A Two–Day Short Course on

Mechanics of Composite Materials and Structures
(MCMS 2015)

(Covers laminated composite plates and shells and nonlocal mechanics)

December 21–22, 2015

REGISTRATION FORM

(PLEASE MAIL TO REACH BEFORE 10TH DEC. 2015)

NAME : _____

ACADEMIC QUALIFICATION : _____

DESIGNATION : _____

ORGANIZATION : _____

MAILING ADDRESS : _____

_____

_____

TELEPHONE : _____

FAX : _____

EMAIL : _____

I AGREE TO ABIDE BY THE RULES OF THE COURSE. IF SELECTED, I SHALL PARTICIPATE IN THE COURSE FOR THE ENTIRE DURATION.

REGISTRATION FEE DETAILS:

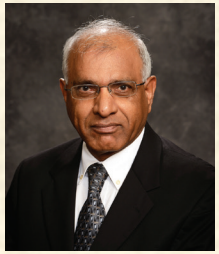
AMOUNT : _____

DD NO. : _____

BANK NAME : _____

ACCOMMODATION REQUIREMENT: ☐ YES / ☐ NO

DATE: SIGNATURE



Professional Highlights of **J. N. Reddy**

Professor J.N. Reddy is a Regents Professor, Distinguished Professor, and the inaugural holder of the Oscar S. Wyatt Endowed Chair in Mechanical Engineering, Texas A&M University. He is the author of over 550 journal papers and 19 text books on theoretical formulations and finite-element analysis of problems in solid and structural mechanics (plates and shells), composite materials, computational fluid dynamics, numerical heat transfer, and applied mathematics. In fact, no single person in engineering mechanics since S. P. Timoshenko has written so many well-received textbooks as J.N. Reddy that have lasting impact on the education of three generations of engineers. Dr. Reddy is also internationally-recognized for his research on mechanics of composite materials and structures and computational methods. The shear deformation plate and shell theories that he developed bear his name (Reddy third-order shear deformation theory and Reddy layerwise theory) in the literature. The finite element formulations and models he developed have been implemented into commercial software like ABAQUS, NISA, and HyperXtrude. He earned numerous professional honors (too many to list here). Dr. Reddy is one of the original top 100 ISI Highly Cited Researchers in Engineering around world with 18,250 citations and h-index of over 63 as per Web of Science, 2015; as per Google Scholar, the number of citations is over 43,300 with h-index of 85 and i10-index of 389. In 2015, Dr. Reddy became elected member of the US National Academy of Engineering for "contributions to composite structures and to engineering education and practice," a Foreign Fellow of the Indian National Academy of Engineering, and inducted into the Hall of Fame of the College of Engineering, Architecture, and Technology at Oklahoma State University. Recently, SRM University appointed him as the A.P.J. Abdul Kalam Distinguished Professor of Engineering.

Professor Reddy has had profound influence on the careers of many students and young researchers who came in contact with him during his professional career (not only as students and collaborators but also as participants in his short courses, workshops and seminars during his visits to various institutions and conferences). Some never met him but were influenced by his professional writings and personal guidance.

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Course Faculty

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Convener

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(Dean, School of Mechanical Engineering)

Coordinator

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31 years of enlightening lives

Department of Mechanical Engineering
SRM University, Kattankulathur,
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About The University

SRM University is one of the top ranking universities in India with over 38,000 students and 2600 faculties, offering a wide range of undergraduate, postgraduate, and doctoral programs in Engineering, Management, Medicine and Health sciences, and Science and Humanities. This University with institutions of 31years of existence under its ambit has emerged as one of the largest privately funded Universities. Over two and half decades, SRM University has set standards in experimental education and knowledge creation across various fields. Over 600 acres replete with a variety of facilities, Stateof–the–art labs, libraries, Wi–Fi, Knowledge center, 4500 capacity AC auditorium, 100 online smart classrooms, Hostels with premium facilities. SRM University is the first private university in India to launch the nano satellite named, SRMSAT; it has been designed by students and faculties of SRM University. The design is made robust enough to support different payloads and act as a Nano Bus for further missions.

