

## POST-GRADUATE EDUCATION AND TRAINING IN OCCUPATIONAL RADIATION PROTECTION IN GHANA

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### ABSTRACT

The Department of Nuclear Safety and Security is one of the Departments of the School of Nuclear and Allied Science (SNAS) established in 2006 jointly by the Ghana Atomic Energy Commission, (GAEC) and the University of Ghana with the collaboration of the International Atomic Energy Agency (IAEA). The Department offers MPhil and PhD Degree programmes in Health Physics and Radiation Protection and also an IAEA sponsored Postgraduate Education Course in Radiation Protection and Safety of Radiation Sources (PGEC). The mandate of the Department is to develop human capability and capacity in Radiation Protection, Nuclear Safety and Security. The department has educated and trained about 90 MPhil and PhD graduates in the past decade, most of whom now constitute the core human resource base for the Nuclear regulatory authority and the its key TSO, the Radiation Protection Institute of the Ghana Atomic Energy Commission. Additionally, the department has since 2011 been recognised as an IAEA Regional Designated Centre for Professional and Higher Education in Radiation Protection which has trained over 200 fellows from various IAEA member countries from Africa through the PGEC programme in Radiation Protection and Safety of Radiation Sources. Beneficiaries from the PGEC programme in Ghana are contributing significantly in various capacities in their respective regulatory bodies and TSO's within the Africa region. The department continues to offer support to regulatory bodies and TSO's within the Africa region through Graduate Education and training in Occupational Radiation Protection which are key components needed to develop and maintain technical expertise. In this Paper, the experience of a comprehensive theoretical, practical and field work in occupational radiation protection Education and training following a well-structured and internationally accepted approach is presented

### INTRODUCTION

Radiation sources and ionising radiation are widely used in various sectors of the Ghanaian economy which includes but not limited to Medical (General X-ray Units, CT Scanners, Dental, Fluoroscopy Units, Mammography, Radiotherapy and Nuclear Medicine), Industry (Moisture/density gauges, level gauges, thickness gauges, X-ray and gamma scanners), Agriculture, mineral mining, Oil and gas industry (well logging), road construction, breweries, NDT, other industrial facilities, Research and teaching etc. Hence there is the demand for professionals who understand radiation hazards and their prevention and control to help them minimize the health risks due to radiation.

Ghana has played a lead role in the development of basic and advanced infrastructure for the peaceful application of nuclear and nuclear related techniques in medicine, industry, agriculture, water resources management, research and teaching after it joined the IAEA 1963 in which it has benefited from several TC projects with the IAEA. In all these applications, adequate, systematic and sustainable education and training of those who are occupationally exposed is key to maintaining radiation protection and safety cultures commensurate with the hazards posed by the varied and complex nuclear technologies introduced and evolving over the years for socio-economic development of Ghana.

The Department of Nuclear Safety and Security is one of the five (5) Departments of the School of Nuclear and Allied Science (SNAS). The school was established in 2006 by the Ghana Atomic Energy Commission (GAEC) in collaboration with the University of Ghana (UG) and in co-operation with the International Atomic Energy Agency (IAEA), Vienna, Austria. The school offers accredited Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) programmes. In addition, the Department also runs the IAEA sponsored Postgraduate Educational Certificate (PGEC) in Radiation Protection and Safety of Radiation Sources which began in 2011 after the Department was endorsed as IAEA Regional Designated Centre (RDC) for Radiation Protection in October 2011.

Currently, the Department is the only University Department in Ghana educating the next generation of professional Radiation Protection Specialist for the Nuclear and other Industries in Ghana and neighbouring member countries. This programme seeks to train Health Physics and Radiation Protection practitioners who would spearhead the beneficial use of radiation while protecting workers and the public from potential radiation hazards

### ADMISSION REQUIREMENTS

Admission to MPhil programme in Health Physics and Radiation Protection is limited to applicants who have a good Bachelor's Degree at least second class lower division in the field of Physics, Chemistry, Biology, Engineering, or equivalent from a recognized university. Applicants with qualifications in appropriate areas of applied science, and those with other qualifications together with suitable practical experience may also be considered. Prospective candidate for admission to PhD programme in Health Physics and Radiation Protection are required to have MPhil /Master's Degree in the field of Physical and Biological Sciences, Engineering, Nuclear Sciences and Nuclear Engineering, or equivalent from a recognized university.

