

<b>Course</b>	<b>SPSM 5730 – Space Operations Research</b>  <i>Please Note: Students must notify the office if they wish to DROP or WITHDRAW from a course. It is not sufficient to tell your instructor. Cancellation of an enrollment is subject to Tuition Refund Deadlines and Policies as outlined in the Graduate Studies Catalog.</i>
<b>Term</b>	<b>Summer 2008</b> <b>Wednesdays, 5:30pm – 9:30pm</b> <b>Class begins: Wednesday, June 4<sup>th</sup></b> <b>Location: Metro Campus</b>  <i>Parking Reminder: "Visitor" parking spaces are reserved for 2 hours or less. Please do not park in "Visitor" parking spaces during class hours.</i>
<b>Instructor</b>	Name: <b>Jerry Dowdy</b> Phone: <b>719-821-3238 cell (Pueblo); 719-567-3423 (SAFB)</b> Email: <a href="mailto:JerryDowdy73@webster.edu">JerryDowdy73@webster.edu</a> and <a href="mailto:Jerry_Dowdy@comcast.net">Jerry_Dowdy@comcast.net</a> and <a href="mailto:jerry.dowdy.ctr@schriever.af.mil">jerry.dowdy.ctr@schriever.af.mil</a>
<b>Catalog Description</b>	Students examine modeling techniques that assist in the decision-making process of space operations. Linear, nonlinear, integer, and dynamic programming techniques applicable to space operations are among the deterministic mathematical methods explored.
<b>Prerequisites</b>	Successful Completion of SPSM5000  <b>Additional Information:</b> The student should have knowledge at the undergraduate level of linear algebra and statistics and be familiar with Microsoft Windows and concepts of commercial spreadsheet applications. Knowledge on the fundamental use of Microsoft Excel is a must. <b>This class uses the Microsoft Excel spreadsheet extensively.</b>
<b>Course Level Learning Outcomes</b>	<b>The student will:</b> <ul style="list-style-type: none"> <li>• Learn and apply operations research techniques to help solve problems encountered in the space operations research environment.</li> <li>• Become familiar with and apply the terminology associated with operations research models used to analyze system behavior.</li> <li>• Understand the concepts associated with various operations research models and underlying principles governing their application.</li> <li>• Gain knowledge of the fundamentals for, and be capable of, designing and conducting research based on the scientific method.</li> </ul>
<b>Materials</b>	<i>Spreadsheet Modeling and Decision Analysis</i> , Cliff T. Ragsdale, 5th Edition Revised, South-Western College Publishing, Cincinnati, OH, 2007. ISBN: 0324312563  <b>Options for Ordering Textbook:</b> <ol style="list-style-type: none"> <li>a. Textbooks are available about four weeks before the start of classes and may be ordered from Webster University's bookstore, <b>MBS Direct</b>. To place an order call toll-free: <b>1-800-325-3252</b> or visit <a href="http://direct.mbsbooks.com/webster.htm">http://direct.mbsbooks.com/webster.htm</a></li> <li>b. Used books for sale by students are posted on a Bulletin Board in the Metro Center Cafe. Please check this area if you are interested in purchasing or selling used books.</li> </ol>

<b>Grading</b>	<p>The course grade is determined as follows:</p> <ul style="list-style-type: none"> <li>• Homework 40%</li> <li>• Mid Term Exam 20%</li> <li>• Individual Project 20%</li> <li>• Final Exam 20%</li> </ul> <p>The instructor's grading Rubric will be handed out and reviewed during the first class period. The following grade point structure is used to compute the letter grades for the final course grade.</p> <table border="1" data-bbox="435 449 1403 1003"> <thead> <tr> <th>Grade Points Earned</th> <th>Equivalent Letter Grade</th> </tr> </thead> <tbody> <tr> <td>94-100</td> <td>A Superior Graduate Work</td> </tr> <tr> <td>90-93</td> <td>A- Superior Graduate Work</td> </tr> <tr> <td>87-89</td> <td>B+ Satisfactory Graduate Work</td> </tr> <tr> <td>83-86</td> <td>B Satisfactory Graduate Work</td> </tr> <tr> <td>80-82</td> <td>B- Satisfactory Graduate Work</td> </tr> <tr> <td>70-79</td> <td>C Work that is barely adequate as graduate-level performance</td> </tr> <tr> <td>Below 70</td> <td>F Work that is unsatisfactory</td> </tr> <tr> <td>I</td> <td>I Incomplete work</td> </tr> <tr> <td>ZF</td> <td>ZF An "I" that is not completed within one year of the end of the course is automatically converted to a "ZF". A "ZF" is treated the same as an F or NC for all cases involving GPA, academic warning, probation and dismissal.</td> </tr> <tr> <td>W</td> <td>W Withdrawn from the course</td> </tr> </tbody> </table>	Grade Points Earned	Equivalent Letter Grade	94-100	A Superior Graduate Work	90-93	A- Superior Graduate Work	87-89	B+ Satisfactory Graduate Work	83-86	B Satisfactory Graduate Work	80-82	B- Satisfactory Graduate Work	70-79	C Work that is barely adequate as graduate-level performance	Below 70	F Work that is unsatisfactory	I	I Incomplete work	ZF	ZF An "I" that is not completed within one year of the end of the course is automatically converted to a "ZF". A "ZF" is treated the same as an F or NC for all cases involving GPA, academic warning, probation and dismissal.	W	W Withdrawn from the course
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<b>Activities</b>	<p>Homework will be assigned each class period and collected the following week. One to two hours of each class period will be dedicated to hands-on spreadsheet programming in the lab.</p>																						
<b>Policy Statements: University Policies</b>	<p>University policies are provided in the current course catalog and course schedules. They are also available on the university website, <a href="http://www.webster.edu">www.webster.edu</a>. This class is governed by the university's published policies. The following policies are of particular interest:</p> <p><b>Course Attendance</b> Students are expected to attend all class sessions of every course. In the case of unavoidable absence, the student must contact the instructor. The student is subject to appropriate academic penalty for incomplete or unacceptable makeup work, or for excessive or unexcused absences. Generally, a student who misses more than one four-hour course period (per course) without a documented military or medical excuse and advanced permission from the instructor should withdraw from the class.</p> <p><b>Academic Honesty</b> The university is committed to high standards of academic honesty. Students will be held responsible for violations of these standards. Please refer to the university's academic honesty policies for a definition of academic dishonesty and potential disciplinary actions associated with it.</p> <p><b>Drops and Withdrawals</b> Please be aware that, should you choose to drop or withdraw from this course, the date on which you notify the university of your decision will determine the amount of tuition refund you receive. Please refer to the university policies on drops and withdrawals (published elsewhere) to find out what the deadlines are for dropping a course with a full refund and for withdrawing from a course with a partial refund.</p> <p><b>Special Services</b> If you have registered as a student with a documented disability and are entitled to classroom or testing accommodations, please inform the instructor at the beginning of the course of the accommodations you will require in this class so that these can be provided.</p>																						

