

# The Gulf Nuclear Energy Infrastructure Institute (GNEII): Two Years On


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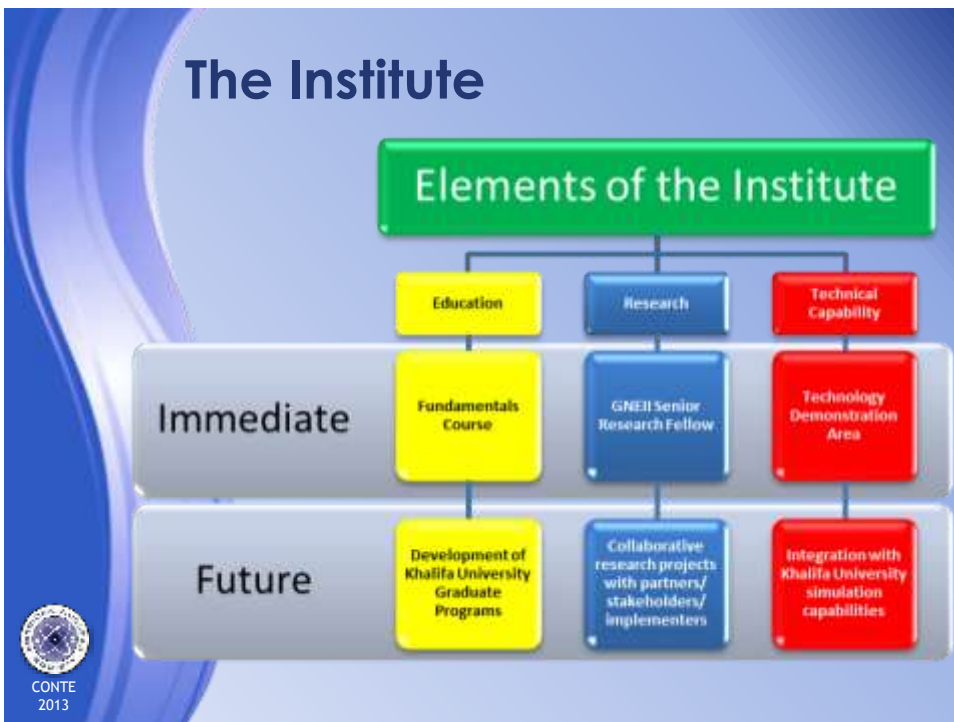
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## Presentation Overview

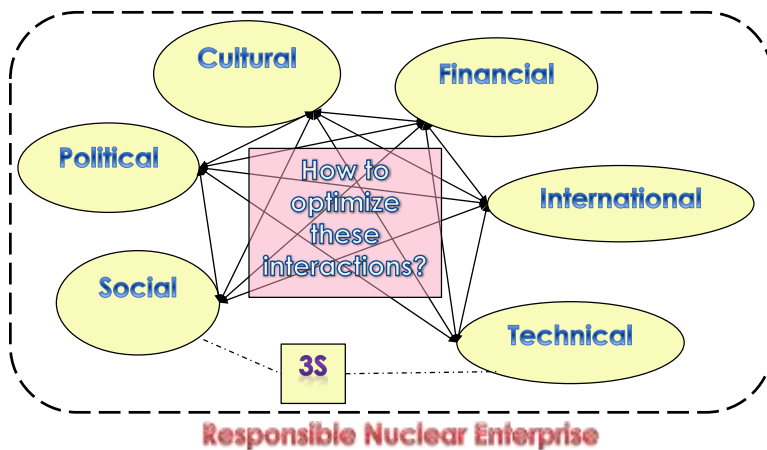
- Background
- The Institute
  - History
  - Educational Philosophy
    - Systems Approach and Integrated 3S
  - GNEII's Pillars
    - Education, Research, Technical Capability
- Recent Milestones & Progress
- Indigenization & Expansion

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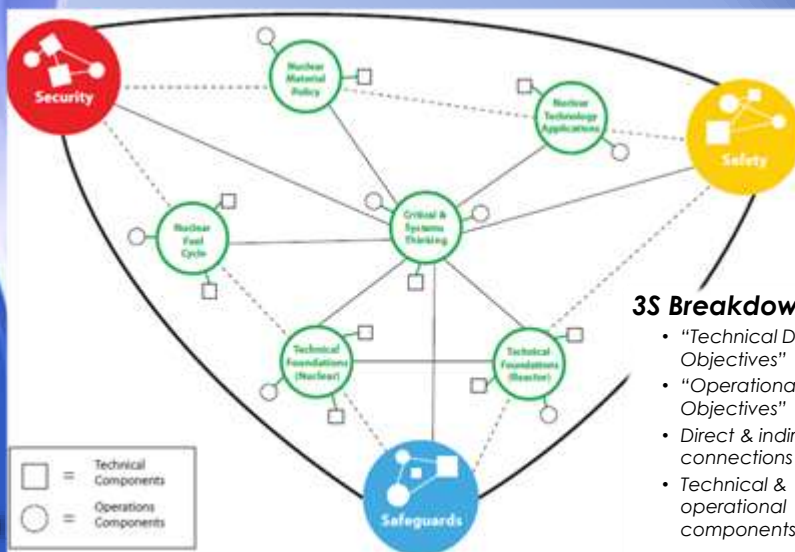


# Educational Philosophy

## A Systems Approach to the Nuclear Energy Enterprise



# Integrated 3S Curriculum



### 3S Breakdown

- "Technical Design & Objectives"
- "Operational Objectives"
- Direct & indirect connections
- Technical & operational components



