Course Outline: STAT5505  Design of Experiments

Professor:
Dr. Shirley E. Mills
5203 Herzberg Bldg.,
School of Mathematics and Statistics
Phone: 613-825-0480 (home)
Email: smills@math.carleton.ca

URL: http://www.math.carleton.ca/~smills

Office Hours: Th 09:30-10:30; other hours by appointment only - please email to arrange

Classes will be asynchronous; all materials will be posted to CuLearn

Course Outline:
1. Linear Models: Review of matrix theory and linear model theory.
2. Complete Randomized Design, randomization theory of inference
3. Randomized Block, randomization theory of inference; analysis with treatment errors; efficiency of randomized block design.
4. Latin Squares, orthogonality of factors; randomization theory for Latin squares
5. Mutually orthogonal Latin Squares (MOLS) (and construction via Galois fields); Graeco-Latin squares, crossover designs
6. Split plot designs, strip plot designs
7. Balanced Incomplete Blocks (BIB), combinatorial properties of balanced incomplete block designs; intra- and inter-block analysis for BIB, efficiency factor; group divisible designs
8. General Incomplete Block Designs (GIBD) and partially balanced incomplete block (PBIBD) designs, Youden squares, construction and analysis
9. Factorials: $2^k$, $3^k$, confounding and fractional replication
10. Response surface theory; method of steepest ascent, canonical analysis of a response surface; factorial and composite designs for response surface analysis; rotatable designs
11. Optimal designs (if time)

Extensive course notes by Prof. S. Mills will be posted throughout the term in CuLearn

Additional Reference Material:

Grading: Assignments: 4 @ 15% each  Final (take-home): 40%
NO LATE ASSIGNMENTS WILL BE ACCEPTED WITHOUT MY PRIOR AUTHORIZATION. Unless otherwise directed by Course Instructor, all work submitted for grading is to be done independently (i.e. without collaboration).
Notices:

1. **Academic Year**:  https://calendar.carleton.ca/academicyear/

2. **Holy Days**:  
   https://carleton.ca/equity/accommodation/religious-observances/

3. Students wishing to see their examination papers must make an appointment within one week of the examination results being posted; it is not an opportunity to argue about the marking!

4. **Academic Integrity**  PLEASE READ THIS
   
   https://carleton.ca/registrar/academic-integrity/

   Although you are expected to complete the work on your own, I understand that a certain amount of collaboration may occur. However, you must turn in your own work which presumably reflects your understanding of the material.

5. Paul Menton Centre (for students with disabilities)  
   http://www2.carleton.ca/pmc/information-for-faculty/accommodation-statement-for-course-outline/

6. You may need special arrangements to meet your academic obligations during the term.  
   F See (includes PMC statement):  
   http://www2.carleton.ca/equity/accommodation/academic/course-outline-wording/

7. TA opportunities within the School for future terms. Information on how to apply can be found on our School web page. In hiring undergraduate TAs, the priority shall first be given to students who have passed some of the following Honours courses: MATH 1002, 1102, 2000, 2100, STAT 2655, 2559 with grades A- or better.

8. **Please note that all of my course materials are protected by copyright. You may make a copy for your own use but you may not sell or distribute these materials without my prior written consent.**

9. I will be using Zoom, Microsoft Teams, and/or Big Blue Button(BBB) for meetings and will send information prior to any such meetings.