

Science and Technology of CCUS and Hydrogen: Carbon Management and Sustainable Energy

A brief introduction of the course offered:

The rapidly increasing atmospheric CO₂ level has negatively impacted our biosphere, which is evident from climate change effects. CO₂ capture, Utilization, and Sequestration (CCUS) have emerged as one of the leading solutions for this pertaining problem. Additionally, green H₂ is also reckoned as one of the essential verticals of our future energy landscape that will aid us in establishing a carbon-neutral scenario.

In this course, we will provide an in-depth discussion of the following topics:

- I. The current CO₂ scenario: An Industrial perspective
- II. The CO₂ capture technologies: The present and future
- III. The CO₂ utilization strategies: Making CCUS sustainable
- IV. The CO₂ storage: Coping up with the scale of CO₂ emissions
- V. CO₂ policy: Establishing the roadmap
- VI. Blue and Green Hydrogen: S&T of the future.

Take away message from the offered course:

In this course, the students will get a clear picture of our current situation with CO₂-related climate issues, their causes, and possible solutions. They will be sensitized on the cutting-edge CCUS and H₂ science and technologies that will be useful for addressing the global challenges around climate and energy.

Instructor bio:



Prof. Vikram Vishal holds a PhD degree jointly from IIT Bombay and Monash University, Australia. He worked at IIT Roorkee during 2013-16, during which he implemented his Fulbright-Nehru postdoctoral fellowship at Stanford University. He later received the Fulbright Kalam Climate fellowship to work at MIT, USA. Prof. Vishal specializes in geomechanics, CCUS, and enhanced petroleum recovery. He is the Convener of the National Centre of Excellence in carbon capture and utilization at IIT Bombay.



Prof. Arnab Dutta received his PhD from Arizona State University in 2012, where he explored the bio-inspired solutions for green hydrogen production. Later, he joined Pacific Northwest National Laboratory and developed synthetic catalysts for H₂ production. He is currently working as an associate professor at IIT Bombay. His research interests are developing sustainable solutions for green hydrogen production, CO₂ mitigation, water oxidation, and other energy-relevant small molecule activation. Arnab is a recipient of the Ramanujan Fellowship, and he is also an associate of the Indian Academy of Science, Bangalore.