E MCH 597B Structural Health Monitoring
Spring 2009, Schedule Number 286612
Tues/Thurs 1:00-2:15 in 12 Walker
Instructor: Cliff Lissenden, Assoc. Prof. ESM

Description: Our aging AERSP/ME/CE infrastructure is a huge maintenance and safety concern. This course addresses technology development to meet these needs.

Structural Health Monitoring (SHM) is the continuous or regular monitoring of the condition of a structure or system using built-in or autonomous sensory systems, and any resultant intervention to preserve structural integrity. SHM is a broad multidisciplinary field both in terms of the diverse science and technology involved as well as in its varied applications. The technological developments necessary to enable practical structural health monitoring are originating from scientists and engineers in many fields including physics, chemistry, materials science, biology, and mechanical, aerospace, civil and electrical engineering. SHM is being implemented on diverse systems and structures such as aircraft, spacecraft, ships, helicopters, automobiles, bridges, buildings, civil infrastructure, power generating plants, pipelines, electronic systems, manufacturing and processing facilities, biological systems, and for the protection of the environment, and for defense.
Fu-Kuo Chang, William H. Prosser, Mark J. Schulz
Structural Health Monitoring, 2002, Vol. 1, pp. 3-4.

Course Objectives: Students will prepare to work in the multidisciplinary field of structural health monitoring by learning fundamental issues about material damage and modeling, sensing technologies, and diagnostics methods as applied to aerospace, civil, and mechanical structures and systems.

Course Outcomes: As a result of this course, students will be able to:
1) characterize material and structural degradation modes based on loading and environment,
2) describe and compare various types of diagnostics for aerospace, civil, and mechanical applications,
3) select a viable SHM methodology for a given application based on available technology,
4) apply the mechanics of guided waves for SHM applications to detect structural defects, and
5) apply fundamentals of prognostic modeling to predict remaining fatigue life.

Grading: homework problems 30%, reading/writing assignments 30%, design project 40%