaced with a 4yr + 2yr structure with the first four years leading to a Bachelor of Architectural Studies degree (B.A.S.) and a further two years leading to Bachelor of Architecture (B.Arch.). The curriculum adopted the concept of electives. Out of these are crafted areas of in-depth study in non – core areas of knowledge. These in-depth study areas are within the first tier of the course.

Strengths	Weaknesses	Opportunities
<ul style="list-style-type: none"> <li>Flexibility of graduating after 4 years with a BAS degree, allowing students to practise in a wide-range of non-design areas of the profession and, within a limited scope, to also engage in design.</li> <li>BArch (Year 5 &amp; 6) offering, is equivalent to an MArch Degree, but with the benefit of funding for Government sponsored students which is only tenable for Undergraduate studies</li> </ul>	<ul style="list-style-type: none"> <li>BAS level currently does not receive any recognition from accreditation institutions such as BORAQS.</li> <li>BArch graduates see little or no value in pursuing a MArch Degree from the Department, and as such the enrolment for postgraduate studies is generally low.</li> </ul>	<ul style="list-style-type: none"> <li>Recognize each stage of the curriculum in the national accreditation system by BORAQS</li> <li>Beef up the 2-tier system, by including an internship program in the interim of BAS &amp; BArch Degrees.</li> <li>BArch (Year 6) Curriculum should focus on resolving fundamental design problems akin to Practice/Industry demands.</li> </ul>



### **Master of Architecture (M.Arch)**

The Department of Architecture offers a two year Postgraduate Master of Architecture Programme. The programme comprises coursework, studio projects, examination and thesis with specialization in the following areas: 1) Architectural Design 2) Environmental Design 3) Building Technology 4) Landscape Design and 5) Urban Design.

**Opportunities:** MArch Degree curriculum should be expanded to resolve research and innovation in specialized fields such as Conservation Practice, History & Theory of Architecture, Industrial Design, etc.

### **Master of Urban Management (MUM)**

The Department of Architecture offers a two year Postgraduate Master of Urban Management Programme. The programme is intended to provide the requisite solid and balanced academic teaching (theory + research) and professional and practical training relevant to urban management in Kenya and the East African region. The course enrolls candidates from various educational and occupational backgrounds relating to urban development.

## **Teaching and Learning**

### **Lectures**

Lectures are administered for thematic theory courses for core areas of the architectural field.

### ***Architecture Design Studios***

This is the core subject in the architectural course and is administered in 'Studio' spaces. All other supporting theory coursework is normally organised to provide contributions towards effective Design Studio learning. The key components of the Design studio include:

- **Practical Student-centred Learning** - Design studio is meant to provide students with expertise and knowledge necessary in order to produce innovative, creative and competent design solutions. The main objective of the Design studio is to develop students' imagination in design and allow them to produce architectural designs that balance between creative, critical and pragmatic thinking.
- **Exhibition-style Presentations** - Students express their architectural ideas through a myriad of communication techniques and methods including free-hand drawings, physical models, computer models, photography, video clips and oral presentations during interim studio presentations
- **Co-teaching/Teaching Panels** - Design Studio sessions are administered through a 1:10 teacher-student ratio. The benefit of co-teaching is that educators work together to plan, organize, evaluate and instruct the students providing a range of ideas/solutions. Students benefit from diverse expertise and panel consensus.
- **Desk-crits** - are one-on-one (teacher-student) instruction activities that increase the opportunity to differentiate student needs.

### ***Examinations***

- Examinations are held in line with the Common Examination Regulations of the School of the Built Environment as approved by the University Senate.
- Examinations shall consist of written papers, projects, studio and portfolios.
- All course units, except projects, studio and portfolios, shall be examined during the semester in which they are taken. Such examinations shall consist of continuous assessment, course tests and end of semester examinations. The end of semester examinations shall account for 70% of the total marks, while continuous assessment and course tests, shall account for 30%.
- All first semester examinations shall be School examinations and shall be approved by the School Academic Board.

## Portfolios and Research Projects

All studio and portfolio examinations in the 2nd, 3rd and 5th years of the BAS/BArch degree course shall be conducted at the end of the academic year in which they are taken and shall in each case be equivalent to six course units.

