5. Analysis of functionally graded beams and plates
6. Recent developments in the modeling of web-core sandwich structures.

Research scholars and faculty members from these branches are encouraged to participate. – Mechanical Engineering, Electrical Engineering, Civil Engineering and Chemical Engineering.

Course Outline

First Day:

- Composite Materials: An Introduction
- Structural Theories of Composite Laminates
- Finite Element Models of Composite Laminates
- Numerical Results and Discussion
- Interaction session (Q&A)

Second Day:

- Functionally Graded Materials
- Finite element models of FGM Beams and Plates
- Numerical Results and Discussion
- Failures in Composites and Design Considerations
- Interaction session (Q&A)

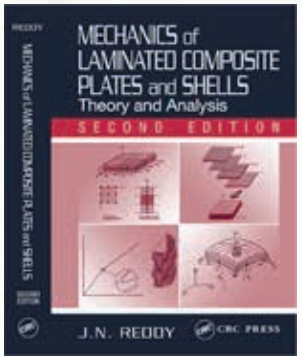
Third-Day: (Half)

- Finite Element Models of Architected Materials and Structures
- Overview of the course
- Interaction session (Q&A)

Course Outline

1. Comprehensive Learning: This course covers the theory and design aspects of composite structural components, including fiber-reinforced materials and functionally graded materials.
2. Practical Application: Participants will gain skills in analyzing and designing these structures, utilizing concepts like anisotropic elasticity, structural theories, and finite element analysis.
3. Stay Current: Stay updated with the latest advancements in modeling web-core sandwich structures.
4. Interactive Learning: Interactive sessions, including Q&A and discussions, enhance problem-solving abilities and consolidate knowledge in composite materials and structural engineering.

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 will not be included as the course material. A copy of all overheads used in the course will be distributed to the participants before the course (as a PDF file).

Important Dates

Last date for Registration: 27th December 2023

Course Dates: 03rd - 05th Jan 2024

Registration Fees

Participants

Research Scholars: ₹ 1000/-

Academic Institutions: ₹ 3000/-

Industry Participants: ₹ 5000/-

Account Details

Account Number: 89250100011983

IFSC Code: BARB0VJMSRI

Bank & Branch: Bank of Baroda / MSRIT Branch

Registration Link

https://forms.gle/WvazoBEXerm7cPsi9

Contact us

Dr. Sunith Babu L, Associate Professor
Department of Mechanical Engineering, RIT - **sunithbabu@msrit.edu**

Dr. Rahul Cadambi Murali, Head and Associate Professor,
Composite Materials and Technologies Research Centre,
Dept of Mechanical Engineering, RUAS - **rahulmc.me.et@msruas.ac.in**

RAMAIAH Institute of Technology

DR. M.S. RAMAIAH CENTENARY YEAR CELEBRATIONS

CELEBRATING 60 Years DIAMOND JUBILEE

A Three-Day Short Course on

THEORY AND ANALYSIS OF LAMINATED COMPOSITE AND FUNCTIONALLY GRADED STRUCTURES

Jointly Organized by
Ramaiah Institute of Technology
&
Ramaiah University of Applied Sciences

3rd – 5th January 2024

Venue
Ramaiah Institute of Technology
(Autonomous Institute, Affiliated to VTU)
MSR Nagar, MSRIT Post, Bengaluru – 560 054
www.msrit.edu

About RIT

Dr. M. S. Ramaiah a philanthropist, founded 'Gokula Education Foundation' in 1962 to serve the society. M S Ramaiah Institute of Technology (MSRIT) was established under the aegis of this foundation in the same year, creating a landmark in technical education in India. MSRIT offers 17 UG programs and 11 PG programs. All these programs are approved by AICTE. All eligible UG and PG programs are accredited by the National Board of Accreditation (NBA). The institute is accredited with 'A+ grade by NAAC in March 2021 for 5 years. University Grants Commission (UGC) & Visvesvaraya Technological University (VTU) have conferred Autonomous Status to MSRIT for both UG and PG Programs since 2007. The institute has also been conferred autonomous status for the full time Ph.D. program from the academic year 2021-2022. The institute is a participant in the Technical Education Quality Improvement Program (TEQIP), an initiative of the Government of India. The institute has around 380 competent faculty out of which 67% are doctorates. Some of the distinguished features of MSRIT are state-of-the-art laboratories, individual computing facilities for all faculty members, all research departments active with sponsored funded projects, and more than 300 scholars pursuing Ph.D. To promote research culture, the institute has established the Centre of Excellence for Imaging Technologies, the Centre for Advanced Materials Technology, the Centre for Antennas and Radio Frequency Systems (CARFS), the Center for Cyber-Physical Systems & Centre for Bio and Energy Materials Innovation. Ramaiah Institute of Technology (RIT) has consistently demonstrated an impressive track record within the National Institutional Ranking Framework (NIRF) administered by the Ministry of Education, Government of India. Notably, RIT has maintained its position within the top 100 rankings since 2016, emphasizing its commitment to delivering academic excellence and high-quality education.

About Resource Person

Dr. J N Reddy is a highly accomplished academic figure, serving as a Distinguished Professor, Regents' Professor, and the inaugural holder of the O'Donnell Foundation Chair IV in Mechanical Engineering at Texas A&M University, College Station, Texas. Renowned as an ISI highly-cited researcher, he has made significant contributions to the field of applied mechanics, boasting a remarkable bibliography of 25 textbooks and nearly 800 journal papers. His pioneering work on shear deformation theories, which now bear his name as the Reddy third-order plate theory and the Reddy layer wise theory, has profoundly impacted the field and spurred new research developments and applications. Several of his concepts have been incorporated into widely-used finite element computer programs like ABAQUS, NISA, and HyperXtrude.

In recent years, Dr. Reddy's research has focused on creating locking-free shell finite elements and addressing nonlocal and non-classical continuum mechanics issues, particularly those involving couple stresses and damage and fracture in solids. Dr. Reddy's accolades include the 2023 Leonardo da Vinci Award from the European Academy of Sciences, the 2022 IACM Congress (Gauss-Newton) Medal, the 2019 SP Timoshenko Medal, the 2018 Theodore von Karman Medal, the 2017 John von Neumann Medal, the 2016 Prager Medal, and the 2016 ASME Medal. He is a member of eight national academies, including the US National Academy of Engineering, and a foreign fellow of several international engineering academies.

Dr JN Reddy
can be contacted by email on
jn_reddy@yahoo.com, jnreddy@tamu.edu

Overview

The Finite Element Method (FEM) is a numerical and computer-based technique of solving a variety of practical engineering problems that arise in different fields. It is recognized by developers and users as one of the most powerful numerical analysis tools ever devised to analyze complex problems of engineering.

The underlying theory of the method is now well established, with many books and courses providing adequate explanations of the theory. However, most

people using the method via commercial software or in-house codes do not often understand the method as applied to engineering problems, especially in generating input data and interpreting the results.

Course Objectives

The course is aimed at providing participants with the theory and analysis (and some design considerations) in dealing with composite structural components in the form of beams, plates, and shells laminated of fiber-reinforced materials and two-constituent functionally graded beams and plates. Theoretical formulations and applications will be presented to illustrate the concepts. Persons who have taken the course and understood the material should benefit from strengthening their background in the following areas:

1. Anisotropic elasticity and functionally graded materials.
2. Theories governing the bending, buckling and vibration behavior of beam, plate and shell structural elements.
3. Finite element analysis of laminated composite structures
4. Theories of functionally graded beams and plates