## Education

### GNEII Fundamentals Course



#### Nuclear Energy Technical Foundations

- Critical Thinking, Systems Approach, Physical Foundations, Nuclear Fuel Cycle

#### Nonproliferation, Safeguards, Safety & Security

- International Nonproliferation Regime, International Safeguards, Safety Culture and Risk Analysis, Physical Protection and Security Culture, 3S Interactions

#### Capstone Research

- Educational and intellectual foundation for conducting independent research
- Bridges GNEII's *Education* and *Research* elements

## Outline for 2013 GNEII Fundamentals Course

2013	Day 1	Day 2	Day 3	Day 4	Day 5
17-Feb	Introduction to 3S, Critical Thinking, and Systems Thinking				
24-Feb	Technical Foundations: Introduction to Nuclear Physics, Radiation, & Nuclear Power				
3-Mar	Capstone Intro / 3S Interactions	Technical Foundations: Nuclear Power Plant Operations & Management			
10-Mar	CAPSTONE / 3S Interactions	Technical Foundations: Nuclear Technologies & Nuclear Fuel Cycle			CAPSTONE
17-Mar	CAPSTONE / 3S Interactions	Technical Foundations: Nuclear Materials Control, Nonproliferation History & Policy			CAPSTONE
24-Mar	SAFEGUARDS (Tools, Systems Design, Applications, Assessments, Case Studies, Exercises)				Model NFC Exercise
31-Mar					Model NFC Exercise
7-Apr	----- BREAK -----				
14-Apr	SAFETY (Tools, Systems Design, Applications, Assessments, Case Studies, Exercises)				Model NFC Exercise
21-Apr					CAPSTONE
28-Apr	SECURITY (Tools, Systems Design, Applications, Assessments, Case Studies, Exercises)				CAPSTONE
5-May					Review, Exam & Case Study CAPSTONE
12-May	Capstone Preparation				
19-May	SYMPOSIUM: Capstone Presentations & Certificates				

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## Research

### Capstone Research

- Independent research projects on integrated 3S issues for nuclear power programs

### GNEII Research Fellow

- Lead GNEII Researcher
- Mentor to GNEII Fellows
- Develops the GNEII Research Framework
- Past Research Fellow (2012) Dr. B.K. Kim
  - Korean Atomic Energy Research Institute, ROK-SSAC, IAEA/TC & SAGSI



### Mission & Vision

**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

**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

### Research Areas

Integrated 3S Methodologies

Nuclear Infrastructure Development

Gulf/Middle East Regional Nuclear Interactions

### Research Methodology

Fundamentals Capstone

Joint Research

Collaboration with Khalifa University

### Research Goal

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

## Technical Capability

### Technology Demonstration Area

- Hands-on equipment
  - Radiation monitors, detectors, etc.
- "3S Laboratory"



### Nuclear Engineering Dept. at Khalifa University

- Radiation Sciences Lab
- Reactor Analysis & Simulation Lab
- Environmental Radiation Lab

Environmental Radiation Lab



Reactor Analysis, Design and Instrumentation Controls Lab



Radiation Sciences Lab

## Year Three

### 2013 Plans & Schedule

- ***GNEII Fundamentals Course***
  - February 17<sup>th</sup> - May 16<sup>th</sup>
  - 12 week course, plus one-week mid-semester break
    - 5 weeks *Technical Foundation*
    - 6 weeks Integrated 3S
      - 2 weeks each of focused safeguards, safety, and security
      - 1 week dedicated Capstone (with additional Capstone throughout)
- ***GNEII Symposium (3<sup>rd</sup> Annual)***
  - May 19-20
  - GNEII Fellows' Capstone presentations
- ***Technical Demonstration Area***
  - New radiation-measurement equipment
- ***Research Component***
  - Papers & conference presentations
    - American Nuclear Society (ANS)
    - Institute for Nuclear Materials Management (INMM)



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## Indigenization & Expansion

### A Self-sustaining Institute

- Increase integration with Khalifa University
  - Nuclear Engineering and Civil and International Security Departments
  - Nuclear Engineering faculty as Instructors
- Self-sustaining 5 years after implementation

### Guest lecturer program

- WINS, IAEA, MESIS
- Select GNEII graduates
- Leverage UAE relationships with global nuclear energy community.

### Regional Expansion

- Qualified participants from Gulf Cooperation Council (GCC) Countries
  - UAE (2011 - 2013)
  - Saudi Arabia (2012 & 2013)
  - Qatar (2012 & 2013)
  - Kuwait (2012 & 2013)
  - Oman (2013)
- Other regional participants
  - Jordan (2012 & 2013)
  - Morocco (2013?)
  - Other countries as appropriate and demand dictates



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## Expanding GNEII's Mission & Scope

- Additional core & elective courses
  - Education opportunities beyond the *Fundamentals Course*
- New Nuclear Engineering Master's Degree Theme
  - **Nuclear Safeguards & Security**
    - *New supporting electives*
  - *Fuel Cycle & Materials*
    - *Formerly Fuel Cycle & Security*
  - *Reactor Design & Analysis*
- Expand applied research capabilities
  - Integrate GNEII expertise with Khalifa University's research capabilities
    - Nuclear Engineering and Civil & Infrastructure Security
- Regional workshops on Integrated 3S and related topics
  - Future outreach and distance learning within the region

*Measured Expansion for Sustainability*



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Thank you!



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