All studio/portfolio examinations in the 1st, 4th and 6th years of the BAS/BArch degree course shall be conducted at the end of the academic year in which they are taken and shall in each case be equivalent to eight course units.

Research projects for the 6th year of study for BArch are submitted by the last day of written examinations and constitute four course units. Research projects shall be examined at the end of the academic year.

Panel Examinations & Peer-Group Reviewers- All studios and portfolio examinations are examined through a panel consensus and peer-group reviewers for 6th Year graduating class

### *Mentorship*

There is an active culture of mentorship for students by a teaching staff that is actively involved in architectural practice. This is achieved by way of class visits to construction sites, and individual apprenticeship during school breaks. Additionally the BArch (Year 6) project involves one-on-one supervisions between student and teacher.

### *Internship*

Though optional, a large number of students undertake internship programs in architectural firms during school holidays. This greatly contributes to the unique learning process and should be reviewed. The Department should be more proactive in facilitating student placement.

## Major Achievements

Date	Item	Remarks
December 11, 2020	Graduation of 4th and 6th year students who had supplementary /special examinations	Supplementary/special examinations were conducted and students were able to graduate.
November 30 to December 8, 2020	Supplementary/Special examinations	Supplementary/special examinations conducted successfully face to face.
November 9, 2020	Blended learning commenced for all years.	Learning for all years both face to face and online commenced and is progressing on well.
September 21, 2020	Online teaching and learning commences for First Year students	Teaching commenced as scheduled and progressed well.
September 25, 2020	Graduation of 4th, 6th and Masters students	Master of Architecture, Master of Urban Management graduated as well as 4th and 6th year students who graduated with Bachelor of Architectural Studies and Bachelor of Architecture respectively.



Date	Item	Remarks
September 14-25, 2020	Online theory examinations	Theory examinations for all years and Masters were conducted successfully online.
September 7 - 5 October, 2020	Face to Face Portfolio examinations for 1st, 2nd, 3rd, and 5th year students	The examinations were conducted successfully face to face.
July 21 to August 10, 2020	Portfolio examinations for graduating years	The examinations were conducted successfully face to face.
February 2020	Publication of a book and an International Exhibition at the Guggenheim Museum in New York showcasing work by our department amongst 5 other international universities from February 2020.	Several members of staff and students in the department participated.
February 9-16, 2020	4th year annual study trip to the Kenya Coastal Strip (Mombasa)	Annual academic trip to Mombasa for 4th year portfolio project.
February 3-8, 2020	3rd year field trip to Voi, Taita Taveta County	Annual academic trip to Voi for 3rd year portfolio project.
February 8, 2020	Mangu High School Career Fair	The department set up an exhibition tent which included brochures for courses offered in the School, student model showcasing a final year project, projector and screen displaying final year works from Architecture students.
January 29, 2020	2nd year academic trip to Machakos University	2nd year tour of Machakos University to design a Students' Centre.
January 6, 2020	Commencement of 2nd semester 2019/2020 learning.	Learning commenced for year 1-6, Master of Architecture and Master of Urban Design.

## Corporate and Community Outreach Activities

Date	Item
February 2020	Publication of a book and an International Exhibition at the Guggenheim Museum in New York showcasing work by our department amongst 5 other international universities from February 2020.
February 9-16, 2020	4th year annual study trip to the Kenya Coastal Strip (Mombasa)
February 3-8, 2020	3rd year field trip to Voi, Taita Taveta County
February 8, 2020	Mangu High School Career Fair

## Staff Portfolio

Designation	No. of Staff
Professor	4
Associate Professor:	1
Senior Lecturer:	6
Lecturer	20
Assistant Lecturer:	1
Tutorial Fellow:	9
Chief Technologist:	1
<b>Total</b>	<b>42</b>

## Projections

Date	Item
August, 2021	Annual E.A. Architecture Workshop and Exhibition
August, 2021	Basco Awards of Excellence
March - April, 2021	Annual 4th year academic trip to Mombasa
March, 2021	Annual 3rd year academic trip to Voi, Taita Taveta County

## School of Engineering

### Department of Electrical and Information Engineering

#### Introduction

The Department runs BSc, MSc. and PhD. programs in Electrical and Electronic Engineering. The undergraduate BSc. program consists of five years of study, and contributes to knowledge in both fundamental and applied areas of Electrical Engineering. It provides a diverse curriculum that instills in our students the skills, talents and creativity necessary for the varied and rapidly changing requirements. This enables them to serve a wide variety of other fields that require leadership, teamwork, decision making and problem solving abilities.

