TEACHING PORTFOLIO

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Dept. Civil Engineering
Texas A&M University
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1 Statement of Teaching Philosophy

I believe my fundamental role as an educator is to develop a mentoring relationship with my students in order to develop their scholarship in the field. As the field keeps changing, one of the key goals in my teaching process is to provide a framework for life-long learning. I aim to help students become reflective and collaborative thinkers, and who are also effective communicators. As with any relationship, both parties must be involved in its growth and development. As a teacher, I strive to demonstrate to each student my respect for them as individuals and for their contributions to the learning process. Thus, I make an effort to learn every student’s name and to encourage their active participation during class.

The primary role of a teacher is as a facilitator, and in that role they should enable students to become responsible for their own learning. I view teaching as a process of encouraging students to make connections between their own experiences and the subject matter. I strive to foster in my students critical thinking skills and problem-solving strategies.

Though knowledge of the fundamental course concepts must be covered and mastered by the students, I am more concerned with the student’s understanding of those concepts and their ability to apply them in new problem-solving situations. My exams are designed to bring together different concepts from individual examples and homework problems and combine them. My intent in developing exam questions is not to evaluate whether a student can solve this particular problem, but to determine whether they understand and can apply the concepts required to solve this problem. After all, the chance that they will face that exact problem in practice is negligible, but the integration of concepts to solve new problems is vital. As a result, student work is graded with respect to the process used in solving the problem.

Assessment of student performance is a key aspect of teaching, and it is absolutely essential to employ methods that are honest and fair. My main criterion in grading is the determination of whether a particular concept is understood and mastered, rather than if the correct answer to a problem is given. As such, I do assign partial credit to problems based on my evaluation of the depth of understanding shown in the solution provided. So showing insight into the principles will also earn a student more credit. For example, if during the solution process a mathematical mistake is made and the resulting answer is not reasonable, students who identify that this behavior is not feasible will earn greater credit than those who just provide the answer their calculations give. I believe in a strict criterion based approach to grading, clearly defined in the course syllabus, where a student’s grade reflects his or her depth of mastery of the material. When grades are assigned based on a curve, a set number of students will get each letter grade. When grades are relative, students may feel themselves to be in competition with one another and be
more hesitant to help each other or to work in study groups, which is a proven method to enhance their own learning.

I have found that, independent of how high (within reason) I set my expectations, roughly the same percentage of students will rise to meet them. I feel that using a review session to “teach for the exam” or giving a test that is too easy may send the signal that getting a good grade is the only concern. With these things in mind, I think a major part of my role as a teacher is to truly challenge my students and help them rise to the level of that challenge. At the first class meeting for every course, I state my belief that every student can master the course subject, though some students may find the process easier than others. I explicitly tell them that my job is to help them in that process and have an open door policy so students can come see me for individual help.

I believe that writing is one of the most important skills that a student can develop. Being an effective writer can allow a student to develop his or her ideas to the fullest potential. The writing process forces one to not only list the numerical answer to a problem, but to also evaluate and interpret that answer. Effective writing skills are also critical in allowing the student to communicate those ideas to others. No engineer exists in a vacuum, and being able to communicate both to other engineers and lay persons is a vital part of their career.

As I believe students learn better when they are involved and excited about the material, I strive to maintain a high level of classroom interaction. The class atmosphere is very relaxed, so students feel comfortable contributing and asking questions. Being able to share knowledge is extremely rewarding to me, whether at the undergraduate or peer level.

2  Teaching Responsibilities

I have taught a wide variety of courses, from sophomore through graduate level in my 3.5 years at Texas A&M University. A list of these courses, together with information about average class size and placement within our curriculum is provided.

