MA 550-Smart Materials

Course Code:	MA-550
UTAA Credit (Theoretical-Laboratory hours/week):	3(3-0)
ECTS Credit:	6.0
Department:	Mechanical and Aeronautical Engineering
Language of Instruction:	English
Level of Study:	Graduate
Offered Semester:	Fall and Spring Semesters.

Course Objectives

On successful completion of this course, students will be able to:

Understand the concept of smart materials and smart structures

Develop familiarity with piezoelectric materials and their use as

sensors and actuators in various configurations

Develop familiarity with shape-memory alloys

Knowledge of various other smart materials/structures with

application examples

Read and understand emerging technical literature about the subject

Course Content

An overview of smart materials and structures

Review of basic mechanical and electrical concepts

Piezoelectric materials

Shape-memory alloys

Electroactive polymers

ER and MR fluids

Vibration control and damping

Case studies

Course Learning Outcomes

1-Ability to design sensors & actuators using piezoelectric materials

2-Ability to design sensors & actuators using shape memory alloys

3-Ability to analyze vibration control and damping structures using piezoelectric

materials and SMAs

4-Ability to interpret emerging technical literature related to smart materials and structures and demonstrate knowledge in a project.