

Overview of the Course:

Combustion science can be considered as fluid dynamics of reactive flows. Studies on fluid dynamics of reactive flows have applications to many industrial and engineering processes. Understanding combustion processes require knowledge of chemical thermodynamics, laminar and turbulent fluid dynamics, heat and mass transfer processes, and chemical kinetics. As public concern about environmental pollution, energy security, and global warming increases, there is an urgent need to impart scientists and engineers with the sound fundamental understanding of fundamentals of fluid dynamics of reactive flows. Knowledge of combustion is required to improve design and performance of internal combustion engines, gas turbine engines for power generation, and propulsion of air-breathing aircraft engines and chemical rockets.

This course will focus on fundamentals of boundary layer theory and combustion science. The first part of the course will be devoted to fundamental concepts in fluid dynamics and heat transfer, in particular, boundary layer theory. This will be followed by theoretical description of combustion. There are three modules, specifically fundamentals of fluid mechanics and heat transfer, fundamentals of chemical thermodynamics and chemical kinetics, and analytical methods in combustion science. The following topics are included in the module

- Fundamentals of Reactive Flows Analysis
- Analytical Methods Employing Multi-Step Chemistry
- Chemical Kinetics
- Analytical Methods Employing One-Step Chemistry
- Analytical Methods Employing Multi-Step Chemistry

Faculty:



Prof. Kalyanasundaram Seshadri currently at the University of California at San Diego, USA has over thirty five years of experience in academia at USA. Prof Seshadri K is also a Visiting Professor to RWTH Aachen, Germany. He has long pedagogic experience and

academic quality in engineering education, course development and implementation. He has taught combustion, fluid mechanics, propulsion, heat transfer and mass transfer, reactor theory, thermodynamics and applied mathematics at graduate and under graduate levels. He is in an editorial board of combustion theory and modelling and also the chairman of Western States section of the combustion institute. He has published over 100 archival publications and over 150 presentations at scientific meetings. He is also active reviewer of proposals to National Science Foundation, NASA and also reviewer of more than 5 reputed journals.



Dr. Madhu Murthy is a Fellow of the Institution of Engineers (FIE) and is a Professor of Mechanical Engineering at the National Institute of Technology Warangal (NITW). Having served as a faculty member for over 30 years at the institute, he served as Dean of faculty welfare (2016-18) and the Head, Mechanical Engineering Department during 2008-10 and he was also the Training & Placement Coordinator of the institute before. He was Member of Board of Governors of various Institutes of repute like NITs and NITTTR (Kolkata), and served on several Committees and Boards of NCVT, Ministry of Textiles, UGC, AICTE, BEE, BIS (MSDC), SIDO-AICTE, CAB of JEE (AIEEE), INDEST-AICTE, etc. During 2005-08 he served as the Advisor at AICTE New Delhi. His research interests lie in the areas of biofuels, IC Engines, emission control, industrial management and entrepreneurship. He has published over 90 research papers and supervised over 25 masters' and 05 doctoral theses and a recipient of three best paper awards.



Dr. A. Veeresh Babu, Associate Professor in Mechanical Engineering, NIT Warangal has more than 13 years of teaching and more than 3 years of industrial experience. He has hands – on experience of low temperature and high temperature application

systems. He is handling both B.Tech and M.Tech courses in field of thermal engineering particularly, IC Engines & Alternate Fuels, Gas Turbines and Jet Propulsion, Renewable Sources of Energy etc. He has published more than 25 research papers and reviewed research papers of more than 10. He supervised 2 doctoral over 30 masters and theses. At present he is Associate Dean, Research and Consultancy.

Who can participate?

- This program is open to the Faculty, UG, PG students, and Research Scholars working or interested in combustion, chemical thermodynamics, IC Engines, CFD, and propulsion etc.
- Engineers/Scientists working in industries, interested in combustion processes

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 "Theoretical aspects of reactive flows" from the list and click on save option. Confirm your registration by clicking on Confirm Course.

Registration Fee:

Faculty & Scientists	Rs. 4000/-
Participants from Industry / Consultancy	Rs. 8000/-
Students & Research Scholar	
○ Without award of Grade	Rs. 1500/-
○ With award of Grade	Rs. 2500/-
○ Students from abroad	\$ 100
○ Faculty/Scientists/Persons from Industry & Consultancy firms	\$ 200

Boarding & Lodging Fee:

Faculty, Participants from Industry/Research Organizations	Rs 5000/-
Student & Research Scholar	Rs 3000/-

Selection and Mode of Payment:

Selected candidates will be intimated through email. They have to remit the necessary course fee (Mandatory for all) and boarding & lodging (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 Coordinator:

Note: Course work will continue without break on 25, 29 & 30 December 2018

Contact address:

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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. This year the Institute is celebrating Diamond Jubilee. 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 Mechanical Engineering was established in the year 1959 and is celebrating its Diamond Jubilee in this year. The Department offers B.Tech in Mechanical Engineering with an intake of 120 students, seven M.Tech programmes (Thermal Engineering, Manufacturing Engineering, Computer Integrated Manufacturing, Machine Design, Automobile Engineering, Material System and Engineering Design, and Additive Manufacturing) and Ph.D programs. Currently, the Department has 40 faculty members with different research expertise. The Department has good facilities for both experimental as well as simulation based research.



A Ten Day

GIAN Course on

THEORETICAL ASPECTS OF REACTIVE FLOWS

24 December 2018 – 02 January 2019

Call for Registration and Participation

International Faculty

Prof. Kalyanasundaram Seshadri

Department of Mechanical and Aerospace Engineering, University of California at San Diego, California, USA

Coordinators

Prof. K.Madhu Murthy

Dr. A.Veeresh Babu

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