

Overview of the Course

Global warming is a major concern in most of the developed countries and also in developing countries such as India. Most of the current day energy needs are met by burning fossil fuels, which release CO₂ into the atmosphere. CO₂ is one of the greenhouse gases that leads to global warming; hence, it is very vital to capture and store/utilize it. Chemical looping combustion (CLC) is an inherent CO₂ capture technology, in which a metal oxide is used to supply oxygen to the fuel to be burnt. The system consists of two reactors—fuel reactor, where oxidation of fuel occurs with the help of oxygen available in the form of metal oxides and air reactor, where the reduced metal oxides are regenerated by the inflow of air. This process results in combustion of fuel and production of two gas streams- one being rich in carbon dioxide and the other rich in nitrogen. CLC is a very promising technology and holds the key to the future of low-cost CO₂ capture technologies. This workshop is mainly aimed at giving fundamentals as well as current research trends in the area of Chemical looping combustion and the preparation of oxygen carriers.

Course Contents:

The course is well organized in terms of the lectures covering the Principles and Thermodynamic aspects of CLC, Properties and preparation of oxygen carriers, Chemical looping gasification, Design and operation of CLC units, and CLC integrated Power plant simulations. This course is organized in the form of nineteen hours of lectures and five tutorials/hands on sessions spread over five days. Course participants will learn these topics through lectures, tutorials and assignments. A graded examination will be conducted on the last day of the course.



Dr. Henrik Leion is Associate Professor in combustion chemistry at the division for Chemistry and Chemical Engineering in the field of CLC and gasification. His research focus includes development of new oxygen carriers and investigation of the chemical reactions of fuel and oxygen carriers in CLC and gasification. Henrik has over 60 journal publication dealing with CLC and oxygen carriers, 6 of them with over 100 citations, making him one of the world top cited researchers in the field. Chalmers University of Technology in Sweden is the world leading institution for CLC research. He has been involved in supervision of 16 Phd-students and over 25 master students and is a frequent reviewer in 10 different journals. Henrik is the director of the master program ‘Material Chemistry’ at Chalmers and has lifted a number of significant grants, such as National Energy grants. He has also received a few rewards for his research, where the most prestigious is “Stiftelsen Konung Carl XVI Gustavs 50-årsfond för vetenskap, teknik och miljö” given from the hand of his majesty king Carl XVI Gustav of Sweden.

For more details: <https://www.chalmers.se/en/staff/Pages/henrik-leion.aspx>



Dr. Sreenivas Jayanti is Professor in Department of chemical engineering at IIT Madras, Chennai is one of the national resource persons besides the coordinators. His research interests include clean coal technologies, carbon capture and sequestration, fuel cells and redox flow batteries. Prof. Jayanti published 110 papers in peer-reviewed SCI indexed journals. He has one patent granted and 5 patents filed. He guided more than 20 Ph.Ds and 8 are on-going. He has completed several sponsored R&D and Consultancy projects. For more details: <http://www.che.iitm.ac.in/~sjayanti/>

Who can Participate?

- Faculty member/ research scientist/ industry professional working or interested in CO₂ Capture and Utilization (CCU).
- Professional working in thermal power plants.
- UG/PG student or research scholar interested / working in CCU technologies

How to Register?

Stage-1: Web Portal Registration:

Visit <http://www.gian.iitkgp.ac.in/GREGN/index> and create login User ID and Password. Fill up the registration form and complete web registration by online payment of Rs. 500/-. This provides the user with life time registration to enroll in any number of GIAN courses offered.

Stage-2: Course Registration:

Login to the GIAN portal with the user ID and Password already created in Step 1. Click on Course Registration option at the top of Registration form. Select the Course titled “Chemical Looping Combustion for CO₂ Capture” from the list and click on Save option. Confirm your registration by clicking on Confirm Course.

Registration Fee:

Faculty	Rs. 4,000/-
Participants from Industry /Research Organizations	Rs. 10,000/-
Students & Research Scholars	
• Without award of Grade	Rs. 1,000/-
• With award of Grade	Rs. 1,500/-
Students from abroad	\$ 300

Boarding & Lodging Fee:

Faculty, Participants from Industry /Research Organizations	Rs. 4,000/- Accommodation -Visitors Block
Student & Research Scholar	Rs. 2,500/- Accommodation -Institute Hostel

Selection and Mode of Payment

Selected candidates will be intimated through e-mail. They have to remit the necessary course fee (**Mandatory for all**) and boarding & lodging fee (**if boarding & lodging is required**) to the Bank as per the details given below.

Account Name	GIAN NITW
Account No.	62447453600
Bank	State Bank of India
Branch	REC Warangal (NIT Campus)
Branch Code	20149
IFSC	SBIN0020149
MICR Code	506002030
SWIFT Code	SBININBB

Candidates registering early will be given preference in short listing process

For any queries regarding registration of the course, please contact the National Coordinators:

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About GIAN Course

MHRD, Govt. of India has launched an innovative program titled “Global Initiative of Academic Networks (GIAN)” in higher Education, in order to garner the best international experience. As part of this, internationally renowned Academicians and Scientists are invited to augment the Country’s academic resources, accelerate the pace of quality reforms and elevate India’s scientific and technological capacity to global excellence.

About the Institute and Warangal

National Institute of Technology, Warangal (NITW) formerly known as RECW is the first among seventeen RECs set up in 1959. Over the years, the Institute has established itself as a premier Institution in imparting technical education of a very high standard, leading to B.Tech, M.Tech and Ph.D. programmes in various specializations of Science and Engineering streams. Warangal is known for its rich historical and cultural heritage. It is situated at a distance of 140 km from Hyderabad. Warangal is well connected by rail and road. National Institute of Technology, Warangal campus is 2 km away from Kazipet railway station and 12 km away from Warangal railway station.

About the Department

The Department of Chemical Engineering was established in the year 1964 and celebrated Golden Jubilee year in 2014. The Department offers B.Tech in Chemical Engineering, two M.Tech programmes (each in Chemical Engineering and Process Control) and Ph.D programs. Currently, the Department has 15 faculty members with different research expertise. The Department has good research facilities for both experimental as well as simulation based research.



A Five Day

GIAN Course on

Chemical Looping Combustion for CO₂ Capture

November 20 - 24, 2017

Call for Registration and Participation

Resource Persons

Dr. Henrik Leion

Chemistry and Chemical Engineering
Chalmers University of Technology, Sweden

Prof. Sreenivas Jayanti

Department of Chemical Engineering
IIT Madras, India

National Coordinators

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