- CVEN 207 – Introduction to the Civil Engineering Profession: sophomore level, average of 80 students (required)
- MEEN 363 – Dynamics and Vibrations: sophomore/junior level, avg. 70 students (required)
- CVEN 345 – Theory of Structures: junior level, avg. 55 students (required)
- CVEN 444 – Structural Concrete Design: senior level, avg. 35 students (required within specialty)
- CVEN 657 – Dynamic Loads and Structural Behavior: graduate level, avg. 30 students (required)
- CVEN 669 – Hazardous Environmental Loads (co-instructor: Dr. L. Beason): graduate level, avg. 7 students (elective)
• CVEN 689 – Advanced Dynamics and Control of Civil Engineering Structures (co-instructor: Dr. P. Roschke): graduate level, 11 students (elective)

I also supervise several undergraduate and graduate students in various research or independent study projects. I believe involving undergraduates in research is a great way to motivate them to pursue graduate studies later on. I have made several presentations, at the request of the ASCE student chapter, on conducting research as an undergraduate and on graduate studies in civil engineering. In addition to students in the Civil Engineering Department, I also serve on the thesis and dissertation committees of students in the Aerospace and Mechanical Engineering Departments. I am also the undergraduate advisor of 25 students in Civil Engineering at the moment.

3 Teaching Methods and Strategies

I strive for clarity of presentation of both course policies and course materials. I provide a detailed syllabus for the students, outlining course topics, grading policies, and homework submission guidelines. A sample syllabus is provided in Appendix A.1.

*Class sessions – lecture and discussion:* I try to begin each class with a brief summary of the previous class session and a presentation of the lesson objectives. A sample set of board notes from my CVEN 444 class is given in Appendix A.2. As I believe students learn better when they are involved and excited about the material, I place a strong emphasis on classroom interaction. When examples are solved in class, they are done together rather than having me stand at the front of the class doing all the work and the students watching. I ask the students to provide the next step and then compute the required solution. This process also allows students the freedom to ask questions from me. I have found that once students become used to this process, the class becomes much more interesting for both them and me.

In classes with a small number of students, I encourage the students, either singly or in small groups, to teach a lecture on a topic of their choice related to the class material. The process of organizing a lecture from the rest of the class requires that students understand the material at a greater depth than standard homework assignments. Another approach is to ask the students to present the results of an individual course project to the class. The individual project allows for students to start exploring issues and developing research type questions on their own. At the end of the semester, the students then present their project to the class. Dr. P. Roschke and myself have used this approach in the new Advanced Dynamics and Control of Civil Structures course.

*Homework – level of difficulty, projects, group work:* In undergraduate classes, I assign homework assignments that encourage a deeper understanding and explanation of results. Such questions contain
phrases such as "explain…" and "show that…" in combination to traditional numerical problems. I also encourage the students to work in study groups. Working in a group allows them to argue, discuss, and explain things among themselves. These techniques have been particularly useful in the undergraduate Theory of Structures course (CVEN 345) and Dynamics and Vibrations course (MEEN 363). In both these courses, students work in teams to solve mini-projects specified in class. These projects allowed students to investigate more realistic structures than can be included in a standard homework assignment. A component of the project is a written summary of the results and a discussion on the assumptions made during analysis. The assignments also included a comparison of different design solutions. The possible structural arrangements were given in the problem statement, and students were then asked to evaluate each solution on the basis or pure structural constraints as well as any other constraints, such as constructability and cost, that they felt were appropriate.

One of the problems I noticed while evaluating these projects, however, was the difficulty the students had with compiling the report – both in how to present the information as well as how to discuss the results. The feedback I was providing regarding this component of their work was not helping the students improve their writing skills. In discussing the problem with another professor in the department, we both felt the need for a more explicit means of communicating to the students their problem areas. Together we developed a grading chart to be used for evaluating the written communication component of their work. This chart, shown in Appendix A.3, is being used for the first time this semester.

In graduate courses, I have used a course project where each student or group of students have the same basic framework but with open-ended issues that each team will answer differently. The graduate Hazardous Environmental Loads course is an example where this style of project was useful. Each group analyzed a building with the same general specifications regarding material and geometry, except that each group had a different site. While one group must design for the Los Angeles area, another group must consider the conditions of the Seattle area. Each student must discover the information and specific constraints of his specific project, and then convey the ideas to the other members of his group. At the end of the project, each team gives a formal presentation of their final design solution and design process.

**Use of technology:** I have used computers for demonstration purposes in many courses. I have also utilized software specifically designed for solution of problems within the scope of the class. These software packages, such as commercial structural analysis software, have the benefit of exposing students to tools they will use in practice as well as allow them to tackle more realistic problems that would be too cumbersome to solve using hand calculations.

