ME 340

HEAT TRANSFER

COURSE OUTCOMES

1. ***Conservation of Energy*** - Each student can apply conservation of mass and energy to a control volume or control surface.

2. ***Fundamentals of Conduction*** - Each student understands the phenomenological origin of Fourier's law and is familiar with the development of the general heat diffusion equation based on Fourier's law and the principle of conservation of energy. Each student can model boundary conditions and can reduce and solve the general heat diffusion equation for one-dimensional, steady-state problems. Each student can analyze steady state systems using thermal circuits.

3. ***Extended Surfaces*** - Each student can analyze extended surfaces (fins and fin arrays). Each student can evaluate a fin or a fin array using fin performance parameters.

4. ***Two-dimensional conduction*** - Each student can describe the analytical and numerical methods commonly used to analyze two-dimensional, steady state heat conduction. Each student can use finite difference methods to solve two-dimensional, steady state problems.

5. ***Transient Conduction*** - Each student can analyze transient problems using the lumped capacitance method, one-dimensional analytical solutions and transient finite difference methods.

6. ***Fundamentals of Convection*** - Each student understands the physical phenomena associated with convection, Newton's law of cooling, and the significance of non-dimensional parameters in convection heat transfer.

7. ***Convection Correlations*** - Each student can use empirical correlations to analyze external and internal, forced and free convection problems.

8. ***Fundamentals of Radiation*** - Each student understands the physical mechanisms involved in radiation heat transfer. Each student can calculate total, hemispherical radiative properties of real surfaces from their spectral, directional counterparts.

9. ***Radiative Surface Exchange*** - Each student can analyze the radiative heat exchange between surfaces and in diffuse, gray enclosures.