#### Student Enrolment

Undergraduate	Masters	PhD
514	16	16

#### International Students

Programme	No. of Students
Undergraduate	6
Masters	2
<b>Total</b>	<b>8</b>

#### Numbers of Graduands

Programme	No. of Students
Undergraduate	60
Masters	4
PhD	1
<b>Total</b>	<b>8</b>

#### Six Students Attained a First Class Honours

#### Research Publications

Some of the reported publications and conference presentations are listed below.

Authors	Title	Journal	Date
Ronoh Kennedy, Kamucha George	Comparison of Hybrid Firefly Algorithms for Binary and Continuous Optimization Problems in a TV White Space Network	WSEAS Transactions on Communications, Vol. 19, pp. 155-172, 2020	Oct 2020
Henry Kiragu, Elijah Mwangi and George Kamucha	An Efficacious MRI Sparse Recovery Method Based on Differential Under-Sampling and k-Space Interpolation	Proceedings of 20th IEEE Mediterranean Electrotechnical Conference (IEEE MELECON 2020), pp. 382-387, Palermo, Italy	Jun 2020
Stephen Kiambi, Elijah Mwangi, George Kamucha	A Low-Complexity Signal Addition Method for PAPR Reduction in OFDM Systems	International Journal of Computer Application, Vol. 5(10), pp. 21-34, 2020.	Oct 2020

Authors	Title	Journal	Date
Peter Musau Moses,	Metaheuristic-based Adaptive Hybrid Algorithm for solving Constrained Optimization Problems	European Journal of Advances in Engineering and Technology 2020, 7(6):57-65, Volume 7 Issue 6	2020
Jackson Mwangi Mbuthia	Metaheuristic-based Adaptive Hybrid Algorithm for solving Constrained Optimization Problems	European Journal of Advances in Engineering and Technology 2020, 7(6):57-65, Volume 7 Issue 6	2020
P. Musau	Comparative Analysis of Implementation of Solar PV Systems Using the Advanced SPECA Modelling Tool and HOMER Software: Kenyan Scenario	High Tech and Innovation Journal pg 8-20 Vol 1, No 1 (2020), DOI: 10.28991/HIJ-2020-01-01-02	March2020
Job Kerosi, Heywood Ouma, and Kibet Langat	Sum Rate and Fairness Maximization in Device-to-Device Communication Underlying Cellular Networks	International Journal of Scientific and Technology Research (IJSTR), ISSN 2277-8616, Volume 9 Issue 2, pp.6438-6443	February 2020
Davies Segera, Mwangi Mbuthia, Abraham Nyete	“An Innovative Excited-ACS-IDGWO Algorithm for Optimal Biomedical Data Feature Selection”	BioMed Research International, vol. 2020, Article ID 8506365, 17 pages, 2020. <a href="https://doi.org/10.1155/2020/8506365">https://doi.org/10.1155/2020/8506365</a>	August, 2020
P.M. Musyoka, P. Musau and A. Nyete	“Optimal Load Shedding Scheme for a Model Renewable Energy Micro-Grid,”	2020 IEEE PES/IAS PowerAfrica, Nairobi, Kenya, 2020, pp. 1-5, <a href="https://doi.org/10.1109/PowerAfrica49420.2020.9219902">https://doi.org/10.1109/PowerAfrica49420.2020.9219902</a>	October, 2020
H. Omondi, P. Musau and A. Nyete	“Smart Grid Energy Management System for Industrial Applications,”	2020 6th IEEE International Energy Conference (ENERGYCon), Gammarth, Tunis, Tunisia, 2020, pp. 1062-1067, doi: 10.1109/ENERGYCon48941.2020.9236544.	October, 2020
P.M. Musyoka, P.M. Musau and A. Nyete	“Coherent Swing Under-Frequency Transient Stability for Renewable Sources Islanded Micro-Grid,”	2020 6th IEEE International Energy Conference (ENERGYCon), Gammarth, Tunis, Tunisia, 2020, pp. 413-416, doi: 10.1109/ENERGYCon48941.2020.9236525	October, 2020
W. O. Amolo, P. Musau and A. Nyete	“Non-Technical Power Loss Reduction and Transients Stability: Optimal Placement of Reclosers,”	2020 IEEE PES/IAS PowerAfrica, Nairobi, Kenya, 2020, pp. 1-5, doi: 10.1109/PowerAfrica49420.2020.9219824.	October, 2020