I utilized the web as a main source of communication with students. All assignments and solutions were posted on the class web site, as well as collection of class emails and announcements. On-line
evaluation quizzes were utilized in selected classes to provide immediate feedback to the students. Typically, the questions asked are conceptual in nature, leaving numerical computations to traditional homework format. As these quizzes were self-paced and could be retaken, the students were motivated to work until they achieved a perfect score on the questions. Supplemental course materials, such as notes and additional examples were also created and made available via the web.

Recently, I’ve been utilizing a web site developed by another professor in the department, Dr. D. Maxwell, to administrate my courses. The format and organization of this site blends well with existing materials already developed for the web, as well as provide additional resources for course organization and communication with the class. Feedback from the students regarding use of the web site has been extremely positive, particularly the organization of course content by weeks and the ability to check their grades online. This web site can be accessed at: http://cenotes.tamu.edu. Guests to my courses can login with:

username: students       and       password: study.

**Extra-credit:** I utilize extra-credit opportunities in every course I teach as a means to encourage students to look for applications of the course material within a broader scope and solving academic problems. For example, students in my Dynamics and Vibrations course (MEEN 363), either individually or in teams, were encouraged to find a real dynamics problem in any field of civil engineering. They were required to explain and give details about the problem and why it was important. The dynamic behavior needed to be explained and modeled, and then tied to course content and theory. Finally, they needed to develop a numerical example, preferably based on realistic data, to illustrate the issue. Though this project needs refinement, several groups found this project one of the more interesting parts of the course. They were surprised at the types of problems they could begin to tackle. In the unofficial course evaluations, several comments were made along the lines of “I learned more about structural engineering doing the extra-credit project than in any other class” and “keep the extra-credit project and make it a bigger part of the course – it was one of the best things this semester.”

At the graduate level, an extra-credit project was developed that could be used in any graduate level course. The goals of the report, which are explicitly stated to the students, are to (1) provide an opportunity to investigate a special engineering topic related to course but not directly covered in lectures, (2) provide an opportunity to demonstrate extra initiative and the ability to direct and manage and produce high quality intellectual work without direct oversight, and (3) Develop research and writing skills. The project required the student to identify a topic of interest and perform a literature survey of the current research in that area. The report required an analysis of the state-of-the-art in the field and the identification of research needs.
4 Efforts to Improve Teaching

4.1 Conferences/Workshops Attended

I believe that as I try to instill in my students an appreciation for the scholarship in our field, I must demonstrate those same principles and strive to keep increasing my knowledge in all areas of my profession as an educator. I must continue to gain new information and skills via conference and workshop attendance as well as affirm myself and inform others of my work. The following is a list of workshops I have participated in to improve my teaching skills.

- “Faculty Learning Community on Development and Invitation,” Texas A&M University, September 2003.
- “The ExCEED Teaching Workshop,” American Society of Civil Engineers (ASCE), West Point, New York, July 29 - August 3 2001.

4.2 Curricular Development and Revisions

I am fortunate to have been involved in several broad-scale curricular development programs within the department, and to have been encouraged to participate in the development of individual courses. I worked with a small committee, crossing all the specialty areas within our civil engineering department, on Teaching of Uncertainty Concepts. We worked closely to ensure that these concepts were an integral part of the curriculum rather than a single course in statistics the students were required to take. We passed on specific suggestions to course coordinators at the senior level regarding how uncertainty principles could be made an integral part of the process. I also worked on a committee on Curriculum Comparison and Evaluation. The goal of this committee was to compare the program our department
offers to our students with those of the top 10 civil engineering programs in the country. Our curriculum as also evaluated with respect to how well students leaving our program performed in their first job or graduate school.

One of my duties within the department is as course coordinator for the CVEN 345 Theory of Structures class. Due to the large size of our department, 5 different sections of that course are taught by different professors in one year. As coordinator, I must ensure that all sections contain the same basic content and that the course properly prepares students for follow-on classes. At the end of spring 2002 semester, discussions with other professors indicated a lack of satisfaction with the students’ knowledge of structural behavior at a conceptual level. As a result, the course was restructured and a new textbook selected. While matrix methods are still covered, the course now contains a discussion of loading and load paths as well as one week devoted to approximate methods of analysis. Preliminary evaluations at the end of the fall 2002 semester have shown positive results, both from the students and other teachers.

