International Journal of Nuclear Security

Volume 2 | Number 3 Article 8

12-31-2016

Developing and Promoting a Nuclear Security Curriculum at Amity University, India: Beginnings, Successes and Challenges

Ms. Kawalpreet Kalra
Amity Institute of Nuclear science and technology, Amity University, India

Ms. Archana Yadav
Amity Institute of Nuclear Science and Technology, Amity University, India

Dr. Alpana Goel
Amity Institute of Nuclear Science and Technology, Amity University, India

Developing and Promoting a Nuclear Security Curriculum at Amity University, India: Beginnings, Successes and Challenges

Cover Page Footnote

*Corresponding Author: Kawalpreet Kalra e-mail: kawal1211@gmail.com ** Special thanks to Mr. Daniel Miller from PNS, Dr. Christopher Hobbs from KCL for helping us while developing the Nuclear security Curriculum

International Journal of Nuclear Security, Vol. 2, No. 3, 2016

Developing and Promoting a Nuclear Security Curriculum at Amity University, India: Beginnings, Successes, and Challenges

Kawalpreet Kalra, Archana Yadav, and Alpana Goel
Amity Institute of Nuclear Science and Technology, Amity University, AUUP, Noida-201303, India

Abstract

Amity University is one of India's leading research- and innovation-driven private universities. The Amity Institute of Nuclear Science and Technology (AINST), established in 2009, contributes to the fulfillment of Amity's mission to promote national development through philanthropy, education, and research. Recently, courses related to nuclear security and security cultures have been added to the existing AINST curriculum. The purpose of introducing these courses was to enhance the understanding of technical, policy, and regulatory challenges associated with nuclear security and to create a nuclear security culture among relevant local institutions. This paper describes the process involved in establishing nuclear security courses as elective courses in the engineering and technology domain for undergraduate-level and postgraduate-level engineering students at the Institute, discusses both the challenges faced in these early stages as well as the achievements and successes, and outlines future plans for the program.

Keywords: Education, curriculum, nuclear security culture, India

I. Introduction

The increased use of nuclear and radioactive materials poses the challenge of keeping that material secure. Most nuclear security systems are designed, managed, and operated by humans; therefore, successful nuclear security depends on the quality of its systems, processes, and, most importantly, on human resources. Effective nuclear security requires that each individual be held accountable, that the systems in place are reliable, and that procedures for access, control, and authority of special nuclear materials are well laid out. A competent and robust nuclear security culture encourages people to be vigilant and take appropriate measures to protect against the proliferation of nuclear materials and nuclear threats **[*1*]**. Many countries around the world, such as the United States, France, Japan, and many more, have successfully introduced human reliability programs to augment their nuclear security culture. India, too, has an established human reliability program in place to make sustainable improvements in nuclear

security, and, as part of this effort, skilled scientists and engineers are taught in an academic environment the best practices in the field of nuclear security.

The International Atomic Energy Agency (IAEA) has emphasized the need to educate and train people in nuclear security **[*2*]**. To strengthen the concept of global nuclear security and nuclear governance, the first nuclear security summit was held in Washington, D.C., in 2010, and was followed by additional summits in Seoul in 2012, The Hague in 2014 **[*3*–*6*]**, and again in Washington, D.C., in 2016. These summits achieved tangible success in the area security of nuclear materials and strengthened international collaborations to support nuclear security practices worldwide. Following these developments, in the last few years many countries have shown an interest in nuclear security education courses. Several universities are already offering academic programs in nuclear security, such as King's College London, while others expect to implement the same in their curricula in the future.

The introduction of nuclear security into the curriculum grants a university the opportunity to update its existing educational programs to address the needs that accompany these global trends. Such courses should provide sustainable knowledge and contribute to an improved nuclear security and safety culture. The development of a comprehensive nuclear security educational program depends on the availability and accessibility of necessary resources. The experts in industry and academia that comprise the faculty of the Amity Institute of Nuclear Science and Technology (AINST) contributed to the creation of the nuclear security curriculum currently in place. Still in the early stages of development, the curriculum tries to incorporate practical, problem-based approaches to learning, such as small tabletop exercises and case studies, whenever and wherever possible.

