

Overview of the Course:

Weight-reduction or light weighting has been on the mind of every automaker in order to meet the CAFE (Corporate Average Fuel Economy) regulations. Mass (or weight) reduction versus increased size, strength and stiffness have been challenging to balance in real life due to other competing functional performances of a vehicle such as aesthetics, corrosion resistance, crash safety, and joining methodologies of multi-materials, to mention a few.

In this workshop, some of the above mentioned issues and CAFE regulations and how they can be achieved using light weighting technologies will be broadly covered. Some details about using different grades and forms of steel and aluminum alloys for the body in white (BIW) components and the role of composite materials will be discussed. Some case studies developed by SAGA, CAR, and other industry experts will be discussed. Joining methodologies of multi-materials will also be discussed in this workshop.

Course Contents:

Module A:

- Background and need for light weighting in automotive industries ,CAFE regulations and fuel economy expectations
- Influencing factors for automotive light weighting – design, materials, processing, manufacturing
- Design, design process, and design for X

Module B:

- Modern automotive materials with applications (steel, aluminum and other)

- Ashby charts – automotive material selection
- Fundamentals of mechanical and metallurgical properties of automotive materials

Module C:

- Fundamentals of modern manufacturing processes of automotive materials
- Rolling and extrusion of automotive materials – automotive applications

Module D:

- Functional design requirements of automotive materials and structures – corrosion, cost, reliability and crash safety; corrosion prevention methods – discussion based on case studies
- Automotive body structures (Body in White); vehicle frames, underbody structures, side body structures – applications

Module E:

- Role of plastics, composites and magnesium in automotive design – applications
- Fundamentals of automotive joining methodologies

Module F:

- Modern and multi-materials joining techniques of automotive structures.
- Efficiency and testing of multi-materials joining – discussion and automotive applications

Prof. Raghu Echempati is in the faculty of Mechanical Engineering at Kettering University, Flint, MI (USA). His research interests include Automotive Machine & Mechanisms Design, Vibrations, Modeling and Study of Automotive Vehicle and Train Dynamics, Applied Finite Element

Modeling& Analysis, Sheet Metal Forming Simulation, and Lightweight Technologies.

Who can participate?

This program is open to the Faculty, PG and Research students of Mechanical Engineering from various Institutes. Practicing Engineers from industries can also participate.

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 blank registration form and do web registration by paying Rs.500/- online through Net Banking/Debit/Credit card. 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 Stage 1. Click on Course Registration option at the top of Registration form. Select the Course titled " Light weight Technologies for Automotive Applications" from the list and click on Save option. Complete your registration by clicking on 'Confirm Course'.

REGISTRATION FEE:

Faculty (Internal & External) & Scientists from R&D Labs	Rs. 2,000/-
Persons working in Industry/ Consultancy firms	Rs. 4,000/-
Students & Research Scholars	
• Without award of Grade	Rs. 500/-
• With award of Grade	Rs. 1,000/-
Students from abroad	\$ 50
Faculty/Scientists/Persons working in Industry and Consultancy firms from abroad	\$ 100

The Registration fee includes instructional materials, tutorials, laboratory and computer use and free internet facility. The participants will be provided with boarding and lodging on additional payment of Rs.3,000/- on sharing basis.

Selection and Mode of Payment

Selected candidates will be intimated through e-mail. They have to remit the necessary course fee to the Bank as per the details given below.

Outstation participants requiring Lodging and Boarding facilities have to pay Rs. 3,000/- in addition to the course fee.

Account Name	GIAN NITW
Account No.	62447453600
Bank	State Bank of India
Branch	NIT Warangal
Branch Code	20149
IFSC	SBIN0020149
MICR Code	506004011

Candidates registering early will be given preference in short listing process Last date for registration is May 20, 2019.

For any queries regarding registration of the course and accommodation, please contact the

Course Coordinators:

Dr. V. Suresh Babu, Professor

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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 Science and Engineering streams.

Warangal is situated at a distance of 140 km from Hyderabad and well connected by rail and road. NIT, 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. The Department offers one UG program and seven PG programs. The Department has experienced faculty and well-established laboratories. The Department has liaison with reputed industries and R&D organizations like NFTDC, BHEL, DMRL, DRDL, ARCI, Praga Tools GTRE, etc. Presently the Department is handling several R&D and consultancy projects. The Department has been recognized as QIP centre for M. Tech. and Ph.D.



**One Week
GIAN Course on**

**Lightweight Technologies for
Automotive Applications**

June 24 – 29, 2019

Call for Registration and Participation

International Faculty

Dr. Raghu Echempati

Professor,
Kettering University, Flint,
MI (USA)

Course Coordinators

Dr. V. Suresh Babu

Dr. B. Satish Ben

**Department of Mechanical Engineering
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