### DURATION OF PROGRAMME

The duration for the completion of the MPhil programme is two years for full-time students and four years for part time- students. For PhD programme the duration is normally four years for fulltime students and six years for part-time students

### STRUCTURE OF PROGRAMME

The following are the credits that a registered MPhil, PhD and PGEC students are required to earn in order to graduate as presented in Figs. 1- 3

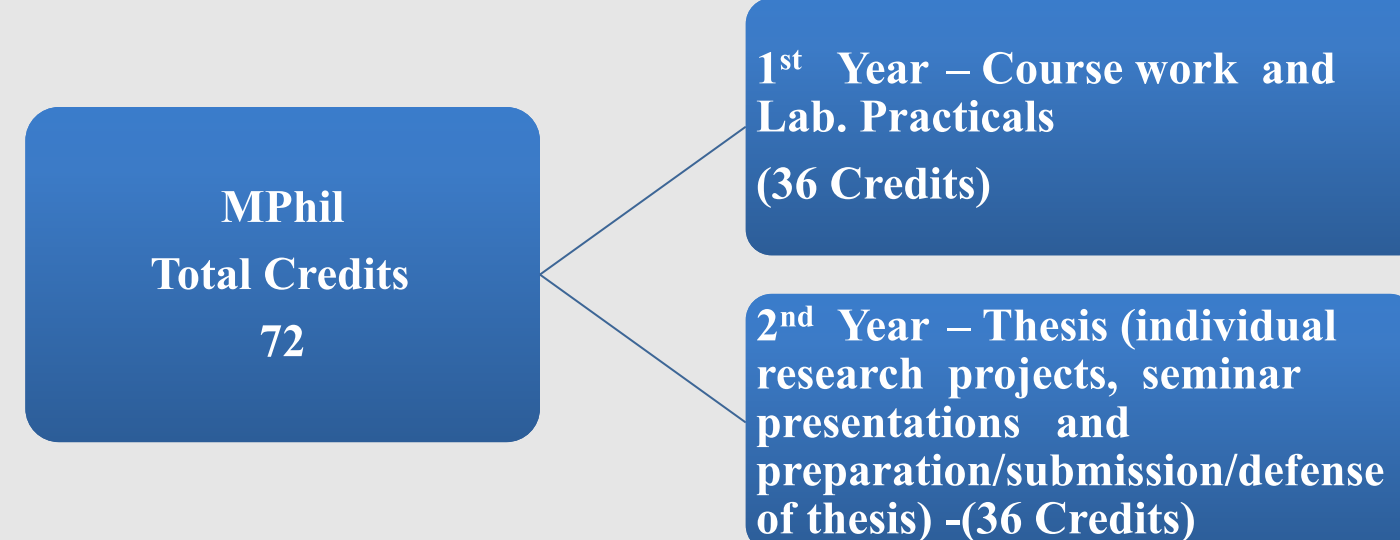


FIG. 1. Structure and graduation requirement for MPhil Programme

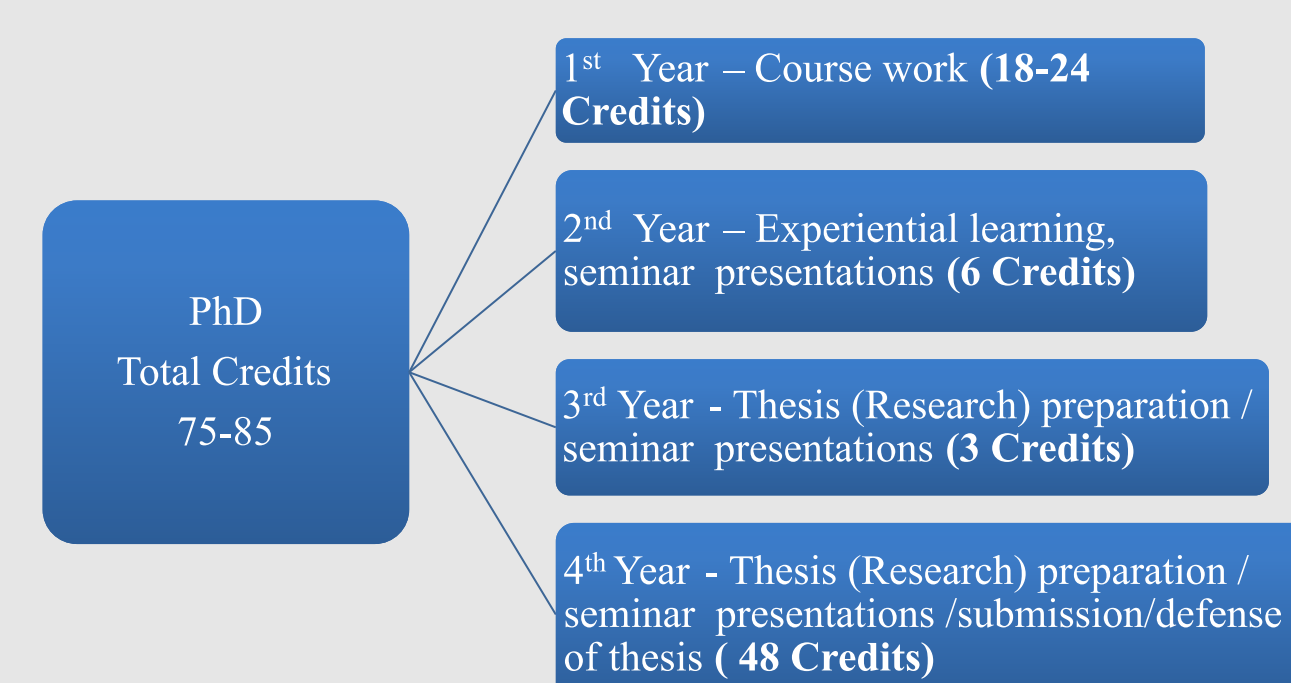


FIG. 2. Structure and graduation requirement for PhD Programme

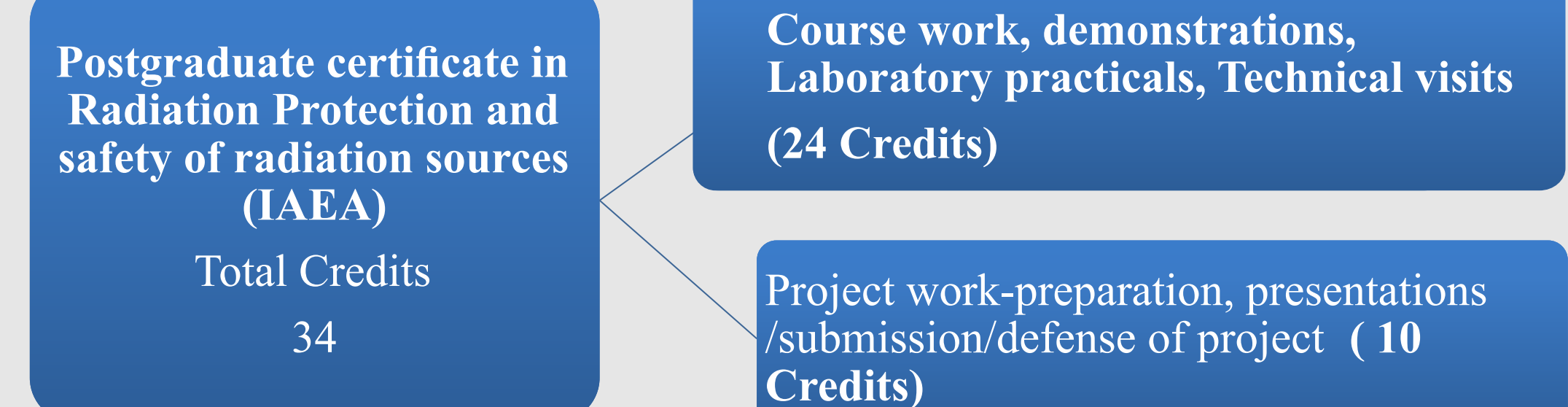
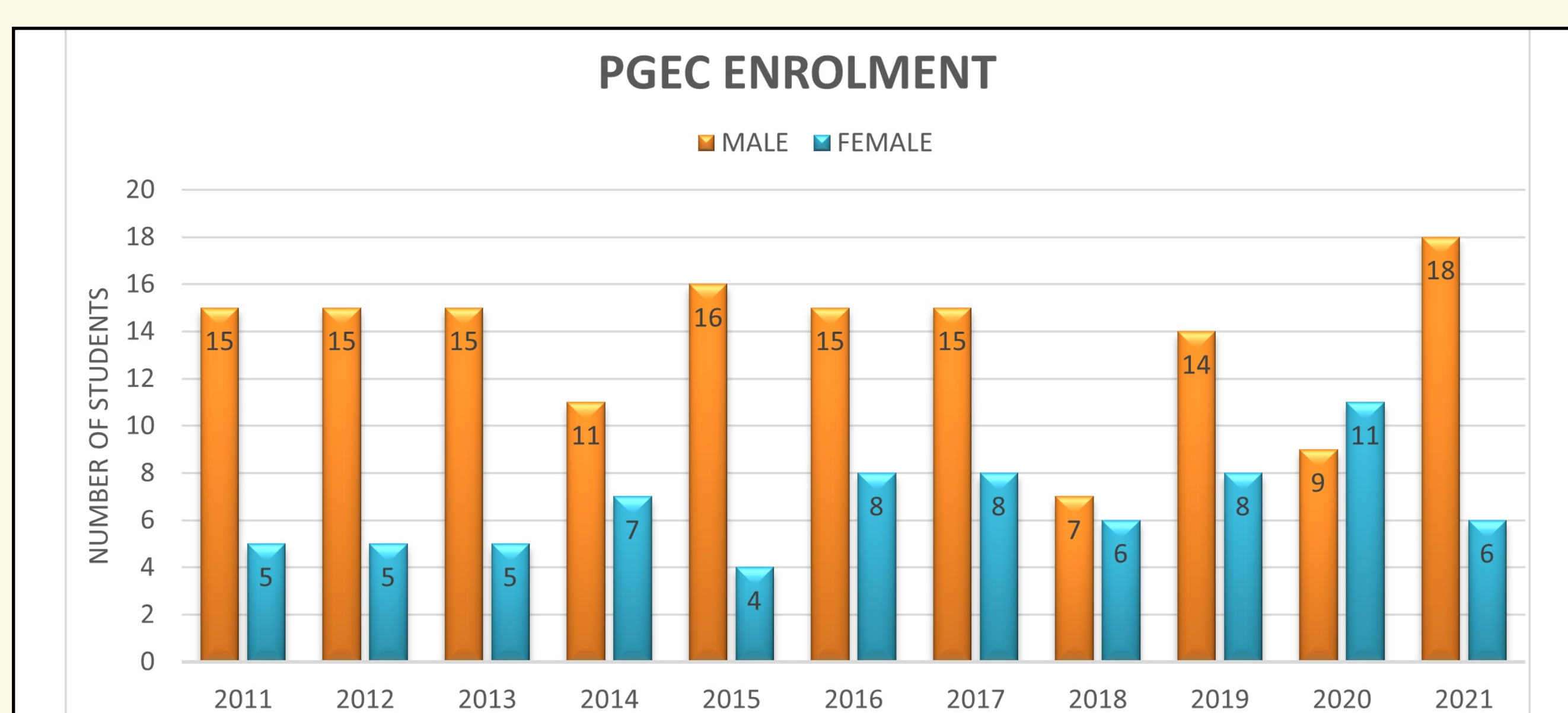


