Course Information for  
MATH 3801 Linear Programming  Fall 2019  

Instructor: Jason Z. Gao, 4366HP, ext. 2138, email: zgao@math.carleton.ca  
Lectures: Wednesday and Friday 10:05--11:25. Room 318SA  
Lecture starts on Sep. 04.  
Office hours: Monday 10:00--11:20, 14:00—15:20, or by appointment.  

TA: Kirsten Nelson, email KirstenNelson@cmail.carleton.ca  

Precludes additional credit for ECON 4004, SYSC 3200.  
Prerequisite(s): MATH 1102 or MATH 2107, or permission of the School.  
Lectures three hours a week and one hour tutorial.  

Evaluation  

- Final Exam 60% (a 3-hour closed book examination).  
- Tests 24%. To be held during the tutorials on Oct 11, Nov. 22.  
- Tutorials 16% (2% for each tutorial)  

Tutorials are a very important part of this course. Tutorial works will be done in teams and each team should consist of 3 or 4 students. You may ask the TA for some help (hints) on the tutorial problems, but the TA will not work out the details for you. Each team will submit one copy of the work. To receive a mark for a tutorial, your signature must appear in the first page of the tutorial work. There will be no make-up tests; if you miss a test due to a valid and properly documented reason, then the corresponding weight will be shifted to your final exam mark.  
If your term mark (total of tutorials and tests) is less than 20% and you don't write the scheduled final exam, you will receive FND.  
Some practice problems are posted on cuLearn. Although they are not counted towards your final grade, it is essential to work on them in order to be successful in this course. The free math software Sage will also be used to demonstrate some numerical calculations.  

Retain your marked tutorials and tests until the final examination. You can check your term marks on cuLearn, any error in your recorded mark should be called to my attention before the final examination. This course uses cuLearn, To access your courses on cuLearn go to http://carleton.ca/culearn. For help and support, go to http://carleton.ca/culearn/students. Any unresolved questions can be directed to
Below is a tentative biweekly lecture schedule (subject to change)

<table>
<thead>
<tr>
<th>Material</th>
<th>Approx. # of weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1,1.2; 2.1-2.4, 3.1-3.3. Formulation of LP, Graphing system of linear equations, The corner point theorem, Geometric method, Algebraic analysis of the constraint set, Canonical form and perfect canonic form, The pivot operation and the simplex tableaux.</td>
<td>2</td>
</tr>
<tr>
<td>3.4-3.7, 3.9,4.1,4.2</td>
<td>2</td>
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<tr>
<td>The simplex method, Geometric interpretation of the simplex method, Converting LP to perfect canonical form, The two phase method, Alternative optimal solutions, Proofs, Degeneracy and Bland’s rule.</td>
<td>2</td>
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<tr>
<td>5.1-5.5, 6.1,6.2</td>
<td>2</td>
</tr>
<tr>
<td>The dual of a standard maximum linear program, Duals of nonstandard linear programs, Other important results related to duality, Complementary slackness conditions and Tucker duality, The dual simplex method.</td>
<td>2</td>
</tr>
<tr>
<td>6.3-6.6,10.1-10.4</td>
<td>2</td>
</tr>
<tr>
<td>Sensitivity analysis, Integer programming, Cutting methods, Branch and bound method.</td>
<td>2</td>
</tr>
<tr>
<td>8.1-8.7, Matrix games, Saddle points, Connections with linear programming, The geometric approach for $2 \times n$ and $m \times 2$ games, Row and Column domination.</td>
<td>2</td>
</tr>
<tr>
<td>9.1-9.3, 9.5-9.7. Transportation and assignment problems.</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>
Academic accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

**Pregnancy obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: [http://www2.carleton.ca/equity/](http://www2.carleton.ca/equity/)

**Religious obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website: [http://www2.carleton.ca/equity/](http://www2.carleton.ca/equity/)

**Academic Accommodations for Students with Disabilities:** The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (*if applicable*). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (*if applicable*) at [http://www2.carleton.ca/pmc/new-and-current-students/dates-and-deadlines/](http://www2.carleton.ca/pmc/new-and-current-students/dates-and-deadlines/)

You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at [http://www2.carleton.ca/eq](http://www2.carleton.ca/eq)

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The Centre for Student Academic Support (CSAS) is a centralized collection of learning support services designed to help students achieve their goals and improve their learning both inside and outside the classroom. CSAS offers academic assistance with course content, academic writing and skills development. Visit CSAS on the 4th floor of MacOdrum Library or online at: [carleton.ca/csas](http://carleton.ca/csas).