

## OVERVIEW

Steel structures are used in Civil Engineering constructions primarily due to faster construction, architectural versatility, and higher strength-to-weight ratio. The design of steel structures as lateral force-resisting systems under earthquake loadings requires an in-depth understanding of their behavior, proportioning rules, and expected force/deformation demands. This course shall cover the fundamental concepts of seismic design of steel structures, ranging from various types of lateral force-resisting systems, earthquake performance of these systems to the advanced design philosophy and detailing techniques. Participants shall get an opportunity to get hands-on experience by using standard computer software for modelling, analysis and data interpretation. The recent advances in steel structures shall be covered.

## OBJECTIVES

The course objectives are as follows:

- To understand the fundamental concepts of seismic design of steel structures,
- To acquire knowledge on solutions to practical problems encountered during the design and analysis process,
- To learn the state-of-the-art knowledge and recent advances in the field of seismic-resistant design of steel structures,
- To enhance the capability of the participants to analyse, design, and take suitable remedial measures for deficient structural systems.

## WHO CAN ATTEND ?

- Executives and researchers from various state and central government laboratories
- Designers, contractors, practicing engineers from construction industries.
- Graduate students (ME/MTech/PhD), post-doctoral fellows, and faculty from academic/technical institutions

## COURSE SCHEDULE

- **Day 1**
  - *Lecture 1-* Design philosophy; Methods of Analyses (2 hrs.)
  - *Lecture 2-* Plastic analysis and design, First-Order vs. Second order analysis, Lumped Vs. distributed plasticity (2 hrs.)
- **Day 2:**
  - *Lecture 3-* Overview of seismic load-resisting systems: Behavior, Applications (1 hr.)
  - *Lecture 4-* Beam-to-column connections: Design and detailing, Modelling (1 hr.)
  - *Lecture 5-* Moment-resisting frames: OMRF and SMRF, Design and detailing (2 hrs.)
- **Day 3:**
  - *Lecture 6-* Centrically braced frames: Behavior and Design, Nonlinear analysis, Code provisions, Connection detailing (2 hrs.)
  - *Tutorial 1-* Problem solving with examples: Computer Modelling, Seismic analysis (2 hrs)
- **Day 4:**
  - *Lecture 7-* EBFs: Behavior and design, Nonlinear analysis, Detailing (2 hrs.)
  - *Lecture 8:* BRBFs: Basic concept, Design philosophy, Recent advances (2 hrs.)
- **Day 5:**
  - *Lecture 9:* Seismic isolation and structural fuses, Design and analysis (1 hr.)
  - *Lecture 10-* Shake-table tests, Challenges and scope for future work (1 hr.)
  - *Tutorial 2:* Hands-on experience: Computer modelling and analysis (2 hrs.)

One-week course  
on

## **SEISMIC DESIGN OF STEEL STRUCTURES**

at

**Indian Institute of Technology Delhi**  
New Delhi, India

during

**October 21-25, 2019**



### Course Coordinator

**Dr. Dipti Ranjan Sahoo**  
Associate Professor  
Department of Civil Engineering  
Indian Institute of Technology Delhi  
Hauz Khas New Delhi-110016 (INDIA)

Email: [drsahoo@civil.iitd.ac.in](mailto:drsahoo@civil.iitd.ac.in)

Tel.: (+91) 11 2659 1203

Fax: (+91) 11 2658 1117

## COURSE FACULTY



**Prof. Taichiro Okazaki** is a Professor in Structural and Urban Safety design Division at the Department of Architectural and Structural Design, Hokkaido University, Japan. His research interests include Hybrid isolation systems, Large-scale seismic testing, Steel braced frames, Nonlinear modelling and analysis, and Seismic design of steel structures. He is a member of Architectural Institute of Japan and Japan Society of Seismic Isolation.



**Dr. Dipti Ranjan Sahoo** is an Associate Professor in the Department of Civil Engineering at Indian Institute of Technology (IIT), Delhi. His research interests are Seismic design and behaviour of steel structures, Passive vibration control, and Performance-based seismic design. He is recipient of the Young Engineer Award from Indian National Academy of Engineering and the Institution of Engineers (India).



**Dr. P. C. Ashwin Kumar** is an Assistant Professor in the Department of Earthquake Engineering, IIT Roorkee. His research interests include Seismic analysis and design of steel braced frames, Seismic retrofitting of structures, and Finite element modelling of structures.

## REGISTRATION PROCEDURE

**Step 1: GIAN Web Portal Registration:** Register at <http://www.gian.iitkgp.ac.in/GREGN/index>, by paying Rs. 500/- online. Registration to this portal is one-time affair and will be valid for lifetime of GIAN. *Please note that Course fee is separate.*

**Step 2: Course Registration:** Login to the GIAN portal with the registered User ID and Password. Choose the Course registration option. Select the course titled “*Seismic Design of Steel Structures*” from the list and click the “Save” option. Confirm your registration by clicking the suitable option.

**Last date for the registration:** 1<sup>st</sup> October, 2019

**Step 3: Course Shortlisting:** Candidates will be intimated through email regarding their selection.

**Step 4: Course Fee Remittance:** Once selected for the Course, the fee (as applicable) has to be paid. The course fee is as follows:

- Students from other Academic Institutes: Rs. 5,000/-
- Faculty from other Academic Institute: Rs. 10,000/-
- Professionals (Industry/ Research) Org.: Rs. 15,000/-
- Participants from abroad: US \$250/-

The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges. The participants will be provided with accommodation on payment basis.

The details of fee payment by Electronic Clearing Service/ RTGS in the name of “IITD CEP ACCOUNT”:

Bank Name: **State Bank of India**  
Branch: **IIT Delhi, Hauz Khas, New Delhi-110016**  
IFS Code: **SBIN0001077**  
MICR Code: **110002156**  
Type of Account: **Saving Account**  
Bank A/C No.: **36819334799**  
SWIFT Code: **SBININBB547**  
IITD PAN No.: **AAATI0393L**

**Step 5: Send Registration Form:** Fill up the registration form with the details of bank transaction and other required information.

Please send the registration form to the Course coordinator at [drsahoo.iitd@gmail.com](mailto:drsahoo.iitd@gmail.com) or [drsahoo@civil.iitd.ac.in](mailto:drsahoo@civil.iitd.ac.in) on or before 1<sup>st</sup> October, 2019

**Maximum Number of Participants: 40**

## REGISTRATION FORM

GIAN Course on  
**SEISMIC DESIGN OF STEEL STRUCTURES**  
IIT Delhi (October 21-25, 2019)

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Organization: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_

Mobile: \_\_\_\_\_

Fax: \_\_\_\_\_

Fees payable to “IITD CEP ACCOUNT”, SBI IIT DELHI

Transaction No.: \_\_\_\_\_

Amount: Rs. \_\_\_\_\_

Dated: \_\_\_\_\_

Bank Name: \_\_\_\_\_

Branch Name: \_\_\_\_\_