Authors	Title	Journal	Date
N.N. Mwanza, P.M. Moses and A.M. Nyete	“Short-term Forecasting for Integrated Load and Renewable Energy in Micro- grid Power Supply,”	2020 IEEE PES/IAS PowerAfrica, Nairobi, Kenya, 2020, pp. 1-5, doi: 10.1109/ PowerAfrica49420.2020.9219859.	October, 2020
B.O. Ojwang, P.M. Musau, A.M. Nyete and C.W. Wekesa,	“Developing an Environmental Decision Making Model for Optimal Solar and Wind Energy Utilization,”	2020 IEEE PES/IAS PowerAfrica, Nairobi, Kenya, 2020, pp. 1-5, doi: 10.1109/ PowerAfrica49420.2020.9219850.	October, 2020
Filbert Onkundi Ombongi, Heywood Ouma Absaloms, Philip Langat Kibet	Energy Efficient Resource Allocation in Millimeter- Wave D2D Enabled 5G Cellular Networks	Engineering, Technology & Applied Science Research, VOLUME 10, ISSUE 4 PAGES 6152-6160	August, 2020

## Research Projects and Grants

Research Project Title	Funding Body	Proposal Details	Principal Researcher	Grant	Duration
Kenya/South Africa Collaborative Research Grant	NRF-Kenya and NRF-South Africa	New multiple Antenna System for 5G	Dr Akuon Peter Otero	KShs 3M	
ADB/MOEST Training Contract	ADB/MOEST	Training for PhD and MSc in Electrical and Electronic Engineering	Prof H A Ouma	KShs 33,842,127	3 years (2017- 2020)

## Staff

Associate Professor - 4    Senior Lecturer - 2    Lecturer - 6    Tutorial Fellow - 3  
Graduate Assistant - 4    Technical Staff - 13    Secretary - 1    Cleaner - 2    **Total = 35**

## Key Achievements

Date	Item	Department	Comment
May 12, 2020	Demonstration of a Ventilator model for Covid-19 mitigation	Electrical and Information Engineering	The electrical engineers (Lead Investigators) teamed with their mechanical counterparts and medical doctors to develop a model of a home-grown portable ventilator that will reduce the cost of the current ventilators by nearly 90%.

Date	Item	Department	Comment
April, 2020	Online teaching and learning commences	Electrical and Information Engineering	In response to COVID-19 pandemic, the department transitioned its teaching and learning for all theoretical units smoothly into online.
August 1st 2020 to 31st July 2021	Award of Mini Grant worth Kshs. 1,500,000/= from KENET	Electrical and Information Engineering	Prof Heywood Ouma, Oscar Ondeng and Kinyua Wachira received Kshs. 1,500,000/= in support of activities of A students-Driven, Quasi-Flipped Learning Program for Embedded Design and Machine Learning Using the Raspberry-Pi Platform.
Aug 24th-4th Sept, 2020	Online examinations	Electrical and Information Engineering	The department conducted its first semester online examination 2019/2020 as approved by the Senate. The Success enabled the completion of studies for students and promotion to the next academic year
August 26, 2020	Online registration & orientation of new students	Electrical and Information Engineering	Enrollment and orientation of first year students was Successful conducted in the department
September 25, 2020	47 students graduated in Virtual 63rd Graduation Ceremony held at the Great Court	Electrical and Information Engineering	The department produced the following graduands: BSc - 44      MSc - 1      PhD - 1
12th - 14th October 2020	AEC2020 Virtual Conference	Electrical and Information Engineering	The Architecture & Engineering conference was conducted virtually chaired by Dr. Peter Akuon.
December 11, 2020	19 students graduated in virtual 64th Graduation Ceremony held at the Great Court	Electrical and Information Engineering	The department produced the following graduands: BSc - 16      MSc - 3
December 2020	Winner Award KSA Research Chair Grant	Electrical and Information Engineering	Overall winner in the KSA Award Grant worth Kshs. 1,000,000/= for development of nanosatellite with PI as Prof. J. Mwangi Mbuthia.
December 2020	Successfully Set up of calibration laboratory	Electrical and Information Engineering	Set up of a modern calibration centre to be accredited by Kenya Accreditation Service (KENAS)



