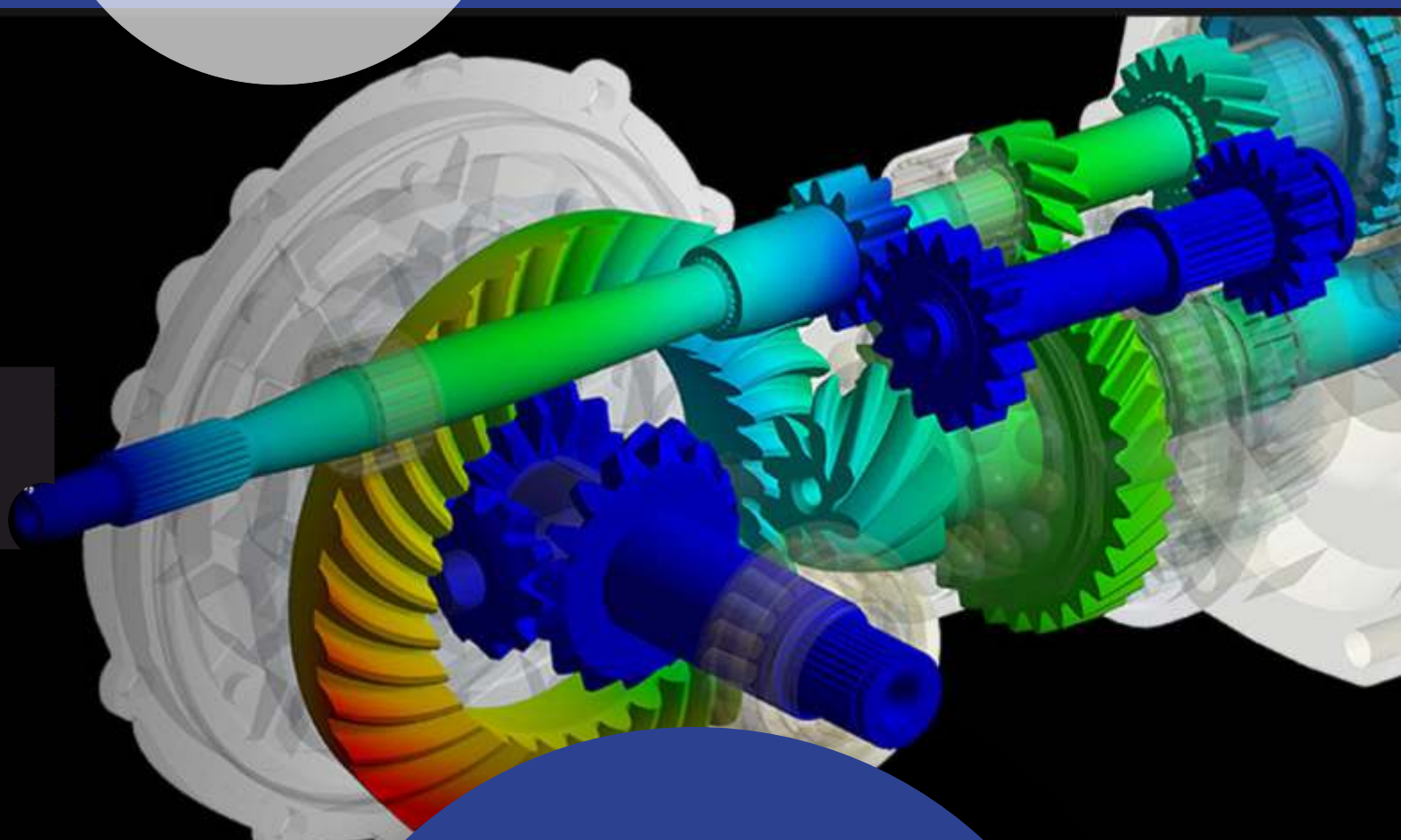




SHARDA
UNIVERSITY
Beyond Boundaries



**SHARDA SCHOOL OF
ENGINEERING &
TECHNOLOGY**



COURSE

Foundations of Ansys for Mechanical Engineering

(VAT 205)

VALUE ADDED
COURSE BROCHURE-30 HRS

2026-27

ABOUT THE UNIVERSITY

Sharda University envisions to serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship. It has 14,000+ students from 95+ countries, 29 states, and Union Territories, providing cultural diversity and global exposure to students. It has 26000+ alumni who are today leaders in their realms. Sharda University is NAAC A+ University with Overall NIRF Rank of 87. Teaching Learning Center at Sharda University is to equip the faculty members with the expertise, skills and knowledge they need for capacity building of students. Teaching as a profession requires highly specialized skills and knowledge to impact significantly on student learning and therefore teachers must refine their conceptual and pedagogical skills.

