



Nuclear Science and Technology Training at Kenyatta University

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Report Outline

- ❑ General Introduction
- ❑ Education and Training
 - ❑ Nuclear Science and Technology
 - ❑ National and Regional Engagements
- ❑ Future Plans and Recommendations



Kenyatta University -General Introduction

Current programs related to nuclear science and technology:

- ❖ School of Pure and Applied Sciences - Department of Physics
 - Nuclear Physics, Nuclear Science and Technology
 - IAEA-IRL project, IAEA-PGEC training
- ❖ School of Engineering - Department of Energy Technology
 - Nuclear Energy Technology
- ❖ School of Health Sciences - Department of Food Nutrition and Dietetics
 - Application of isotope techniques in child obesity studies

Emerging interests:

- ❖ School of Law – Nuclear Law
- ❖ School of Education – Nuclear Knowledge Management
- ❖ School of Business and Economics – Nuclear Economics

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Training Programs

- ✓ Bachelor of Science (Pure and Applied Physics)
- ✓ Bachelor of Science (Telecommunication and Information Technology)
- ❖ **Bachelor of Science (Nuclear Science and Technology) - New**

- ✓ Master of Science (Physics)
 - Environmental Physics
 - Geophysics
 - Nuclear Physics
 - Material Science
- ✓ Master of Science (Electronics and Instrumentation)
- ❖ **Master of Science (Nuclear Science and Technology) - New**

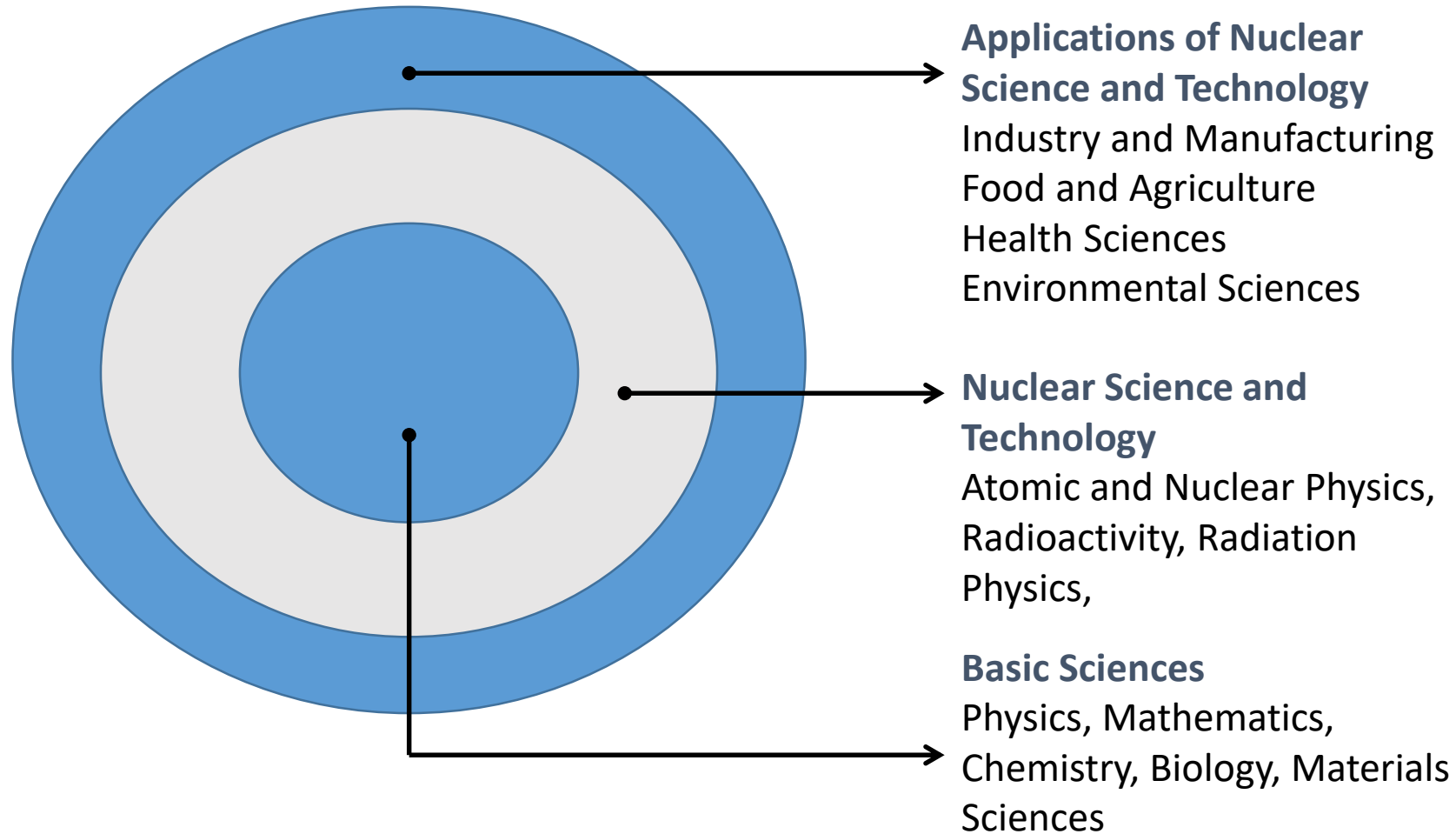
- ✓ Doctor of Philosophy (Physics)
- ✓ Doctor of Philosophy (Material Science)
- ❖ **Doctor of Philosophy (Nuclear Science and Technology) - New**