II. Professional Development Courses and Initial Steps Toward a Nuclear Security Curriculum

The first stage of the AINST's curriculum development began with a three-day nuclear security workshop at the Indian Institute of Technology of Kanpur (IITK). This workshop was conducted by Texas A&M University of the United States in collaboration with the IITK in Uttar Pradesh, India, from August 4-6, 2014 **[*7*]**. The workshop, sponsored by the U.S. Department of State's Partnership for Nuclear Security (PNS), involved the active participation of undergraduate bachelor's and bachelor's/master's dual degree nuclear science and technology students from AINST, who attained an understanding of the basics of nuclear security, a field which was entirely new to them. They impressed the instructors at the workshop and, upon returning to Amity, shared their experiences and new knowledge from the workshop with their fellow classmates. While at IITK, the idea of an advanced nuclear security workshop was introduced by a team of experts from Texas A&M University in order to focus on furthering knowledge of nuclear security culture.

In January 2015, an advanced nuclear security workshop was held at Pandit Deendayal Petroleum University (PDPU) in Gandhinagar, India. The attendance of students from AINST was even greater at this workshop than it was at the previous IITK workshop in 2014. It was at this workshop that Daniel Miller, program officer at the U.S. Department of State, proposed that a professional development course in collaboration with King's College London be pursued as a way to further nuclear security curriculum development in the region.

The threat of malicious acts involving nuclear and radioactive material remains present worldwide and nuclear security is required to neutralize this ongoing challenge. The complicated nature of nuclear security means that both industry professionals and subject matter experts are needed in the field. Therefore, there is strong demand for training for the next generation of professionals in nuclear security. The IAEA Nuclear Security Series No. 12 (NSS 12), "Educational Program on Nuclear Security," published in 2010, contained recommendations for masters-level and certificate eligible programs for

educating people in the field of nuclear security **[*2*]**. The implementation of these programs in academic institutes requires sufficient human resources, advanced infrastructure, and available experimental facilities. In India, because the nuclear industry is strategic in nature and of importance to national defense, it has been largely controlled by the government sector, with the exception of a few sections under private influence. Hence, information is not available to the general public and complete confidentiality is maintained. In such a situation, there may not be wide applications for courses on nuclear security and security culture.

Still, the most effective way to improve the quality of human resources is to educate current and potential members of the nuclear security community. Professional development courses (PDCs) provide a platform for instructors from different institutions to gain the sufficient knowledge and expertise necessary to advance and succeed in the field **[*8*]**. On a larger scale, the development of a nuclear security curriculum requires an investment in proper education and training curricula with an emphasis on training a new generation of qualified experts in nuclear security.

Nuclear security course development began at Amity University Noida with a two-week PDC training session; the first week of the training program was held from June 1-5, 2015 (Figure1) and the second week was held from August 24-28, 2015 (Figure 2). This training session established the foundation for nuclear security curriculum development. The topic of the PDC was "Insider Threats and Security Culture," **[*8*–*10*]** and it was conducted in collaboration with King's College London **[*11*]**.

Figure 1. Delegates Alpana Goel, Christopher Hobbs, Sunil Chirayath, Sukesh Aghara, Craig Marianno, and participants in the first week of the PDC held from June 1-5, 2015, at Amity University of Uttar Pradesh, India.

This was the inertial step for the movement of the AINST towards an introduction of nuclear security and nuclear security culture into the course curriculum for undergraduate and postgraduate students. After the two week PDC, we incorporated nuclear security related courses into the existing curriculum, making Amity University one of the premier institutions to formally introduce such courses **[*12*–*14*]** into their curriculum. (Regular workshops have also been conducted for the past several years at PDPU, wherein speakers from Texas A&M delivered lectures.)

