

# **Nuclear Energy and Climate Change**

**NE 491: A New UG Course at NC State in Spring 2022**

*(will get permanent course number in 2022)*

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# Nuclear Energy in the 21<sup>st</sup> Century

## Current Reactors

- **Carbon-free** energy source from more than 90 nuclear reactors in the US.
- Generates nearly 20% of the total electricity.
- Provides 55% of the carbon-free electricity in the country.
- Extremely reliable – very high-capacity factor.
- Based on Generation II Light Water Reactors (LWRs).
- Very expensive!

## Nuclear Energy in a Diverse Portfolio

- Nuclear energy is considered as an integral part of the energy landscape in the 21<sup>st</sup> century.
  - ‘The Bridge’ from National Academy of Engineering – 2020.
  - Recent opinions from leaders in the energy field and business.
- Department of Energy (DoE) is promoting a several advanced technologies (Gen-IV).
- Paradigm shift – focusing on small modular reactors (SMRs).
- Considerable investment from the private industry.
  - TerraPower, NuScale Power. GE Hitachi and many more!

## NE 491

- **No prerequisites. No technical background assumed. Welcome a diverse participation!**
- **Guest lectures from the nuclear and energy industry, national laboratories, and government.**
- **Would cover technology and societal concerns (radiation, spent nuclear fuel etc.)**
- **Grading: Based on homeworks and projects. No exams!**