

SHORT TERM COURSE ON

Environmental loads and Design Approach for Fixed and Floating Offshore Structures

26th -30th December 2018

Organized by
National Institute of Technology Karnataka, Surathkal

OVERVIEW

Since about 1950, the industrial and commercial interest for the behavior of ships and other floating structures in seaway has been increased significantly. Nowadays, it becomes more and more usual to predict a ship or other offshore designs on its sea keeping performance. Further, the rapid growth of the offshore field, particularly in the exploration and development of offshore oil and gas fields in deep waters of the oceans, the science and engineering is seeing a phenomenal advancement in this area. Tremendous strides have been made in the last decades in the advancement of offshore exploration and production of minerals. In the recent years, tapping of offshore renewable energy (tidal/wave/wind) is thought of every nation to meet their energy demand. These have given rise to development of new concepts and structures, and materials for application in the deep oceans.

Ocean surface is highly random due to gravity waves and causes periodic loads on all sorts of man-made structures in the sea. It does not matter whether these structures are fixed, floating or sailing and on the surface or deeper in the sea. To understand these loads, an insight of the physics of water waves is necessary. The existence of structure (fixed/floating) in the wave field and its interaction with waves adds complexity in the estimation of wave loading. In addition to diffraction effects, the physical phenomenon such as Vortex Induced Vibration (VIV) exerts additional load on the structures which should also be taken into consideration for the design of offshore structures. In this particular arena, it is learnt that there is a lack of knowledge among academicians, practicing engineers and professionals in the government and private sectors. Also, few institutes like IIT Madras, IIT Kharagpur and National Institute of Technology Karnataka are offering courses in the same field. Further, many projects in this field are outsourced to foreign companies being it government/non-governmental projects. Hence, there is a deliberate need to inculcate the knowledge and address the issues/challenges in the field of design of offshore structures by conducting the courses quite often till there is a full-fledged transfer of knowledge to our young budding engineers.

This course enhance the understanding of basics of wave structure interaction and design approach for offshore floating/fixed structures, among various faculties and researchers on board and intend to work in the area of design of offshore systems mainly used for Oil and Gas exploration and production systems, ship like systems, and offshore renewable energy harvesting systems. This course will be useful for enhancing the knowledge among various practicing engineers (Civil, Mechanical, Naval Architect and Petroleum Engineers') from industries in the vicinity of NITK and elsewhere in India. Also, the course is designed for several young faculties, research scholar, and graduate students of the institute.

Course Schedule	26 th – 30 th December 2018 Total contact hours: 15hrs
Objectives	<ul style="list-style-type: none"> • To expose the participants to the mechanics involved in wave structure interaction • To enhance and to make aware of design approach for fixed, floating and sub-sea systems among engineers and academicians • To inculcate analysis of sea keeping systems, and • Providing exposure to the practical problems through case studies about floating and fixed systems such Oil and Gas exploration systems, sea going vessels, offshore energy devices etc.,
Who can attend?	<ul style="list-style-type: none"> • Researchers from the disciplines of Civil, Mechanical and Naval Architect engineering, Practicing Engineers from Offshore Oil and Gas Industry and Port sectors (Both Private and Government sector and Scientists from Government, Private organizations and R&D laboratories. • Students at all levels including B.Tech./M.Sc./M.Tech./PhD and interested faculties from academic institutions.
Course details	<ul style="list-style-type: none"> • Introductory design concepts: Fixed vs. floating systems, Types of floating concepts, Design process, Development of specifications • Environment loads: Short and long term sea states, Probability and statistics modeling, Wave theory, wave spectra, design wave concept • Wave statistics • Fixed structure: Types, functions, and trends; Topsides, Configuration sizing and weight budget • Steel structures - design, Structural strength basics, Local and global strength, Rule book based design calculations; Concrete structures – design • Wave load calculation on structures • Sub-sea systems and Foundations • Global performance issues, Survival vs. operating design conditions, Seakeeping basics, Hydrodynamic response analysis, linear response and RAO • Calculation of natural frequencies for floating systems, added mass and damping • Floating system stability: intact stability, Wind heel and righting moment, Dynamic stability, minimum freeboard and airgap, Ballasting requirements, Damage stability and compartmentation • Station keeping systems: mooring system types, Environmental forces, Mooring components, Catenary mooring systems, Spread moored systems, Taut moored systems • Design of mooring line • Installation and maintenance, Load out, unique installation and maintenance issues, Case studies: Jacket design and life cycle • Special Topics: VIV, Dynamics of Offshore wind platform, LNG sloshing

Course Registration Process and Fee

Step 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 web registration by paying Rs. 500/- online through Net Banking/Debit/Credit card. This provides the user with life time registration to enrol in any number of *GIAN* courses offered.

Step 2: Course registration: Login to *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 “*Environmental loads and Design Approach for Fixed and Floating Offshore Structures*” from the list and click on save option. Confirm your registration by clicking on confirm course. Download and print your enrolment application form for your personal records and copy of the same can be sent to the course coordinator.