Figure 2. Delegates and participants in the second week of the PDC held from August 24-28, 2015, at Amity University in Uttar Pradesh, India.

III. Overview of Nuclear Security Curriculum at Amity University

The Amity Institute of Nuclear Science & Technology (AINST) offers a bachelor's degree in technology, a master's degree in technology, and a dual (bachelor and master's) degree. Core courses are taught by industry professionals and renowned researchers and cover topics such as radiation protection and detection, health physics, the nuclear fuel cycle, and reactor physics (Figure 3). These courses provide the basic knowledge necessary to progress to deeper investigation of subjects related to nuclear security. Two new courses related to nuclear security introduced in the same academic year, 2015-2016, grew out of the professional development courses held at Amity; the new courses were titled "Introduction to Nuclear Security" (NST 315) and "Nuclear Security and Security Culture" (NST 623). Since these courses are offered as electives, students of other disciplines can also choose to enroll in the courses. The courses are introduced according to the guidance given in NSS 12 **[*2*]**. Presently, about 70 students from different disciplines, including electrical, mechanical, and computer science, have opted to partake in these elective courses. The following subsections describe the individual courses:

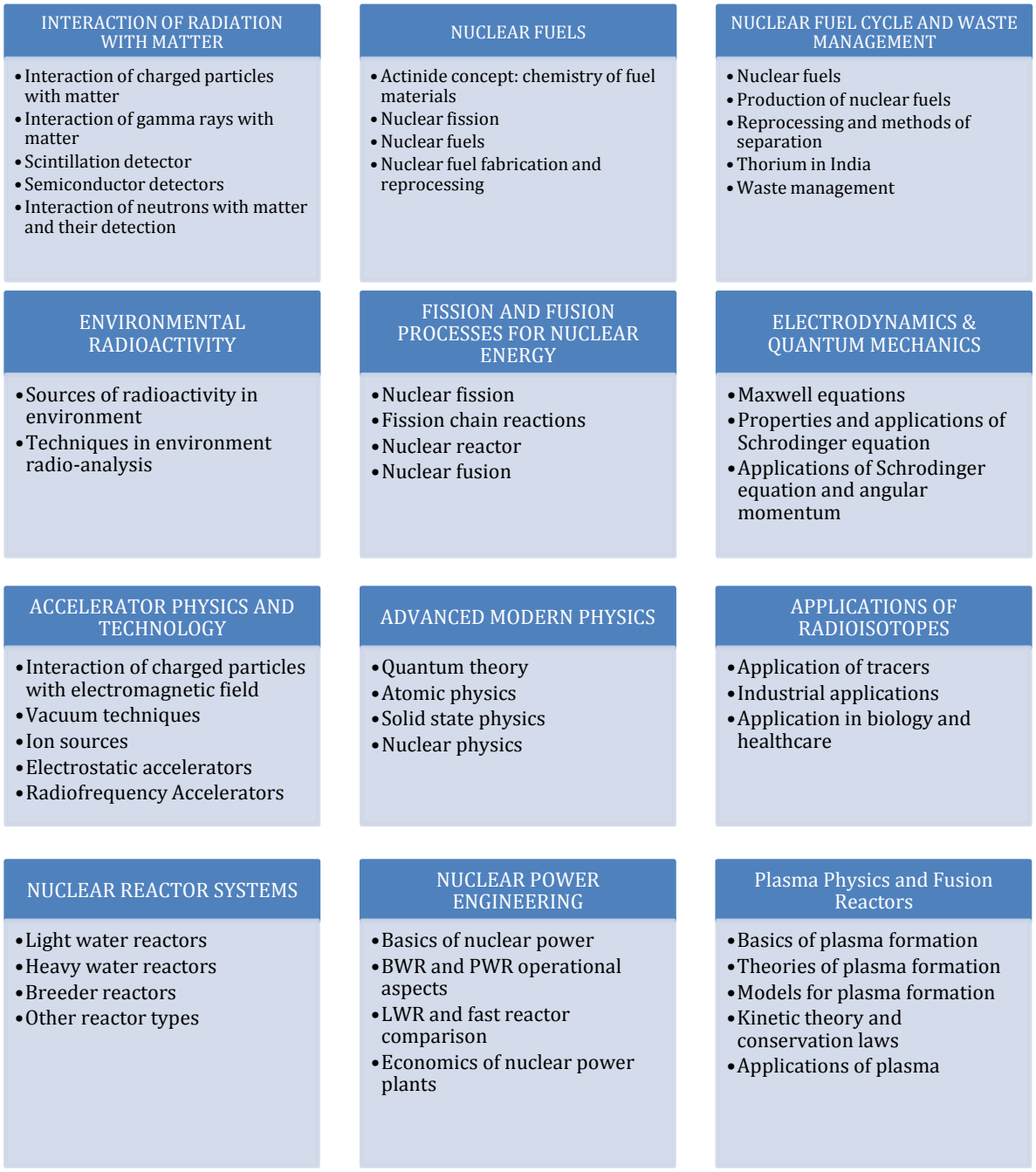

Figure 3. Existing Course Curriculum at the AINST

A. Course 1: Introduction to Nuclear Security

The objective of this course, which is primarily for **undergraduate-level students** in engineering and technology domains, is to provide an understanding of the basics of nuclear security, including the importance of nuclear security, the role of human factors, and preventive and protective measures. The course covers the gamut of nuclear security components and their interconnections between safety and safeguards. Furthermore, it covers the planning of nuclear security activities and informs students about nuclear security adversaries like terrorists, protestors, and insiders, for example, and how they can harm

the security of nuclear as well as radioactive materials. This course incorporates a lecture, tutorial, and practical (LTP) structure with 50 minutes of each component per week. The two-credit course consists of a total of 30 classroom-teaching hours, i.e. two hours per week, for a semester extending from 15-16 weeks. Case studies and tabletop exercises are incorporated in the teaching material to reinforce the lecture material **[*15*]**. The outline of the course is shown in Table 1. In the academic year 2015-2016, a total of 30 students in odd/even semesters have opted for these newly established courses as elective courses.

