



STRUCTURAL HEALTH MONITORING

Ocean Engineering

Instructor Name: S. Chandrasekaran

Institute: IIT Madras

Department: Ocean Engineering

Course Intro: : Structural Health Monitoring (SHM) deals with assessment, evaluation and technical diagnosis of different structural systems of strategic importance. Extensive knowledge of SHM shall lead to a clear understanding of risk and reliability assessment of structures, which is currently mandatory for structures of strategic importance like bridges, offshore structures etc. Course deals with both elementary and advanced applications of SHM along with details of case studies in lab scale.

Pre Requisites: : No pre-requisites. Course contents will be self-explanatory and induct basic knowledge as a part of its contents

Core/Elective: : Elective

UG/PG: : Both

Industry Support : All academic institutes, all consultancy organizations like Technip, L&T, Reliance etc

Reference : Aktan, A.E., Catbas, F.N., Turer, A. and Zhang, Z.F. (1998a). Structural identification: Analytical aspects, J. of Structural Engrg, 124(7):817-829. Alexandros A. Taflanidis, Demos C. Angelides, Jeffrey T. Scruggs. 2009. Simulation-based robust design of mass dampers for response mitigation of tension leg platforms, Engineering Structures, 31(4): 847-857. doi:10.1016/j.engstruct.2008.11.014 Alexandros, A., Taflanidis, Jeffrey T. Scruggs and Demos C. Angelides. 2008. Robust design optimization of mass dampers for control of tension leg platforms, Proceedings of the Eighteenth International Offshore and Polar Engineering Conference, ISOPE-I-08-326, Vancouver, BC, Canada, July 6-11.

About Instructor: Srinivasan Chandrasekaran is currently a Professor in the Dept. of Ocean Engineering, Indian Institute of Technology Madras, India. He has teaching, research and industrial experience of about 23 years during which he has supervised many sponsored research projects and offshore consultancy assignments both in India and abroad. His active areas of research include dynamic analysis and design of offshore platforms, Development of geometric forms of compliant offshore structures for ultra-deep water oil exploration and production, sub-sea engineering, Rehabilitation and retrofitting of offshore platforms, structural health monitoring of ocean structures, seismic analysis and design of structures and risk analyses and reliability studies of offshore and petroleum engineering plants.



COURSE PLAN

SL.NO	Week	Module Name
1	1	Structural Health Monitoring (SHM): Introduction
2	2	Methods of SHM- I
3	3	Methods of SHM- II
4	4	Non-destructive techniques- I
5	5	Static and Vibration based Health Monitoring
6	6	Sensor technologies used in SHM
7	7	SHM using Artificial Intelligence
8	8	Damage Identification and assessment
9	9	Applications of SHM on bridges and buildings
10	10	Applications of SHM in offshore structures- I
11	11	Applications of Structural control strategies
12	12	Future of SHM