Stat 415 Syllabus
Fall 2012

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Official Office Hours: M2, WF PM (in Black Engineering) and by appointment or good fortune

"Text": Course materials (including the "Course Outline," which is a preprint of the tutorial article "An Introduction to Statistical Issues and Methods in Metrology for Physical Science and Engineering") are to be found on the course web page at:

http://www.public.iastate.edu/~vardeman/stat415/stat415vard.html

Course Requirements: 13 Lectures on the course materials and one (100 point) in-class Exam (given September 21). Ungraded "homework" problems and solutions (mostly consisting of old exam questions from the "statistics and metrology" part of IE/Stat 361) are posted on the course web page. These will not be turned in or marked.

Extra Credit: Any or all of the following may be completed and e-mailed to your instructor by 5 PM October 1 in .pdf format for the indicated amount of exam extra credit (provided the assignments are professionally and correctly done).

Extra Credit Assignment A (20 points): Find and document (in a report of not more than 5 pages of 11 point type with 1.5 line spacing) a real example of a "Type B" measurement uncertainty analysis. Be sure to completely cite your source. Provide both a "GUM-type" and a Bayesian assessment of measurement uncertainty. (Put the BUGS code in an appendix that does not count against the 5 page limit.)

Extra Credit Assignment B (10 points): Find and document (in a report of not more than 5 pages of 11 point type with 1.5 line spacing) a real calibration example. Be sure to completely cite your source. Provide both a standard regression analysis and a Bayesian analysis of uncertainty associated of measurands $x$ corresponding to various future measurements $y$. (Put the BUGS code in an appendix that does not count against the 5 page limit.)

Assignment B may be done twice if one example is one where $x$ and $y$ are in the same units and the second is one where $x$ and $y$ are in different units (e.g. $x$ being temperature in degrees C and $y$ being a resistance in ohms.)
**Extra Credit Assignment C** (10 points): Find and document (in a report of not more than 5 pages of 11 point type with 1.5 line spacing) a real example where digitalization/quantization of measurement occurs and matters. Be sure to completely cite your source. Provide both a **JMP** "survival" analysis and a Bayesian analysis of a mean and standard deviation of real number measurement associated with the observed digital measurements. (Put the **BUGS** code in an appendix that does not count against the 5 page limit.)

**Accommodation for Students with Disabilities**
Iowa State University complies with the American with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact Vardeman before the end of the 2nd week of the semester. Anyone requesting an accommodation will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 of the Student Services Building.