Table 1: Outline of the Undergraduate Course, "Introduction to Nuclear Security"

S. No.	Module	Descriptors / Topics	Percentage Weight
1	Basics of Nuclear Security	Basic elements of nuclear security: prevention, transport security, detection, response, information security; security zones; responsibility of the state for nuclear security; evolution of the nuclear threat throughout history; attributes of potential adversaries; counterterrorism and its instruments; international experience in counterterrorism	35
2	Chemical, Biological, Radiological and Nuclear (CBRN) Weapons	Potential targets and methods of CBRN adversaries; four main nuclear and radiological concerns: theft of nuclear weapons, acquisition of nuclear material and improvised nuclear device (IND) development, sabotage, development of radiological dispersal device (RDD) and radiation exposure device (RED).	25
3	Planning of Nuclear Security	Threat assessment and risk management; legal instruments and authorities related to nuclear security; nuclear related infrastructure; state nuclear security measures; IAEA Nuclear Security Plan; international cooperation; malicious acts and databases; physical protection systems; nuclear material accounting and radioactive material inventory control; contingency plans and drills; response arrangements, institutional arrangements and measures; roles and responsibilities of relevant organizations	40

B. Course 2: Nuclear Security and Security Culture

Enrollment in this three-credit course is set at 28 postgraduate engineering students**.** The objective of the course is to teach students how to bring an awareness of the function and importance of a nuclear security culture to institutions and the general public, establish attitudes and beliefs in an organization, and promote an understanding of the basics of nuclear security. The course covers such topics as organizational and professional culture and models for the implementation of nuclear security culture in various types of organizations and institutions responsible for nuclear security. As with "Introduction to Nuclear Security," this course also utilizes the LTP course structure with 50 minutes allotted to each component. This is a three credit course extending for a semester running for 15-16 weeks with a total of 45 teaching hours, i.e. three lectures per week. The course content is shown in Table 2.

