Statistics 6570: Applied Bayesian Analysis
Spring 2018 Course Syllabus

Instructor: Dr. O. Chkrebtii

Lectures: 12:40 pm - 2:30 pm on Tuesdays and Thursdays in Cockins Hall 218.

Office Hours: Monday, 1:30 pm - 2:30 pm (individual appointments should be requested via email and will not be available on short notice).

Email: chkrebtii.1@osu.edu, **begin subject with "Stat 6570"**. To protect your privacy, **all course email correspondence must be conducted using your valid OSU name.# email account**. Also please keep in mind that due to the large volume of emails, I may not be able to answer promptly. Please consider whether your question would be best answered in person during office hours.

Office: 323 Cockins Hall (CH)

Grader: Kumar Somnath

Course Description: This course aims to provide a general introduction to Bayesian, modeling, analysis and computing. A variety of Bayesian models will be studied, and Bayesian hierarchical modeling will be discussed as a framework for modeling complex systems and incorporating multiple data sources. Simulation-based methods will be introduced to fit Bayesian models to data using the JAGS software. Students will also gain experience in programming basic MCMC algorithms in the statistical software R.

Prerequisites: Prerequisites: STAT 6301 or STAT 6801, or permission of instructor. Prerequisites or concurrence: STAT 6450 or STAT 6950, and STAT 6302 (with 6301 prerequisite) or STAT 6802 (with 6801 prerequisite). **Enrollment permission from the instructor does not guarantee success in this class. It is each student's responsibility to assess their level of preparation and act accordingly.** If you have questions or concerns about your level of preparation, please see me. Note also that due to the compressed schedule of this class, it may be extremely difficult to catch up on large amounts of missing prerequisite material while keeping up with the course content.

Course Website: Important announcements, course materials, homework problems and solutions, computing references, and other information about the class are posted on Carmen (carmen.osu.edu, login with your web ID).

Textbook: The required textbook for this course is:

- Gelman, A., Carlin, J.B., Stern, H., Dunson, D., Vehtari, A., and Rubin, D. *Bayesian Data Analysis, Third Edition.* Chapman and Hall, 2014.

Course Materials: Lecture notes will be posted on Carmen. Please read the sections of the textbook that will be covered, and print out a copy of the lecture notes before class. There may be parts of the notes that you should fill in during lecture, and you may need to take separate notes on examples that are not in the lecture notes. Unless instructed otherwise, you are responsible for all of the material in the sections of the book that are covered in lecture even if some of the material in the book section is not covered in class. If you are unsure if you are responsible for a particular topic, be sure to ask the instructor.

Computing: We will be using the R statistical computing package. No prior knowledge or R is necessary, although previous experience may be helpful. R is available in the Department of Statistics computing laboratory and may be downloaded for free. Links to the website where R can be download and reference manuals are available on Carmen. Most homework assignments will require some computing. Please cut and paste your computer output and graphs into your homework solutions or provide them in a clearly referenced appendix.

Homework Assignments: There will be four homework assignments for the course. You are encouraged to work together on the problems, but each student must hand in his or her own work. **Do not copy any part of another student's homework including computer output**. Use of homework solutions distributed in previous offerings of the course or solutions available on the web constituents academic misconduct and will be handled according to university rules.

For grading purposes, a hard copy of the homework solutions should be submitted at the beginning of class on the due date. The solutions should be submitted in pdf format and generated using the knitR package (more details will be provided in class). Handwritten or typed solutions may be submitted in some cases only if prior permission is obtained from the instructor. Please be sure that the questions are clearly labeled, all supporting work (including computer code) can be easily identified, and that all figures/tables are referenced and interpreted in the text. Electronic versions of homework solutions will not be accepted unless permission from the instructor is obtained in advance.

Solutions to the homework problems will be posted on Carmen. You should assume that solutions to the homework assignments will be posted after class on the day the homework is due, unless you are notified otherwise. Once the solutions have been posted, late homework will not be accepted. If you are unable to come to class the day a homework assignment is due, please contact the instructor. Re-grade requests on the homework problems must be submitted in writing to the course grader within one week of the day homeworks are returned.

Attendance: Regular attendance and class participation is required. Please let the instructor know by email if you will miss any lectures.

Grading: Grades will be allocated as follows:

Homework 30%;
Midterm 35%, in class on Thursday, April 12, 2018;
Final Project 35%, due by midnight on April 30, 2018.

The following OSU standard rubric will be used to compute the final letter grade: A: 93 – 100, A-:

90 – 92.9, B+: 87– 89.9: B: 83 – 86.9, B-: 80-82.9, C+: 77-79.9, C: 73 – 76.9, C-: 70–72.9, D+: 67 – 69.9, D: 60–66.9, E: below 60. The instructor reserves the right to make appropriate changes to the above scheme if necessary. However, as usual there are no exceptions nor arbitrary grade adjustments for individual students, nor grade guarantees of any kind, for any reason. Students who fundamentally disagree with their final grade have recourse to a formal dispute mechanism through the university. The information is available here: http://www.gradsch.osu.edu/i.-overview-grievance.html.

Special Considerations: If a situation exists or arises that you think may hinder your progress in this class, you must notify me as soon as possible.

Advising: For questions related to prerequisites and course suggestions, please contact the Statistics Department's Graduate Program Coordinator, Michelle Lee (lee.2293@osu.edu).

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term academic misconduct includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

Disability Services: The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Mental Health Statement: As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Lifes Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273-TALK or at suicidepreventionlifeline.org.