<http://spas.ku.ac.ke/index.php/departments/departments-of-physics>



New Training Program

Bachelor of Science (Nuclear Science and Technology)





New Training Program

Master of Science (Nuclear Science and Technology)

Level I

Core courses

SCU 800 Research Methodology
SCU 801 Scientific Data Analysis
SPH 802 Quantum Mechanics (existing)
SPH 804 Mathematical Methods in Physics (existing)
SPH 855 Advanced Nuclear Shell Theory (existing)
SPH 858 Radiation Physics
SPH 893 Nuclear Reactor Physics I (new)
SPH 895 Nuclear Energy Management (new)
SPH 896 Nuclear Knowledge Management (new)

Elective Courses

SPH 856 Nuclear Spectroscopy (existing)
SPH 857 Nuclear Techniques (existing)
SPH 859 Nuclear Electronics (existing)
SPH 894 Nuclear Reactor Physics II (new)

Level II

SPH 880 Thesis

1

- Formulation of research topic
- Presentation of proposal

2

- Conduct of research
- Progress reporting

3

- Dissemination of findings
- Examination of thesis

Completion of M.Sc. degree



New Training Program

Doctor of Philosophy (Nuclear Science and Technology)

Course Work

Common courses

SCU 900: Research Methods and Scientific Writing
SCU 901: Scientific Innovations and Entrepreneurship
SCU 902: Advanced Data Analysis