ABOUT SCHOOL

Sharda School of Engineering and technology is an open platform for diverse voices where teaching runs parallel to the real world and students are groomed to join the global workforce. SSET is distinguished as one of the top-ranked engineering schools in India. The students at SSET benefit through the professional grooming of renowned faculty and industry experts having experience of tackling pressing engineering problems. Students discover their passion in one of the various offered Engineering majors at the School of Engineering and technology.

ABOUT DEPARTMENT

The department of mechanical engineering is one of the broadest and oldest in the Sharda School of Engineering and Technology, which is constantly evolving with advancements in technology, especially in Automotive Electrical Vehicles, Mechatronics, and Digital Manufacturing. The department offers B. Tech Mechanical Engineering and M. Tech Mechanical Engineering. In addition to theoretical coursework, mechanical engineering students also have access to well-equipped laboratories such as the Mechanical Simulation Laboratory, Computer-Aided Design and Drafting, Mechanical Workshop, Manufacturing Technology Laboratory, Mechanics of Machines and Solids Laboratory, Fluid Mechanics and Turbo Machinery Laboratory, Heat Transfer and RAC Laboratory, IC Engines, Automobile Engineering, and Mechatronics Engineering Laboratory, where they can gain hands-on experience in testing and evaluating mechanical systems. These laboratories include facilities for design simulation, materials testing, thermal testing, fluid mechanics, advance machining processes, automobile engineering and control systems.

VALUE ADDED COURSE (VAC)

The Value added Education Courses aim to provide additional learner centric graded skill oriented training, with the primary objective of improving the employability skills of students.

PURPOSE OF VALUE-ADDED COURSE

Value-Added Courses (VACs) are crucial instructional strategies designed to bridge knowledge gaps in students and provide them with a competitive edge in the job market. These courses enhance students' employability by developing a variety of competencies. VACs help students lay the creative groundwork for passion projects, such as design projects and Manufacturing, beyond their regular coursework. In the context of mechanical engineering, VACs can help students understand basic concepts and terminology related to advanced manufacturing technologies, robotics, and automation. Students can classify and analyze terms related to these technologies, understand their types, applications, and challenges, and apply this knowledge to practical projects. By doing so, VACs transform students' enthusiasm into practical skills, making them more attractive to employers and better prepared for their future careers.

COURSE DESCRIPTION

This course will offers a foundational understanding of ANSYS software, a cornerstone in mechanical engineering simulation and analysis. Students delve into Finite Element Analysis (FEA) principles, ANSYS Workbench interface navigation, and the complete workflow, covering geometry creation, meshing, boundary conditions, solving, and post-processing. Through practical exercises, including Tensile and Bending Test Simulations, Thermal and Fluid Flow Analyses, and Design and Structural Optimization, students acquire hands-on experience in utilizing ANSYS for real-world engineering challenges. By course completion, students possess the skills to independently set up and analyze engineering models, making them proficient users of ANSYS in mechanical engineering applications.

RESOURCE PERSON

Dr. Ananda Babu Arumugam

Dr. Ananda Babu is a Professor and Head of the Department of Mechanical Engineering in the School of Engineering and Technology, Sharda University, India. Dr. Ananda Babu obtained his doctorate from Vellore Institute of Technology (VIT), Vellore in the area of composite structural dynamics. He obtained his B.E-Manufacturing Engineering in College of Engineering, Guindy, Chennai, and his M.E- Engineering Design in PSG College of Technology, Coimbatore from Anna University. Dr. Ananda Babu worked in Vellore Institute of Technology (VIT), Vellore about eight years with various designations. He has experience of about thirteen years in both teaching and research.

