BMEN 7342 - Design of Experiments

BMEN 7342 Design of Experiments (3 semester credit hours) This graduate level course will walk students through the basics of experimental design in biomedical engineering with a focus on the practical application of skills and concepts to student research. Specific topics include understanding types of data; independent vs. dependent variables; design and selection of experimental controls; reagent standards and equipment calibration; forming robust, testable hypotheses; the danger of assumption; calculating sample size and power; forming evidence based conclusions; confounds and error; IRB documentation; selection of well-suited laboratory animals; informed consent; ethics in research; results forecasting; graphical representation of results; articulation of the research findings, and the implications of the findings in view of the strengths and weaknesses. Software packages including Excel and GraphPad will be demonstrated. Journal articles, including infamous retractions, will be reviewed and assessed for flaws in experimental design. Student-designed experiments relating to their work will be presented and reviewed. Prerequisites: PhD standing and department consent required. (3-0) Y