FIG. 3. Structure and graduation requirement for PGEC Programme

Enrolment statistics in the MPhil/PhD Radiation Protection and PGEC programmes are presented in Table 1 and Fig. 4 respectively.

Year	Total	Male	Female	M Phil	PhD
2006	6	4	2	6	-
2007	6	6	-	5	1
2008	7	5	2	7	-
2009	5	5	-	5	-
2010	6	5	1	6	-
2011	10	10	-	5	5
2012	7	6	1	7	-
2013	8	6	2	8	-
2014	9	5	4	9	-
2015					
2016	4	2	1	3	1
2017	2	2	-	2	-
2018	4	2	2	2	2
2019	5	2	3	2	3
2020	3	2	1	1	2
2021	11	9	2	7	4



### FACULTY

The Department of Nuclear safety and security has a well-resourced and experienced faculty comprising of professors, associate professors, senior lecturers and lecturers. In addition to faculty members from GAEC and UG, adjunct professors, lecturers and consultants are also recruited from partner institutions in other IAEA Member States to co-supervise research studies of PhD candidates who are on IAEA sandwich programmes.

### CONCLUSION

The department has educated and trained over 90 MPhil and PhD graduates since 2006, most of whom now constitute the core human resource base for the Nuclear regulatory authority and the its key TSO, the Radiation Protection Institute of the Ghana Atomic Energy commission. Additionally, the department under sponsorship of the IAEA has since 2011, trained over 200 fellows from various IAEA member countries from Africa through the PGEC programme in Radiation Protection and Safety of Radiation Sources. Beneficiaries from the PGEC programme in Ghana are contributing significantly in various capacities in their respective regulatory bodies and TSO's within the Africa region. The department continues to offer support to regulatory bodies and TSO's within the Africa region through Education, training and tutoring in Radiation Protection which are key Components Needed to Develop and Maintain Technical Expertise for a formidable Radiation Protection work force.

### FOR ENQUIRIES CONTACT:

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