

ESS205 Draft Course Work Summary

- Week 1: Science: Introduction to the Earth Upper Atmosphere: Troposphere, Stratosphere, Mesosphere, Thermosphere, and Magnetosphere; Electronics – getting familiar with electric circuits – resistors, voltages and currents;
- Week 2: High Altitude ballooning and Balloon Experiments: Temperature profiles, pressure profiles, profiles of other atmospheric properties, radiation profiles (UV/IR), cosmic rays, electric fields, natural radio emissions, advanced technology experiments (tethers, solar sail). Balloon characteristics and trajectories – zero pressure vs. superpressure. Recovery issues. Electronics – other critical circuit elements – capacitors, and inductions, influence of environment;
- Week 3: Communications with ground-based stations; radio links, frequencies and resonances; timing circuits; Electronics: the last bit – amplified and modulated; Potential payload defined; Science – our environment does it too – Lightning and T-Storms;
- Week 4: Payload: build a sample payload and test; Science – our Ionosphere, radio broadcaster extraordinaire;
- Week 5: Science Experiments: Ballooning in Antarctica vs your ballooning experiment off the building; Tracking of the payload: Antennas, transmitting, receiving, direction finding. Science: power of electrons as seen in Aurora; Data management issues: analog vs. digital, available bit rate, S/N, methods of data recovery;
- Week 6: Remote Sensing of our atmosphere; Taking your own data; Timing & location determination – issues, history, Global Positioning System (GPS); Science: Finding where you are in space – the magnetosphere; Students present preliminary experiment designs;
- Week 7: Investigation of the planets; Crunch time – fabricate your experiment; Talking to ground control – if it don't talk, then it don't walk (or fly);
- Week 8: Strung out: Tethers Unlimited provides solutions for low cost access to space; Final fabrication;
- Week 9: City slicker testing of recovery of payload; find the bag of candy and its yours; data analysis preparation; Go fly a balloon; Comparisons with early rocketry;
- Week 10: Did you recover? Post-mortem or post data-analysis; Development of Final report; Final word on Rockets and spacecraft;

ESS205 Discussion and Lab Work:

- Week 1: Group identification of experiment, formation of group management plan and individual responsibilities; Analogue or Digital; Basic Electronics Components
- Week 2: Further Development of Payload Ideas; Basic Electric Circuits and the Influence of the environment;
- Week 3: Transmitting: Frequencies and all that jazz
- Week 4: Experiment fabrication of baby payload: Cricket Sat.
- Week 5: Launch and Track (non-recoverable) payload from UW

- Week 6: Data Acquisition
- Week 7: Begin fabrication of recoverable payload
- Week 8: Environmental testing and Integration
- Week 9: In-City testing
- Week 9-10: Go offsite (Eastern Washington) for recoverable launch
- Week 10: Analysis of recovered payload

Grading

Grade will be based on:

- Weekly Assignments relating to Lectures and Labs
- Development of Experimental Apparatus
- Mid-Term: Based from Weekly assignments
- Final Report: All must submit
 - Group Management Plan
 - Analysis of First Launch Data
 - Summary of In-city Testing and Flight Integration
 - Analysis of Final Launch Data and Final Report