Table 2: Outline of the Postgraduate-level Course, "Nuclear Security and Security Culture"

S. No.	Module	Descriptors/Topics	%age weight
1	Introduction to Nuclear Security	Basic elements of nuclear security; threat assessment and risk management; counterterrorism and its instruments; strategies and approaches of counterterrorism; international experience in counterterrorism; chemical, biological, radiological and nuclear (CBRN) weapons, potential targets and methods of CBRN adversaries; the four main nuclear and radiological concerns; physical protection systems; nuclear material accounting and radioactive material inventory control; contingency plans and drills; transport of nuclear and other radioactive material; roles and responsibilities of relevant organizations	40
2	Information Security	Sources of risk for nuclear security; classification of information; security policies and procedures; encryption; computer security; information access techniques and control; communication; security zones; balancing heavy control and user-friendly access	20
3	Security Culture	The awareness of institutions and the general public of nuclear security culture; the establishment attitudes and beliefs in an organization; behavior of assigned personnel; proper working methods; models for implementation of nuclear security culture at various types of organizations and institutions responsible for nuclear security; interrelation and synergies of nuclear security, safety and safeguards; the nuclear non-proliferation regime; the state system of accounting for and control of nuclear material (SSAC); international safeguards	40

C. Evaluation Process

The evaluation criterion is the same for both of the courses mentioned above and it is similar to the evaluation process for core courses. After the completion of the semester, a specific procedure prescribed by the university is followed to judge the knowledge gained by the students. Assessment is divided into two components: an external end of semester examination worth 70 percent of the final grade and a continuous internal assessment worth 30 percent. An external end-of-semester exam is administered and the continuous evaluation of students is carried out throughout the semester. This continuous evaluation includes a mid-semester internal exam, timely submission of homework assignments, and an occasional quiz in the form of viva-voce or tabletop exercises for a particular topic. Seventy-five percent is the minimum required attendance percentage students are expected to complete in order to be eligible for participation in the end of semester exam. A breakdown of the evaluation process is shown in Table 3.

Table 3: Evaluation Process for Both Courses in Nuclear Security

S.No.	Components	Details	%age
1	**External Exam**	Theory Examination	70
2	**Continuous Internal Assessment**	Quiz (viva-voce or verbal questionnaire session in class)/Tabletop exercises	7
		Mid-semester exam	10
		Homework assignments/Seminar presentations	8
3	**Attendance**		5
	Total		100 (70+7+10+8+5)

D. Challenges to Establishing a Nuclear Security Curriculum

As this is the first time that courses related to nuclear security have been included in the Amity University curriculum, we face several challenges in implementing these courses. Time constraints are the most significant factor; it is not an easy task to teach such a vast subject in only 30 or 45 lectures. The faculty's interaction with the students after the classroom teaching is limited due to other academic responsibilities and research activities. Currently, we do not have dedicated nuclear security infrastructure, lab facilities, or live training sites where active demonstration can be done. In addition, in the Indian context in general, there is a lack of coordination between nuclear industry professionals and the academics that impart theoretical knowledge in their university courses. Since nuclear and the allied technologies are completely under the control of the government, the technologies, implementation guides, diversions, and malicious acts of stealing of nuclear materials are rarely, if ever, brought to the attention of the general public. Due to the existing limitations, students have very little hands-on experience beyond classroom instruction.

