The Gulf Nuclear Infrastructure Institute (GNEII)

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Site Map for UAE BNPP
Background

GNEII is designed to be:

- A regionally based institute for development of human resource capability
- A part of nuclear energy 3S (safety, safeguards & security) infrastructure for development & education in a regional context
- A strategic effort to develop a responsible nuclear energy culture in future program decision-makers

***Not intended to train nuclear engineers or operators, intended instead to educate and prepare future leaders of region’s nuclear energy programs***
Background

GNEII is a Strategic Partnership

UAE PARTNER
Under the sponsorship of and implemented by:
  • Khalifa University of Science, Technology & Research
With Support from
  • The Federal Authority for Nuclear Regulation (FANR)
  • The Emirates Nuclear Energy Corporation (ENEC)
  • Critical Infrastructure and Coastal Protection Authority (CICPA)

US PARTNER
Under the sponsorship of:
  • DOE/NNSA – International Nuclear Safeguards and Engagement Program (INSEP)
  • DOS/CTR – Partnership for Nuclear Security (PNS)

Implemented by:
  • Sandia National Laboratories (SNL)
  • Texas A&M University (TAMU)

GNEII - The INSTITUTE
GNEII Fundamentals Course

<table>
<thead>
<tr>
<th>FUNDAMENTALS COURSE</th>
<th># UAE Fellows</th>
<th># Non-UAE Fellows</th>
<th>Total</th>
<th>Countries Represented</th>
</tr>
</thead>
<tbody>
<tr>
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<td>ENEC</td>
<td>FANR</td>
<td>CICPA</td>
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<td>2013</td>
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<td>6</td>
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<td>2014</td>
<td>6</td>
<td>3</td>
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Total Fundamentals Course Alumni - 60 (64)
UAE - 49

GNEII 2015 Fundamentals Course Curriculum

<table>
<thead>
<tr>
<th>Week</th>
<th>Sessions</th>
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<tbody>
<tr>
<td>11-Jan</td>
<td>Intro, 3S, Critical &amp; System Thinking, Scientific Method, Need for Nuclear, History, Components, Economics</td>
</tr>
<tr>
<td>18-Jan</td>
<td>Nuclear &amp; Radiation Physics, Neutron Interactions, Basic Reactor Theory, Radiation Effects, Nuclear Technology</td>
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<tr>
<td>25-Jan</td>
<td>Reactor Operations, Power Plant Systems, Nuclear Fuel Cycle</td>
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<td>1-Feb</td>
<td>Nuclear Nonproliferation History &amp; Policy</td>
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<td>8-Feb</td>
<td>SAFEGUARDS (2 weeks) State System of Accountancy Controls, Non-Destructive and Destructive Analysis, Bulk and Item Facilities</td>
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<tr>
<td>15-Feb</td>
<td>Independent Capstone Research</td>
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<tr>
<td>22-Feb</td>
<td>SECURITY (2 weeks) Probabilistic Risk Assessment, Security Culture, Physical Protection Systems, Detect, Delay, Respond, Evaluate</td>
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<tr>
<td>1-Mar</td>
<td>SAFETY (2 weeks) Safety Culture, Engineered Safety Features, Emergency Response Planning, Radiation Safety</td>
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<tr>
<td>8-Mar</td>
<td>Capstone Research &amp; Preparation (2 weeks)</td>
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<tr>
<td>22-Mar</td>
<td>Capstone Preparation &amp; Dry Runs</td>
</tr>
<tr>
<td>29-Mar</td>
<td>SYMPOSIUM: Capstone Presentations &amp; Certificates</td>
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Research and GNEII

Mission & Vision

VISION: to provide the Gulf, and surrounding region, with a continual source of indigenous nuclear energy professionals with whom the global community can effectively collaborate to achieve broader nuclear energy security and safety priorities.

MISSION: to develop a responsible nuclear energy culture and institutionalize key safety, security, and nonproliferation norms in the future decision-makers of Gulf region nuclear energy programs.

Research Areas

Integreated SS Methodologies
Nuclear Infrastructure Development
Gulf/Middle East Regional Nuclear Interactions

Research Methodology

Research Goal

Ongoing and Future Research Efforts

- Radiation Baseline Measurements in Abu Dhabi Urban Environment
- A Search for Time-Variations in Radioactive Half-Lives
- Gamma-ray Detector Efficiency Transfer through Monte Carlo Modeling
- Border Security in Collaboration with Abu Dhabi Customs

Provide the Gulf and surrounding region - an avenue through which the global nuclear community can effectively collaborate to achieve broader nuclear energy safety, security and safeguards priorities.

Collaboration with Khalifa University
Joint Research
Fundamentals Capstone
Radiation Baseline in AD Urban Environment

Time-Variations in Radioactive Half-Lives

• Purdue University has published data showing a slight variation in decay rates (0.1%) on a yearly cycle

• Khalifa University is setting up various detector systems to investigate Purdue University’s claim
  • x2 shielded NaI detectors
  • x2 shielded GM detectors
  • Beta liquid scintillation detector
  • Alpha liquid scintillation detector

• Khalifa University is conducting both experimental and theoretical work related to this project
Monte Carlo Detector Modeling

- ANSWERS MCBEND Monte Carlo radiation transport software
  - model NaI, HPGe and CZT detectors
  - benchmark with experimental data
  - benchmark with ISOCS, ANGLE

Abu Dhabi Port Security

* www.ortec-online.com

** www.as-e.com
Summary

- GNEII is based on three pillars: education, research and technical capabilities
- Research pillar is currently being actively developed in 3S areas
- Regional collaboration is of great priority
- Alan Heyes “An Assessment of the Nuclear Security Centers of Excellence”:
  - “An example is the Gulf Nuclear Energy Infrastructure Institute (GNEII) which was established to strengthen nuclear energy security, safeguards, and safety infrastructure throughout the Gulf region”

SHUKRAN

For more information or to nominate GNEII Fellows, please contact us:

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