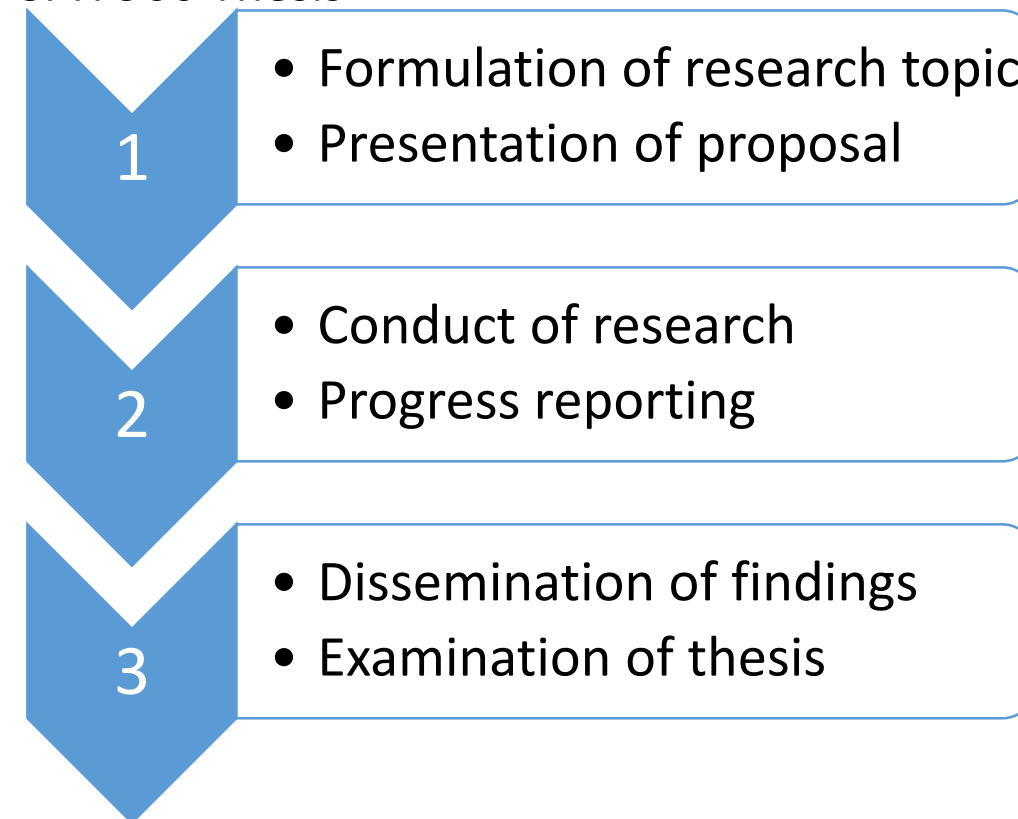
SPH 900: Ph.D Thesis

Core Courses

SPH940 Advanced Computational Nuclear Science
SPH941 Advanced Nuclear Detectors
SPH942 Integrated Nuclear Management