IV. Success and Achievements

Though our achievements regarding the nuclear security curriculum are modest, as we are still in the learning phase, the addition of nuclear security courses to the existing curriculum has given us an advantage in this vast field. Students are taking a keen interest in this field as they participate in a number of events organized by different international agencies. The faculty is also involved in the development, perpetuation, and advancement of these courses by delivering lectures in the Nuclear Security Workshops in India and the Nuclear Security Training series in the United States. The implementation of these courses at the university level at Amity is, in itself, a great success, as it marks the first instance of a university in India teaching courses for credit of this nature.

Other, specific successes include:

1. Alpana Goel, deputy director and head of the Amity Institute of Nuclear Science and Technology and member of the International Nuclear Security Education Network (INSEN), attended the working group INSEN meeting and advanced workshop on curriculum development held at the IAEA conference in Vienna from February 23-27, 2015. During the meeting, she proposed a professional development course be held at Amity University on "Insider Threats and Security Culture" **[*16*]**. Later at the two-day curriculum development workshop following the INSEN annual meeting held at the IAEA in Vienna from August 10–12, 2015, she presented "The Developments in the Implementation of Course Curriculum of Nuclear Security for the Undergraduate and Post Graduate Students of Amity University."

Figure 4. Alpana Goel, deputy director and head of AINST, (second from left) at the annual meeting of INSEN on August 10-12, 2015, held at the IAEA in Vienna, Austria.

Recently, Goel participated in a workshop on "Fundamentals of Physical Protection at Facilities Holding Nuclear and Radioactive Materials" held at King's College London from September 20-25, 2015.

Figure 5. Alpana Goel (center) visiting a nuclear facility during the workshop held at King's College London in September 2015.

2. Four students and one faculty member from AINST had the opportunity to participate in the 2015 Nuclear Security Training Series (NSTS), which was hosted at Texas A&M University, the Sandia National Laboratory, and the Oak Ridge National Laboratory. This training series concluded with the International Nuclear Materials Management Annual Conference. Students were exposed to the teaching methodologies practiced in the U.S. and to facilities including the TRIGA reactor and the Nuclear Regulatory Commission Office and Simulation Facilities. The students also obtained hands-on experience with radiation monitoring devices. The concept of tabletop exercises, which was proposed during the two nuclear security workshops in India, was observed in greater detail in the U.S. research laboratories.

Figure 6. Faculty and students of AINST at Texas A&M University along with participants from eight other Indian institutes/universities for NSTS-2015 (Source: NSSPI website)

3. Attending the INMM annual conference instilled students with enthusiasm to establish their own student chapter and to organize various events under the umbrella of the INMM. In the inaugural event of the chapter, students organized an innovative quiz competition. Following the competition, guest speaker Chary Rangacharyulu, professor and head of the physics and engineering physics department at the University of Saskatchewan, delivered a lecture on the wide variety of opportunities existing for nuclear engineering students.
4. Dhruv Dharamshi from AINST was selected to present his paper titled "Radioisotopes: How They Are Produced" at the World Nuclear University's Nuclear Olympiad 2015 at the IAEA in Vienna, allowing him to showcase his knowledge to a vibrant audience in the form of an oral presentation. While attending the Olympiad, Dharamshi was able to visit the IAEA's Seibersdorf Laboratories.
5. Indranil Bisuri also participated in the Nuclear Olympiad 2015 organized by World Nuclear University. He produced a video titled "Nuclear Techniques: A Force to Reckon With." The main goal of this video was to promote nuclear techniques for global development and was selected as a Top 10 entrant by the judges. He participated in the All India Essay Contest on the topic of "Nucleus for the Nation," organized by the Variable Energy Cyclotron Centre in Kolkata, during which competitors present their essay in front of a panel of judges. He won second prize and was awarded INR 6000.
6. Students of AINST prepared videos to participate in the Nuclear Security Multimedia Competition sponsored by the U.S. Department of State's partnership with Nuclear Security (PNS) and CRDF Global and won first and second prizes. The competition was intended to promote nuclear security culture and the best practices among educational institutions, nuclear facilities, and research laboratories, and to inculcate innovative uses of technology to promote nuclear security culture.