# Department of Petroleum and Chemical Engineering

## Introduction

The Department of Petroleum and Chemical Engineering is the most recent addition to the School of Engineering, at the University of Nairobi. The Department was started as a program under the Department of Mechanical and Manufacturing Engineering in the year 2014, which led to the admission of the first cohort of students in 2015.

The Petroleum Engineering undergraduate program is primarily concerned with the training on how to engage in economic extraction of oil and gas natural resources from the earth. Producing oil and gas is accomplished through the exploration, design, drilling and operation of wells and well systems, and the integrated management of the underground reservoirs in which the resources are found. A minor emphasis of the petroleum engineering program at the University of Nairobi will be the study of transportation of crude and refined petroleum products as well as downstream activities such as storage and distribution of petroleum products.

The curriculum is tailored to give the students a solid scientific foundation from the start, where in the first year of study, courses in mathematics, physics, chemistry, computer programming are taught, as well as other courses in the humanities such as communication skills, philosophy and HIV/AIDS. These courses are common to other disciplines of engineering.

Engineering sciences such as Geology, Fluid Mechanics, Thermodynamics and Heat Transfer, Mechanics of Machines, Systems and Controls, Engineering Communication as well as Mathematics.

In the fourth and fifth years of study, the students study specialized courses in reservoir engineering, well drilling technology, the evaluation of petroleum formations, and production systems and production enhancement. In these senior years, students also are expected to study broad subjects such as engineering management. In the final year of study, students work on an engineering project that could be experimental or design-based and this exposes them to the design process from concept to the final product, emphasizing effective communication and presentation skills.

## Strategic Issues

The success of any program is a combination of a well trained and committed team of faculty plus a strategic investment in equipment for student training and research. The department has developed as a strategic initiative, a plan to acquire state of the art equipment for demonstration activities, experiments, and research and development activities. Currently there are efforts to develop a High Performance Computing Laboratory to enable simulation of Oil and Gas reservoirs. In addition, efforts are underway to map out laboratory facilities within industry and to build collaborative efforts that would enable mutual beneficial collaboration through the use of these laboratories.

## Staff

The Department of Petroleum and Chemical Engineering is currently in the growth stages of its set up. The department has used a combination of adjunct Professors and industrial experts to support its training program. This has been implemented in tandem with an aggressive program to develop its own staff. Currently we have two members of staff at an advanced stage in their MSc. in Petroleum Engineering. Additionally, there are plans to register members of staff in relevant PhD programs.

## Major Achievements

Our pioneer class is currently in their final year of study and is expected to graduate in September of 2021. This is a major milestone that we expect to celebrate. The curriculum has also undergone its first overhaul and is set to be approved by the senate in the first quarter of 2021. The delivery of courses entered a new stage this year with the start on online instruction. The Department also succeeded in mounting online instructions that saw the conclusion of the 2019-2020 academic year, and the first semester of the 2020-2021 academic year. The Department of Petroleum and Chemical Engineering has links and collaborations with University of Petroleum and Energy Studies (UPES) India. This collaboration enabled one of our staff members to pursue further studies in India. In addition, our pioneer fifth year students studied five (5) units in their first semester in UPES, India.

## Projections

In the next academic year, the Department expects to grow its team of faculty to further strengthen delivery of its curriculum. This has been a long-term effort and we are glad to see a return on the initial efforts of the program developers. Additionally, the department will prepare and present post graduate course curricula to develop higher level skills for the enhancement of our contribution in this sector.