By this process SRM University would be able to provide qualified and trained scientific and technological manpower in satellite technology. Added to the crowning glory for the SRM University is that the 98th Indian Science Congress was hosted with the theme 'Quality Education and Excellence in Scientific Research in Indian Universities', was formally inaugurated by Prime minister Dr. Manmohan Singh in which more than10,400 delegates from India and abroad including six Nobel Laureates has participated.

OVERVIEW

Structural elements (e.g., Beams, plates, and shells) made of fiber–reinforced composite materials and functionally graded materials (Reddy, J.N.: Mechanics of Laminated Composite Plates and Shells, Theory and Analysis, 2nd ed., CRC Press, 2004) are used in a variety of engineering applications, such as medical prosthetics, off–shore oil drilling platforms, wings of airplanes, automobile parts, to name a few. The study of deformation and stresses developed in such structures subjected to thermo–mechanical loads is of practical significance, because even small changes in loads, support conditions, or geometry can result in unpredictable deformations and stresses that can make the structure not functional. Experimental investigations of deformation and stresses are very expensive, time–consuming, and limited by the ability to measure various mechanisms of failure. Therefore it is of practical importance to develop the most accurate mathematical models and associated computational approaches to determine their response in different contexts, i.e., bending, buckling, vibration, and transient response. The present course is primarily intended for young researchers from academia (Ph.D. students and faculty members) as well as structural engineers from aerospace, civil, and mechanical engineering disciplines and automobile and off–shore industries.

COURSE OBJECTIVES

The course has the objective of presenting recent advances in the development of refined theories of composite beams and plates, accounting for (1) transverse shear strains, (2) von Kármán nonlinearity, (3) grading through thickness, and (4) nonlocal effects (accounting for material length scales). The course is intended to provide graduate students and researchers working in aerospace, automotive, chemical, civil, mechanical engineering, as well as numerical analysts and materials scientists with the recent advances made in structural theories. The course is aimed at providing engineers with the theory and analysis in dealing with composite structural components in the form of beams, plates, and shells laminated of fiber–reinforced composite materials. Theoretical formulations and applications will be presented to illustrate the concepts. Persons who have taken the course and understood the material should benefit in strengthening their background in the following areas:

- Theories governing the bending, buckling and vibration behavior of laminated composite beams and plates
- Analysis methods, analytical as well as the finite element method, to determine bending, buckling and vibration response of structural elements
- Functionally graded beams, plates, and shells
- Nonlocal elasticity of Eringen
- Modified couple stress theories of beams and plates

BENEFITS OF ATTENDING THE COURSE

Persons who have attended the course and followed the material should benefit in strengthening their background in the following areas:

- A strong understanding of the formulative steps involved in the development of structural theories and their solutions by analytical as well as the finite element models of laminated composite and functionally graded structures.
- Exposure to recent research and developments in the field of composites and nonlocal mechanics so that researchers can find topics to explore and be able to apply and/or publish journal papers.

COURSE MATERIAL AND REFERENCE BOOK

A copy of the overheads used in the presentation of the course will be provided as a part of the course material. Much of the material for the course will come from the book, Mechanics of Laminated Composite Plates and Shells by J. N. Reddy (CRC Press, 2004; second edition); however, it is not included as the course material.

COURSE CONTENTS

First Day:

- Composite Materials: An Introduction
- Structural Theories of Composite Laminates
- Composite Plates (CLPT and FSDT) and their analytical solutions
- Finite Element Models with Applications

Second Day:

- Functionally Graded Material Beams and Plates
- A Robust Shell Finite Element for Large Deformation Analysis of Plates and Shells
- Nonlocal elasticity of Eringen
- Modified couple stress theories and finite rotation gradient elasticity

Important Dates

Last date for registration : December 10, 2015
Course Dates : December 21–22, 2015

Registration Fee

For participants from industry : Rs.10000/–
For participants from academic institutions : Rs.6000/–
For Research Scholars : Rs.4000/–
(Registration fee includes, course material, lunch and snacks)

Application

Please fill out the Registration Form and send it before the date indicated along with DD in favour of "Mechanical Engineering Association" payable at Chennai.

Contact:

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