V. Future Plans

We intend to introduce more tabletop exercises and case studies into the course curriculum and classroom sessions to reinforce the retention of conceptual learning. We will also strive to collaborate with various international universities with established and successful nuclear security curricula.

Four students and one faculty member have already been certified by the World Institute for Nuclear Security (WINS) as nuclear security professionals **[*17*]**, but we plan to gather additional subject matter experts (SMEs) and industry professionals from the Department of Atomic Energy (DAE), the Indian government, and the Bhabha Atomic Research Centre (BARC) of Mumbai to introduce key concepts in the area of nuclear security. Experts from the Institute for Defense Studies and the Analysis and Global Centre for Nuclear Energy Partnership will also be invited to deliver lectures and to provide insight into the foreign policies of India regarding nuclear security.

VI. Conclusions

In conclusion, it is important to emphasize that the efforts described here are not an end point, but a beginning. With the aid of the previously mentioned PDCs and the Nuclear Security Training Series, Amity's nuclear security programs were able to initiate these types of courses in the curriculum; however, the full-fledged implementation and acceptance of these learning programs by the national regulatory authority will require some time. Since Amity University believes in innovation and development, the university supports AINST's efforts and ensures that the courses remain vibrant, current, and high quality. The Area Advisory Board (AAB), the Board of Studies (BoS), and the Academic Council at Amity University's NOIDA campus ensure the regular updating and upgrading of the courses in light of evolving industry standards. A firm implementation of these programs would result in the creation of more training programs in the field of nuclear security and nuclear security culture development.

VII. Works Cited

1. IAEA, "Nuclear Security Culture," *IAEA Nuclear Security Series No. 7* (IAEA, Vienna, Austria, 2008), (available at http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1347_web.pdf).

2. IAEA, "Educational Programme in Nuclear Security," *IAEA Nuclear Security Series No. 12* (IAEA, Vienna, Austria, 2010), (available at http://www-pub.iaea.org/MTCD/publications/PDF/Pub1439_web.pdf).

3. The White House, Communiqué of the Washington Nuclear Security Summit. *whitehouse.gov* (2010), (available at https://www.whitehouse.gov/the-press-office/communiqu-washington-nuclear-security-summit).

4. Nuclear Security Summit 2014 - The Hague. *2014 Nucl. Secur. Summit*, (available at http://www.nss2016.org/past-summits/2014/).

5. Seoul Communique - 2012 Seoul Nuclear Security Summit, (available at http://www.state.gov/documents/organization/236996.pdf).

6. M. van A. Zaken, The Hague Nuclear Security Summit Communiqué - Directive - Government.nl (2014), (available at https://www.government.nl/documents/directives/2014/03/25/the-hague-nuclear-security-summit-communique).

7. T. N. S. S. and P. I. at T. A. University, Nuclear Security & Safeguards Education Portal. *NSSPI - Nucl. Secur. Sci. Policy Inst.*, (available at http://nsspi.tamu.edu/nssep).

8. IAEA, "Professional Development Course Overview," *INSEN* (Vienna, Austria), (available at https://nusec.iaea.org/portal/UserGroups/INSEN/Resources/Professionaldevelopmentcourses/tabid/802/Default.aspx).

9. IAEA, "Preventive and Protective Measures Against Insider Threats," *IAEA Nuclear Security Series No. 8* (IAEA, Vienna, Austria, 2008), (available at http://www-pub.iaea.org/MTCD/publications/PDF/pub1359_web.pdf).

10. IAEA, Safety Glossary Concepts and Terms (2015), (available at http://www-ns.iaea.org/standards/concepts-terms.asp).

11. IAEA, "Nuclear Security Series Glossary" (2015), (available at https://www-ns.iaea.org/downloads/security/nuclear-security-series-glossary-v1-3.pdf).