	<p><b>Disturbances</b>  Since every student is entitled to full participation in class without interruption, disruption of class by inconsiderate behavior is not acceptable. Students are expected to treat the instructor and other students with dignity and respect, especially in cases where a diversity of opinion arises. Students who engage in disruptive behavior are subject to disciplinary action, including removal from the course.</p> <p><b>Student Assignments Retained</b>  From time to time, student assignments or projects will be retained by The Department for the purpose of academic assessment. In every case, should the assignment or project be shared outside the academic Department, the student's name and all identifying information about that student will be redacted from the assignment or project.</p> <p><b>Contact Hours for this Course</b>  It is essential that all classes meet for the full instructional time as scheduled. A class cannot be shortened in length. If a class session is cancelled for any reason, it must be rescheduled.</p>
<p><b>Course Policies</b></p>	<p>Students are encouraged to cooperate in learning, but the sharing of spreadsheets in this class is strictly prohibited. All homework will be turned in as hard copy unless the student is on travel, when homework must still be e-mailed on time.</p>
<p><b>Additional Information</b></p>	<ul style="list-style-type: none"> <li>• Webster University's online library, <i>Passports</i>, is available through <a href="http://library.webster.edu">http://library.webster.edu</a>, you will need to use your student ID to access the databases.</li> <li>• Students who are discovered cheating or committing plagiarism will be awarded a failing grade for the course, and may be subject to discipline or dismissal. <a href="http://www.turnitin.com">www.turnitin.com</a> is a tool Webster University uses to assist faculty in identifying plagiarism.</li> <li>• Students should use citation protocol from APA. Guidelines are available in the office or online at <a href="http://www.webster.edu/coloradosprings">www.webster.edu/coloradosprings</a></li> <li>• Class sessions are limited to currently enrolled students.</li> <li>• Please be considerate and turn-off your cell phone during class sessions.</li> <li>• Childcare services are not available at Webster University. Children are not allowed to attend class or use Webster University facilities.</li> <li>• Grades are available online by visiting <a href="http://www.webster.edu">www.webster.edu</a>, select Registration and Online Services. You will need to provide your student number and password to access your online information.</li> </ul>
<p><b>Weekly Schedule</b></p>	<p>Week 1: Introduction to Modeling and Decision Analysis (Chapters 1 and 2) - Review course syllabus and expectations. Review the basics of Microsoft Excel and discuss the use of Solver and Premium Solver software in the course. Present manual methods of solving two-dimensional linear programs (LP) and introduce computer methods.</p> <p>Week 2: Modeling and Solving Linear Programming Problems in a Spreadsheet (Chapter 3) – Learn to formulate LP problems in computer terms and apply MS Excel and Solver to implement and solve basic LP models in the lab.</p> <p>Week 3: Sensitivity Analysis (Chapter 4) Network Modeling (Chapter 5) - Discuss the application and meaning of sensitivity analysis in relation to LP. Introduce the basics of general network modeling, focusing on the transshipment problem and its application to air transportation planning.</p> <p>Week 4: Network Modeling (Chapter 5 completed) - Present and implement solutions to further examples of important network models such as the Transportation Algorithm and shortest path problems. Present the Minimal Spanning Tree solution for connecting networks.</p> <p>Week 5: Mid Term Exam &amp; Network Modeling (Chapter 8) - <b>In-class Exam</b> covering Chapters 1 through 5. Use evolutionary programming and the Traveling Salesman Problem to determine minimum plane changes for optimizing multiple satellite rendezvous (sections 8.12-8.14)</p>

Week 6: Goal Programming (GP portions of Chapter 7) - Present GP methodology, modeling methods for goal programming, and GP applications and limitations. Distinguish GP from MOLP problems and explain their fundamental differences. Examine use of GP for space-based imagery collection. Assign project.

Week 7: Multiple Objective Linear Programming (MOLP portions of Chapter 7) - Present the general approach to solving multiple objective problems and the different objective function methodologies. Apply MOLP to space-based imagery collection problem.

Week 8: Project Management (Chapter 14) - Present PERT/CPM methodology (manual & using Excel). Perform course review and assist with projects as needed.

Week 9: Project Presentations and In-Class Exam - **Comprehensive exam** focusing on later chapters. **Projects** are presented individually.