Experience: 13+ years

COURSE SCHEDULE

Unit	Content	Duration
1	Overview of Finite Element Analysis (FEA) and its significance in mechanical engineering.	2 h
2	Introduction to ANSYS Workbench interface.	2 h
3	Understanding the workflow: geometry creation, meshing, boundary conditions, solving, and post-processing.	2 h
4	Basics of structural analysis: static equilibrium, stress, and strain.	2 h
5	Introduction to ANSYS Mechanical module.	2 h
6	Performing linear static analysis: setting up geometry, applying loads and constraints, solving, and interpreting results.	2 h
7	Fundamentals of heat transfer: conduction, convection, and radiation.	2 h
8	Introduction to ANSYS Thermal module.	2 h
9	Conducting steady-state thermal analysis: defining material properties, boundary conditions, solving, and analyzing temperature distribution.	2 h
10	Introduction to computational fluid dynamics (CFD) principles.	2 h
11	Overview of ANSYS Fluent module.	2 h
12	Setting up and solving basic fluid flow problems: flow through a pipe, flow over an airfoil.	2 h
13	Basics of design optimization using ANSYS DesignXplorer.	2 h
14	Understanding design parameters, objectives, and constraints.	2 h
15	Performing simple optimization tasks to improve mechanical designs.	2 h
Total		30 h

School: SSET Programme: B. Tech Branch: All		Batch : 2022-26 Current Academic Year: 2024-25 Semester: VI	
1. Course Code	VAT205		
2. Course Title	Foundations of Ansys for Mechanical Engineering		
3. Credits	Audit Course		
4. Contact Hours (L-T-P)	30 Hours		
Course Type	Value added course		
5. Course Objective	✓ This course offers a comprehensive introduction to ANSYS software for mechanical engineering students. It covers essential theoretical concepts and practical applications through hands-on experiments, enabling students to solve basic engineering problems using ANSYS.		
6. Course Outcomes	The student will be able to CO1: Interpret Basic introduction of Ansys CO2: Applying Structural Analysis Principles through ANSYS CO3: Demonstrate thermal Analysis Principles via ANSYS. CO4: Demonstrate the fundamentals of fluid mechanics through ANSYS. CO5: Demonstrate Design Optimization through ANSYS. CO6: Interpret simulation results and optimize mechanical designs using ANSYS software.		
7. Course Description	This course will offers a foundational understanding of ANSYS software, a cornerstone in mechanical engineering simulation and analysis. Students delve into Finite Element Analysis (FEA) principles, ANSYS Workbench interface navigation, and the complete workflow, covering geometry creation, meshing, boundary conditions, solving, and post-processing. Through practical exercises, including Tensile and Bending Test Simulations, Thermal and Fluid Flow Analyses, and Design and Structural Optimization, students acquire hands-on experience in utilizing ANSYS for real-world engineering challenges. By course completion, students possess the skills to independently set up and analyze engineering models, making them proficient users of ANSYS in mechanical engineering applications.		
8. Outline syllabus			CO Mapping
Unit 1	Introduction to ANSYS Basics		
A	Overview of Finite Element Analysis (FEA) and its significance in mechanical engineering.		CO1
B	Introduction to ANSYS Workbench interface.		CO1
C	Understanding the workflow: geometry creation, meshing, boundary conditions, solving, and post-processing.		CO1
Unit 2	Structural Analysis Fundamentals		
A	Basics of structural analysis: static equilibrium, stress, and strain.		CO2
B	Introduction to ANSYS Mechanical module.		CO2
C	Performing linear static analysis: setting up geometry, applying loads and constraints, solving, and interpreting results.		CO2
Unit 3	Thermal Analysis Basics		
A	Fundamentals of heat transfer: conduction, convection, and radiation.		CO3
B	Introduction to ANSYS Thermal module.		CO3
C	Conducting steady-state thermal analysis: defining material properties, boundary conditions, solving, and analyzing temperature distribution.		CO3
Unit 4	Fluid Flow Simulation Basics		
A	Introduction to computational fluid dynamics (CFD) principles.		CO4
B	Overview of ANSYS Fluent module.		CO4
C	Setting up and solving basic fluid flow problems: flow through a pipe, flow over an airfoil.		CO4
Unit 5	Introduction to Design Optimization		
A	Basics of design optimization using ANSYS DesignXplorer.		CO5
B	Understanding design parameters, objectives, and constraints.		CO5
C	Performing simple optimization tasks to improve mechanical designs.		CO6
Mode of examination	Assignments / Quizes		
Marks Distribution	Continuous Assessment (CA): 25 End Term Examination (ETE):75		