12. IAEA, "Developing the Nuclear Security Curriculum," *INSEN* (IAEA, Vienna, Austria), (available at https://nusec.iaea.org/portal/UserGroups/INSEN/tabid/409/ctl/Details/mid/2922/ItemID/309/Default.aspx).

13. M. Moran, C. Hobbs, W. Bowen, L. Lentini, M. Cottee, *Nuclear Security Briefing Book* (Centre for Science & Security Studies, King's College London, London, 2014 Edition.; https://www.kcl.ac.uk/sspp/departments/warstudies/research/groups/csss/pubs/NSBB---Full-final.pdf).

14. IAEA, Objective and Essential Elements of a State's Nuclear Security Regime (2013) (available at http://www-pub.iaea.org/books/IAEABooks/10353/Objective-and-Essential-Elements-of-a-State-s-Nuclear-Security-Regime).

15. C. Hobbs, M. Moran, "Insider Threats: An Educational Handbook of Nuclear and Non - Nuclear Case Studies" (King's College London, London, 2015).

16. IAEA, "INSEN Working Group Meeting 2015," (available at https://nusec.iaea.org/portal/UserGroups/INSEN/INSENEvents/WGMeeting2015/tabid/1055/Default.aspx).

17. World Nuclear Security (WINS), (available at https://www.wins.org/index.php?article_id=61).

VIII. Authors' Bio and Contact Information

Kawalpreet Kalra is working as a visiting faculty in Amity Institute of Nuclear Science & Technology, Amity University, Noida where she has been teaching since 2014. She obtained her education right from the school to M.Sc. & B.Ed from the high ranked university of India. She has done graduation from Kurukshetra University, Kurukshetra in 2006 and post graduation from Punjabi University, Patiala in 2008. She has completed the degree of Bachelor of Education from Panjab University, Chandigarh in 2009 and currently she is pursuing Ph.D from Amity University. Her area of research is Theoretical Nuclear Physics: Nuclear Structure Physics. She holds an all-through First class record with distinction in Physics. She is a having 5 years of teaching experience. Recently, she has been done with the World Institute of Nuclear Security (WINS) certification course. She has attended the Joint ICTP – IAEA Nuclear Security School in Italy in April, 2016. She is a life member of Indian Association of Nuclear Chemists and Allied Sciences (IANCAS). She is an excellent speaker and very good teacher.
Contact Information: Kawal1211@gmail.com

Ms Archana Yadav is the assistant professor at Amity Institute of Nuclear Science and Technology (AINST), Amity University, NOIDA since 2012. She is serving as Dy. Center Superintendent Examination, Discipline Coordinator and Student Welfare Coordinator in the institute. She is having the experience of organizing conferences and workshops at university level with great leadership qualities. She is a good teacher with great knowledge in her specialized field. Prior to her present job she served in PM DIMENSIONS PVT.LTD as Senior Engineer. She has been done M.Tech in Nuclear Sc. and Technology from University of Delhi in 2011.
Contact Information: ayadav@amity.edu

Dr. Alpana Goel is the director & Head of Amity Institute of Nuclear Science and Technology (AINST), Amity University, NOIDA. She is an active member of INSEN, IAEA and working greatly in the field of Nuclear Security. She earned her Ph.D. degree from IIT, Roorkee. She is having research experience of more than 25 years. Her research interest includes Nuclear Structure and published more than 35 research papers in national and international journals. She is Guiding 4 research students in the field of Theoretical Nuclear Physics. Dr. Goel is teaching graduate and post graduate students since 2003. She has been invited for delivering lectures at many institutes and Universities. She has written four books for graduate students. She is having good collaboration with IIT, Roorkee, IIT, Kanpur, BARC, Mumbai and VECC, Kolkata.
Contact Information: agoel1@amity.edu