Research Work

SPH 900 Thesis



Completion of Ph.D. degree



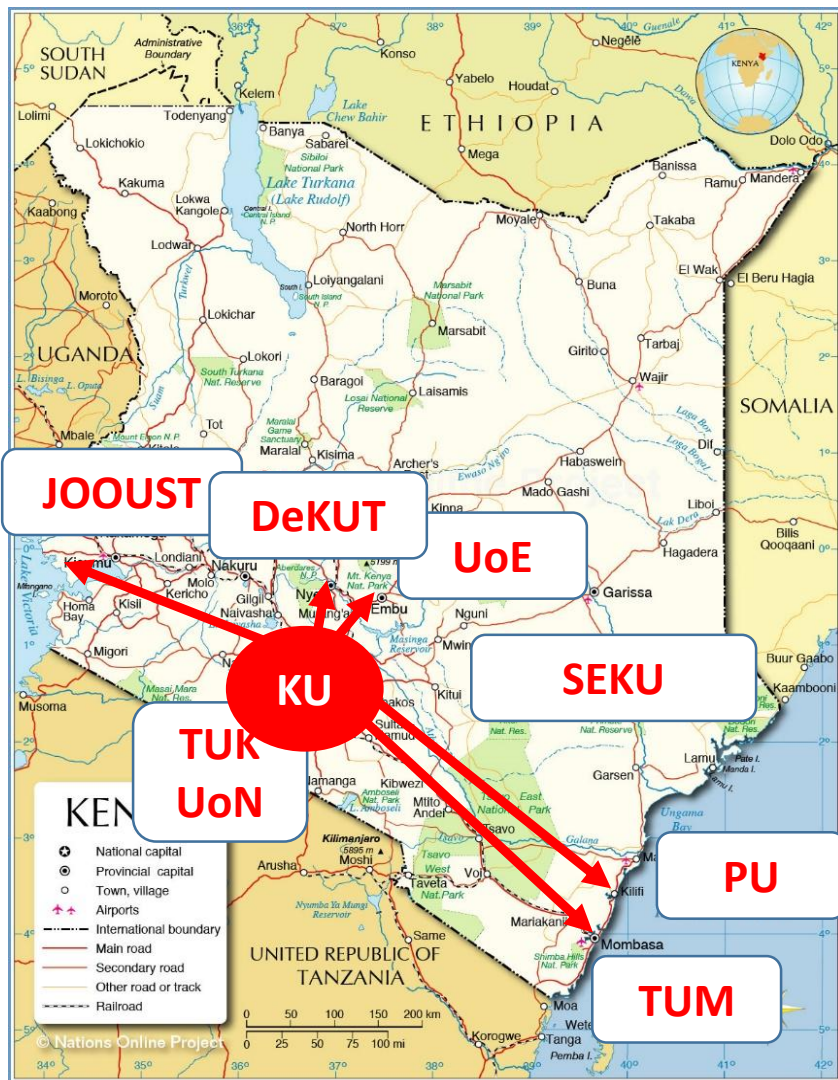
Facilities for Training and Research



Facility	Applications
Nal(Tl) detectors Portable gamma-ray spectrometer Radeye	Gamma-ray spectroscopy, Radioactivity measurements Radiation surveys
Plastic Scintillators Water Cherenkov detector	Measurement of cosmic ray muons
Radiometer	Measurement of radon in water



IAEA – Internet Reactor Laboratory in Kenya



Host: CNESTEN, Morocco

Local Participants:

- ✓ Kenyatta University (KU) – coordinator
- ✓ Dedan Kimathi University of Technology (DeKUT)
- ✓ Jaramogi Oginga Odinga University of Science and Technology (JOOUST)
- ✓ Pwani University (PU)
- ✓ South Eastern Kenya University
- ✓ Technical University of Kenya (TUK)
- ✓ Technical University of Mombasa (TUM)
- ✓ University of Embu (UoE)
- ✓ Kenya Young Generation in Nuclear (KYGN)
- ✓ University of Nairobi (UoN)

Experiments:

1. Reactor start-up
2. Approach to criticality
3. Reactivity measurement
4. Rod worth measurement
5. Reactor dynamics
6. Measurement of reactor power





Stakeholder Engagement – July 2025



Stakeholder engagement for the curricula in Nuclear Science and Technology

N.O. Hashim – Nuclear Science and Technology Training at Kenyatta University – INPRO 2025

IAEA-PGEC training in Kenya 2025-26



- 28 Participants from 15 Member States in Africa
- Course Director from Kenya Nuclear Regulatory Authority (NKRA)
- Participants hosted at Kenyatta University



National Commission for Science,
Technology and Innovation



RAF0060 Educating Secondary Students and Training Science Teachers in Nuclear Science and Technology



Topics covered:

- ✓ The atomic nucleus
- ✓ Nuclear radiation
- ✓ Effects of ionizing radiation
- ✓ Applications of nuclear science and technology in:
 - ☐ Agriculture
 - ☐ Energy
 - ☐ Environment
 - ☐ Health
 - ☐ Industry
 - ☐ Water resources management

Facilitated by:

Prof. Nadir Hashim – KU

Dr. Stephen Situma – NACOSTI

With technical support by:

Mr. Manase Wakala - KU

Ms. Jane Migwi - KU

Mr. Jack Kisingu - KU

Nuclear Science and Technology Awareness Session for Mama Ngina Girls High School
held in the Department of Physics at Kenyatta University, on Friday 01 August 2025



Future Plans and Recommendations

- ❖ Seek the necessary support, assist visit by IAEA
- ❖ Engage with stake holders at the national, regional and international levels
- ❖ Enhance the use of digital learning in course delivery
- ❖ Seek accreditation by the Commission for University Education (CUE) in Kenya
- ❖ Enhance industrial collaborations, for example:
 - local cement companies for non-destructive testing,
 - government department of water and mineral resources for isotope hydrology applications,
 - nuclear power and energy agency for nuclear reactor applications
- ❖ Enhance the collaboration at the national, regional and international level
- ❖ Implement Nuclear Science and Technology (NST) program
- ❖ Enhance national network in Nuclear Education Science and Technology