UNIVERSITY OF WISCONSIN – MILWAUKEE
DEPARTMENT OF CIVIL ENGINEERING

TRANSPORTATION ENGINEERING
240-490, Spring 2004
TTh 9:30-10:45, Room EMS E150

Instructor: Dr. Edward Beimborn
Office: EMS E371D
Office Phone: 229-4978
E-mail: beimborn@uwm.edu
Office Hours: TTh 1:00-2:00

Course Description:
Technological and common elements of all modes of transportation; their effect on performance, demand and outputs of a transportation system. Development of new transportation systems.

Texts:
Edward Beimborn, Transportation Engineering Notes (available at Clark's on Oakland)
Aldo Leopold, Sand County Almanac
Papacostas, Transportation Engineering and Planning, optional
Ambrose, Nothing Like it in the World (optional)

Course Objectives:
- Students will learn the process of transportation system design from planning to physical design to operations.
- Students will learn how to represent and analyze modes, involving both supply and demand characteristics.
- Students will understand the important elements of transportation system evaluation.

Learning Outcomes
- Students are familiar with the concept of a transportation network, how data is represented on a network and how a network may be used in transportation analysis.
- Students are able to perform the elementary steps of travel forecasting: trip generation, trip distribution, mode split and traffic assignment. They are able to see how the results of travel forecasting affect physical designs and aid evaluation of alternatives.
- Students understand how vehicle and driver characteristics influence the design of various transportation facilities.
- Students will learn basic procedures for horizontal and vertical location of transportation facilities.
- Students can relate traffic flow characteristics, including capacity, speed and safety considerations, to the design of highways.
- Students can perform elementary queuing analysis for terminal operations.
- Students learn the major steps in transportation system evaluation as part of alternative selection and how evaluations include environmental considerations.
- Students have a better sensitivity for the needs of persons with mobility disabilities in engineering design.
Course Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 26</td>
<td>Transportation overview, problems, description of modes</td>
<td>Read: <em>Sand County Almanac</em></td>
</tr>
<tr>
<td>Feb. 2</td>
<td>Transportation planning</td>
<td>Review <em>GNE/QRS Primer</em> (web page)</td>
</tr>
<tr>
<td>Feb. 9</td>
<td>Transportation choice/Demand analysis Network analysis</td>
<td>GNE problem</td>
</tr>
<tr>
<td>Feb. 16</td>
<td>Transportation supply The vehicle Control Containers</td>
<td>Mode choice</td>
</tr>
<tr>
<td>Feb. 23</td>
<td>Propulsion and resistance</td>
<td>Train resistance spreadsheet</td>
</tr>
<tr>
<td>March 2</td>
<td>Networks Terminals</td>
<td>Queuing problems</td>
</tr>
<tr>
<td>March 9</td>
<td>Links</td>
<td>Parking lot</td>
</tr>
<tr>
<td>March 16</td>
<td>Geometric design</td>
<td>Horizontal and vertical alignment</td>
</tr>
<tr>
<td>March 29</td>
<td>Pavements</td>
<td>Wheelchair</td>
</tr>
<tr>
<td>April 5</td>
<td>Operating policy</td>
<td></td>
</tr>
<tr>
<td>April 12</td>
<td>Transportation Outputs</td>
<td>Fleet size problems</td>
</tr>
<tr>
<td>April 19</td>
<td>Capacity</td>
<td>Highway capacity problems</td>
</tr>
<tr>
<td>April 26</td>
<td>Costs/Evaluation</td>
<td>Benefit/cost</td>
</tr>
<tr>
<td>May 3</td>
<td>Impacts</td>
<td>Environmental Impact Statement review</td>
</tr>
<tr>
<td>May 10</td>
<td>Safety</td>
<td></td>
</tr>
<tr>
<td>May 15</td>
<td>Final exam, 10:00-noon</td>
<td></td>
</tr>
</tbody>
</table>

**Grading:**

Grading will be based on three examinations, two during the semester and a final, and homework. Grades will be based on relative score and rank in class rather than on a fixed scale. The various activities will be weighed as follows:

- Midterm examinations (2) 50%
- Final examination 25%
- Homework 25%
- Total 100%

**How to get a good grade:** Do your homework on time, attend class and ask questions when you don’t understand something.

**Examinations:**

The examinations will consist primarily of problems, but they may also ask short answer essay questions. Most, but not all, of the problems on the examinations will be similar to your homework.
Homework:

The purpose of the homework is to help you understand concepts and to help you prepare for the examinations. **Experience has shown that students who do little homework or who rely on others for their homework answers tend to do very poorly in this class.** Assignments will be worth 10 to 50 points each and will be penalized two points per school day up to a maximum of 50%. Do the problems on time; if you have difficulty, see your instructor.

Undergraduate/Graduate Differentiation: A graduate student taking this course will be required to do outside reading and additional assignments, or make a class presentation on a topic of his/her interest on the subject of this course.

Mail List:

There is an e-mail group for this course. Its address is ce490@uwm.edu. If you have questions or comments, feel free to use it. Messages go to all persons in the class and to the instructor. The course web page, http://www-uwm.edu/Dept/cuts/ce490, will include material relevant to the course and links to related sites of interest.

All homework assignments are posted on the course web site.
UWM POLICIES THAT AFFECT THE CONDUCT OF A COURSE

Participation by Students with Disabilities: If you need special accommodations in order to meet any of the requirements of this course, please contact me as soon as possible.

Accommodation for Religious Observances: Students will be allowed to complete examinations or other requirements that are missed because of a religious observance.

Academic Misconduct: The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors.

A more detailed description of Student Academic Disciplinary Procedures may be found in Regents Policy Statements, UWS Chapter 14 and UWM Faculty Document #1686.

Complaint Procedures: Students may direct complaints to the head of the academic unit or department in which the complaint occurs. If the complaint allegedly violates a specific university policy, it may be directed to the head of the department or academic unit in which the complaint occurred or to the appropriate university office responsible for enforcing the policy.

Grade Appeal Procedures: A student may appeal a grade on the grounds that it is based on a capricious or arbitrary decision of the course instructor. Such an appeal shall follow the established procedures adopted by the department, college, or school in which the course resides. These procedures are available in writing from the respective department chairperson or the Academic Dean of the College/School.

A more detailed description of the grade appeal policy may be found in UWM Selected Academic and Administrative Policies, Policy #S-28 and UWM Faculty Document #1243.

Sexual Harassment: Sexual harassment is reprehensible and will not be tolerated by the University. It subverts the mission of the University and threatens the careers, educational experience, and well being of students, faculty, and staff. The University will not tolerate behavior between or among members of the University community which creates an unacceptable working environment.

Attendance: Incomplete's. A notation of "incomplete" may be given in lieu of a final grade to a student who has carried a subject successfully until the end of a semester but who, because of illness or other unusual and substantiated cause beyond the student's control, has been unable to take or complete the final examination or to complete some limited amount of term work. An incomplete is not given unless you prove to the instructor that you were prevented from completing course requirements for just cause as indicated above.

A more detailed description of the Incomplete Policy may be found in UWM Selected Academic and Administrative Policies, Policy #S-31 and UWM Faculty Documents #1558 and #1602. Also, a description of this policy may be found in the UWM Schedule of Classes.

Financial Obligation: The submission on your registration form and your subsequent assignment to classes obligates you to pay the fee-tuition for those classes or to withdraw your registration in writing no later than January 15. It is important to both you and the University that you make payment on time. A complete description of UWM fee policies may be found in the Schedule of Classes.