PROF. SUDIP TALUKDAR
Department of Civil Engineering
IIT Guwahati

PRE-REQUISITES : BE (Civil/ Mechanical/ Aerospace Engg/ Marine Engg or Naval Architecture) and Final year students of BE/BTech in Civil/Mechanical/Aerospace/Marine Engg or Naval Architecture

INTENDED AUDIENCE : Master degree/ PhD students/Final year BE/BTech students

INDUSTRY SUPPORT : Aeronautics Research & Development Board, Delhi; Indian Space Research Org., Bangalore

COURSE OUTLINE :
Plates and shells exhibit two dimensional structural actions that result in stronger, thinner and lighter structures and therefore, have economic advantage. This has opened the scope for the wide use of such elements in all fields of engineering due to significant increase of strength/weight ratio. This course is usually taught in Master's degree level either as separate elective subject or including some principal topics in Continuum Mechanics. The exposure to this course and its completion are very essential in understanding the behaviour of thin structures for their applications in design. The proposed course is framed for post graduate level elective subjects for 12 weeks duration. The syllabus includes various topics of the linear elastic plate and shell theories, formulation of problems for different load cases and boundary conditions, finding closed form solutions and discussions of their limitations. The approximate methods, in case the closed form solutions are not available have also been included in the syllabus. The course is divided into 12 modules in which each module consists of 3 or 4 lecture hours. The assignment after the end of each module in MCQ/ Fill in the blanks or problem solving mode will be offered to the participants and asked to submit for evaluation. Evaluation is planned in off-line mode.

ABOUT INSTRUCTOR :

Prof. Sudip Talukdar is currently working as a faculty of Civil Engineering Department of Indian Institute of Technology Guwahati. Prior to joining IIT Guwahati, he was Assistant Professor in Civil Engineering at Regional Engineering College, Silchar (presently, NIT Silchar). He is specialized in Structural Engineering. He obtained his B.E from Regional Engineering College Silchar (presently NIT Silchar) with a gold medal. He completed his Masters in Structural Engineering from Department of Civil Engineering of Indian Institute of Technology Kharagpur and PhD from Institute of Technology Kanpur in Structural Dynamics in Aerospace Engineering Department. He has 21 years of experience in teaching and research as faculty of Civil Engineering Department in IIT Guwahati and 16 years in Regional Engineering College Silchar. He has published 127 papers till date in reputed International/ National Journals and Conference Proceedings. His research area includes theoretical and experimental works in wide areas of Structural Engineering. He is a member of Institution of Engineers (Ind), Indian Road Congress and Indian Society of Theoretical and Applied mechanics.

COURSE PLAN :

Week 1**:** Introduction to plate theory and back ground

Week 2**:** Navier's method for rectangular plate

Week 3**:** Levy's method for rectangular plate

Week 4**:** Axi-symmetrical Bending of Circular Plate

Week 5**:** Approximate methods for bending of plate

Week 6**:** Buckling of thin plate

Week 7**:** Approximate methods for buckling of thin plate

Week 8**:** Introduction to shell structures and shell geometry

Week 9**:** Membrane theory for surface of revolution

Week 10**:** Membrane theory of pressure vessels

Week 11**:** Membrane analysis for cylindrical shell roof

Week 12**:** General theory of cylindrical shell