CSC 320
Introduction to Linear Programming Techniques

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Meetings: 1:15-2:45, Monday & Wednesday, in TEC 101
Office Hours: 11:00-12:00 (Monday & Wednesday) + 1:00-3:00 (Tuesday & Thursday) + by appointment

Overview
This class will introduce students to the formulation of models, graphical solutions, simplex method, two-phase activity, duality, convexity, simultaneous linear equations, vector spaces.

Course Information
Prerequisites: MAT 103

The class textbook is:

The textbook will be followed very closely. Most of the materials between chapters 1 and 11 will be covered.

Additional course materials may be posted on the class website (CASE SENSITIVE): http://www.cs.usm.edu/~banerjee/CSC320
Various notifications and (possibly) ungraded weekly reading assignments will also be posted on this web-page, so that you can be prepared for a class. So be sure to check this URL often.

Attendance
You should do your best to attend every class. Material presented in class will be critical for passing the midterm and final. In addition, pop quizzes (at the very beginning of a class) based on the week’s readings are always a possibility. If you are late for class, you may miss a quiz, unless prior arrangements are made with the instructor.

Email policy
If you send me any email, you must include your full name in the email, and mention “CSC 320” on the subject line. I may not respond to your email if you fail to do so.
Behavior in Class
You are NOT allowed to use any electronic devices in class, without permission. You must NOT leave while the class is in session without permission. If you have anything to say, it must be addressed to the instructor; you must NOT talk amongst yourselves. Any violation will automatically earn a fail-grade.

This policy is not meant to discourage questions about the class materials. You should ask as many questions about the material as you need to.

Homework and Grading
There will be several assignments, in addition to quizzes, a midterm, and a comprehensive final. The workload will be targeted to roughly 6 to 8 hours per week outside of class. Assignments must be submitted on paper (no emails) and must be stapled. Otherwise they will not be accepted. Try to create your answers digitally (use MS Word or a similar word processing software which supports mathematical symbols) if your handwriting is difficult to read. Please always answer assignment questions in the same order as given in the assignment. Also try to start working on assignments earlier than you are used to; you may need more time than you anticipate.

Grading breakdown
40% Homework/Assignments & Quizzes
30% Midterm
30% Comprehensive Final

Late assignments will be penalized by 20% per calendar day, except for extreme circumstances. If possible, give the instructor advance notice of any problems.

Extra credit may be offered periodically, so take advantage of it when it arises. There will not be any extra credit available toward the end of the course, so plan accordingly.

In order to get a good distribution of grades, it may be necessary to apply a scale or curve.

(Tentative) Topics Covered in the Course
1. Introduction
   History of LP, modeling, components of an LP.
2. Linear Algebra
   Vectors and matrices, linear equations and Gauss Jordan method, linear dependence and independence.
3. Linear Programming and the Simplex Algorithm
   Examples of LP and graphical solution, the Simplex algorithm, the AMPL format, using the NEOS server.
4. Sensitivity Analysis and Duality
   Graphical sensitivity analysis and examples, the dual of an LP and the dual theorem, the Dual Simplex algorithm.
5. **Integer Linear Programming**  
   (Mixed) integer programming and the branch and bound method, examples.

6. **Advanced Topics**  
   Column generation, Dantzig-Wolfe decomposition, application to game theory

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**Academic Integrity**

Students are encouraged to collaborate in preparing for tests/quizzes, and even for homeworks/assignments. However, the final work submitted must be the student's own work. No collaboration will be allowed during quizzes/tests.

All students at the University of Southern Mississippi are expected to demonstrate the highest levels of academic integrity in all that they do. Forms of academic dishonesty include (but are not limited to):

1. Cheating (including copying from others' work)
2. Plagiarism (representing another person's words or ideas as your own; failure to properly cite the source of your information, argument, or concepts)
3. Falsification of documents
4. Disclosure of test or other assignment content to another student
5. Submission of the same paper or other assignment to more than one class without the explicit approval of all faculty members' involved
6. Unauthorized academic collaboration with others
7. Conspiracy to engage in academic misconduct

Engaging in any of these behaviors or supporting others who do so will result in academic penalties and/or other sanctions. If a faculty member determines that a student has violated our Academic Integrity Policy, sanctions ranging from resubmission of work to course failure may occur, including the possibility of receiving a grade of “XF” for the course, which will be on the student’s transcript with the notation “Failure due to academic misconduct.” More details can be found here: https://www.usm.edu/provost/students-guide-academic-integrity. Note that repeated acts of academic misconduct will lead to expulsion from the University.

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**Disability Accommodations**

If a student believes that they have a disability which is covered by the Americans with Disabilities Act (ADA) and makes them eligible to receive classroom or housing accommodations, they should contact the Office for Disability Accommodations (ODA) for information regarding the registration process. Disabilities covered by the ADA may include but are not limited to ADHD, learning disabilities, psychiatric disabilities, physical disabilities, chronic health disorders, temporary illnesses or injuries and pregnancies. Students should contact ODA if they are not certain whether their documented medical condition qualifies for ODA services. Students are only required to disclose their disability to the Office for Disability Accommodations. All information submitted to ODA by the student is held with strict confidentiality.
Address:  
The University of Southern Mississippi  
Office for Disability Accommodations  
118 College Drive # 8586  
Hattiesburg, MS 39406-0001  
Voice Telephone: 601.266.5024 or 228.214.3232  
Fax: 601.266.6035  

Individuals with hearing impairments can contact ODA using the Mississippi Relay Service at 1.800.582.2233 (TTY) or emailing ODA at oda@usm.edu.