Step 3: Course fee and Selection of candidates

Course Fee (Non -refundable): The registration fee for the course is as follows

- Faculty/Students/Research Scholars from NITK: NIL
- Students/Research Scholars from other organization: Rs. 1,500/-
- Members of Faculty from other Academic Institutes: Rs 3,000/-
- Industry/research Organizations: Rs. 5,000/-
- Participants from abroad: US \$250

The course fee includes the instructional materials, internet facility and snacks between the sessions. Course fee in the form of a DD in favour of “Director, NITK Surathkal” payable at Surathkal, to be sent along with filled in course registration form to the course coordinator.

Dr.T.NASAR

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Scanned copies of course registration form and DD must be sent to the above mentioned email Id. Selection will be made purely on First Come First Serve basis and eligibility (subject to fulfilling of the seats available). Maximum fifty (50) participants will be accommodated in the course.

Accommodation: Outstation participants can be provided accommodation at nominal cost in the institute guest house/hostel on prior request. The registration fee doesn't include lodging and boarding.

Course Faculty

Dr. Krish P Thiagarajan

Dr. Krish P Thiagarajan obtained his Ph. D from University of Michigan, USA in 1993, specializing in Naval Architecture & Marine Engineering. His research emphasis is on the study of Fluid Structure Interaction (FSI), Floating System Dynamics and Computational Fluid Dynamics. He has published more than 100 papers in refereed international journals, along with several conference proceedings, and has been a keynote speaker at various national/international conferences. He is also engaged in Editorial Board of Applied Ocean Research (Elsevier), US Technical Advisory Group, International Electro-technical Commission (IEC). Currently he is a Professor of Mechanical Engineering and the Endowed Chair in Energy at the University Of Massachusetts Amherst, USA.



Course Co-ordinators

Dr. T. Nasar

Dr. T. Nasar is currently serving as Assistant Professor at National Institute of Technology Karnataka, Surathkal since March 2015. His area of research includes Wave structure interaction, Coastal engineering, Liquid sloshing dynamics in engineering applications, Development of smart materials, Structural health monitoring, Dynamics of Offshore Structures and Design of Offshore Structures.



Prof. Subba Rao

Prof. Subba Rao joined in 1984 and is currently serving as Professor at National Institute of Technology Karnataka, Surathkal. His area of research includes Sediment Dynamics in the Estuary and Shoreline, Coastal Erosion Problem – Causes, Mitigation and Management, Application of Artificial Neural Network to Coastal Engineering problems, Study of soil structure interaction of a different type berthing structure subjected to wave and earthquake induced forces, Design and Performance analysis of Pile Breakwater, Berm Breakwater, Tandem Breakwater, Semi-circular Breakwater, Quarter-circular Breakwater and Floating Breakwater.



About NITK

National Institute of Technology Karnataka (NITK) Surathkal is located in Mangalore (also called Mangaluru) City, Karnataka State, India. NITK is a centrally funded technical institute and was established in the year 1960. NITK is a premier institution engaged in imparting quality technical education and providing support to research and development activities. NITK is recognized as an institute of national importance by an act of Indian parliament. NITK has carved a niche for itself among the best technical institutions in India. NITK has been consistently ranked among the top ten technical institutions in the country. Today, the institute offers 9 B. Tech, 27 post graduate and doctoral programmes in all its 14 Departments and is making significant advances in R&D and outreach activities. NITK is probably the only institution in the country which can boast of its own beach.

About the Department

The Department of Applied Mechanics and Hydraulics established in 1960, the Department has earned a good reputation as a centre for academic, research and industrial consulting activities. Academic programme leading to M.Tech Degree in (i) Marine Structures (MS) (ii) Water Resources Engineering and Management (WREM) and (iii) Remote Sensing and Geographical Information System (RS & GIS) and Ph.D. Degree in the broad areas of Hydraulics and Water Resources Engineering, Coastal Engineering and Remote Sensing and GIS Applications are offered. In addition to regular students, candidates sponsored under the Quality Improvement Program (QIP) are admitted to these programs. The Department also contribute significantly to the academic content of the B.Tech. program in Civil Engineering and offers basic Engineering Science & Elective courses to all undergraduate programs. Laboratories with state-of-art equipment, highly qualified faculty and dedicated staff provide an ideal environment for academic pursuits. The Department is well known for its R&D activities as is evident from the large number of completed and ongoing projects funded by external agencies (MHRD, AICTE, MoST, ISRO, INCGW, INCOH, MOEF, MOES, NMPT, INCH etc.), technical papers published in peer-reviewed Journals & Conferences and Doctoral Degrees awarded.

National Institute of Technology Karnataka, Surathkal
MHRD Scheme on Global Initiative for Academic Networks (GIAN)
Short term Course
On

“Environmental loads and Design Approach for Fixed and Floating Offshore Structures”

Duration: 26-12-2018 to 30-12-2018

Registration Form

1. Name of applicant: _____

2. Designation & Department _____

3. Mailing Address: _____

_____ (Mobile): _____

5. Email: _____

6. Qualification: _____

7. Experience: Teaching: _____ and Industrial: _____

8. Comment on your exposure: _____

9. Fee Payment Details

Amount Rs: _____ Demand Draft No. : _____

Bank: _____ and Date: _____

10. Category of participants:

Faculty/Student/Research scholar of NITK

Faculty/Student/Research scholar of Outside NITK

Industry/Research Organizations

11. Require accommodation Facility? : Yes / No

I agree to abide by the rules and the regulations governing the GIAN–MHRD Course and I will attend the course for entire duration.

Place:

Date:

Signature of the applicant