Experiments

ME 107B Experiments For Fall 2009

(A) WIND TUNNEL: Eli Patten epatten@me.berkeley.edu **Lab: between 45 & 50 Hesse**
Computer modeling is an important tool for evaluating potential designs, but it is critical to verify the model using actual experiments. Students will use a blade-element-model to predict the performance of rotors for wind turbines and then measure the actual performance using a wind tunnel. Custom rotor blades can be manufactured using rapid prototyping and will be used to isolate specific variables and test if the computer model can accurately capture their effects. This lab will combine aspects of multiple fields, including fluid dynamics, aerodynamics, instrumentation, electric motor theory, and numerical methods.

(B) REFRIGERATION PERFORMANCE Ralph Greif greif@me.berkeley.edu Lab: 70 Hesse
A vapor compression cycle is to be used for a refrigeration system. The system elements are a compressor, expansion valve, condenser and evaporator. The expansion valve is controllable, as is the flow rate of coolant through the condenser, and the flow rate of a cooled liquid. A pre-cooling circuit also exists to study its possible effects on compression efficiency. The expt involves the determination of the system performance by evaluating data taken at different operating conditions

(C) SHOCK ABSORBER DYNAMOMETER Shashank Nawathe shashank@berkeley.edu **Lab: 49 Hesse** The objective of this experiment is to evaluate the behavior of a gas-filled shock absorber. In order to characterize the behavior of the shock absorber, data will be obtained using a custom fabricated dynamometer and Pentium based PC. A baseline set of data will be collected first, and then additional sets of data will be collected after changing one parameter at a time. The parameters available to be modified are: flexible shim stack/valve arrangement, oils of different viscosities, externally adjusted compression and rebound dampening valves, pressure of gas charge within the shock, temperature of shock, the rotational speed of the faceplate, and the amplitude of the shock stroke.

(D) VALVE & CAM DYNAMICS Don Frederick Wed,Fri don.frederick@berkeley.edu, Andrew North MonFri anorth@berkeley.edu **Lab: 40 Hesse**
Students will have the opportunity to evaluate the dynamic performance of an overhead camshaft valve train. They will design, fabricate and experimentally test modifications to the valve train in order to increase its performance. A modified late model overhead cam engine fitted with force transducers will be used for this investigation. Students should be prepared to apply a broad range of skills to this experiment including sound experimental techniques, dynamic modeling, innovative thinking, mechanical fabrication skills and team values.