The Introduction to Civil Engineering course (CVEN 207) was restructured to allow more time with presentations on individual specialty areas and accommodate the significantly larger section sizes. To allow for a more interactive class, a case study was developed presenting an ethical dilemma. The class was broken up into teams, and each team had to reach a consensus on a series of questions. The results for the entire class were computed and plotted in real-time and a full class discussion was based on the results.

I was also part of the committee that introduced a new dynamics course into the civil engineering curriculum. We were observing that our first year graduate students struggled significantly in the graduate level structural dynamics class, whether here or at other universities. So we decided to adopt a course in the Mechanical Engineering department on Dynamics and Vibrations, and I am one of 2 teachers who teach the section of that course for civil engineering students. Due to its inclusion of vibrations, the course content is more readily applicable for civil engineers and provides a great introduction to topics that will be covered at the graduate level. A significant amount of effort went into developing civil engineering examples for the material. The required computational assignments were modified from the mechanical engineering examples to ones that provide a simple but realistic civil engineering problem. Though simplified, these assignments introduced students to more advanced topics such as earthquake engineering and utilization of supplemental control devices.

I was also extremely fortunate in being able to introduce a completely new course to the department. This course is CVEN 689 – Advanced Dynamics and Control of Civil Engineering Structures and was developed to provide exposure to students on material cutting edge technology in the field of civil engineering. While control courses are readily found in other disciplines, such as mechanical and electrical engineering, asking civil students to take those courses discouraged them from pursuing
research activities in those areas. While our students are more than qualified to tackle those problems, the presentation of the material was not within the knowledge framework of typical civil engineering students. The course was co-taught by Dr. Paul Roschke, who is also actively involved in research in this field.

5 Evaluation of Teaching Effectiveness

5.1 Student Ratings

Student evaluations are a major formal vehicle I use to improve my instruction and to meet the perceived needs of my students. The university has an official evaluation that is required at the end of each course. Instructors are scored on a 5-point scale, with 5 being excellent and 1 being poor. In Appendix A.4, I include detailed results for each course as well as written student comments for different courses. A summary of the results for each category are provided below, with averages given for undergraduate, graduate, and all courses individually:

<table>
<thead>
<tr>
<th>Category</th>
<th>Undergraduate</th>
<th>Graduate</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Preparation</td>
<td>4.29</td>
<td>4.33</td>
<td>4.30</td>
</tr>
<tr>
<td>Assignments</td>
<td>3.95</td>
<td>4.16</td>
<td>3.96</td>
</tr>
<tr>
<td>Communications</td>
<td>4.01</td>
<td>4.24</td>
<td>4.08</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>4.45</td>
<td>4.49</td>
<td>4.45</td>
</tr>
<tr>
<td>Academic Concern</td>
<td>4.42</td>
<td>4.48</td>
<td>4.44</td>
</tr>
<tr>
<td>Availability</td>
<td>4.30</td>
<td>4.39</td>
<td>4.33</td>
</tr>
<tr>
<td>Fairness in Grading</td>
<td>4.00</td>
<td>4.28</td>
<td>4.07</td>
</tr>
<tr>
<td>Environment</td>
<td>4.15</td>
<td>4.26</td>
<td>4.18</td>
</tr>
</tbody>
</table>

When I have erred as a teacher, it has been on the side of expecting too much of the students rather than too little, and this error has occurred because I personally have appreciated those teachers and students who have demanded the best from me. I am working hard at clearly communicating my expectations to the students, as well as my sincere willingness to help them meet those expectations. To that end, I have begun to include a discussion of Bloom’s taxonomy of learning at the introduction of the class and linking it explicitly to the lessons objectives. When I return the exams, part of the discussion, beyond how to solve the problems, includes what level of learning the problem was designed to meet. These efforts have begun to be effective and students later appreciate being challenged intellectually. Unsolicited emails from students demonstrate this and are provided in Appendix A.5.

As the official final evaluation results are not available until much after a course is complete, the information can be too late to help students currently in the course. Also, some of the feedback is too general in nature to be able to correct specific concerns from the students. As a result, I collect different forms of feedback from the students throughout the duration of a course. The simplest form of feedback I
use is based on the 2-minute paper that asks the students to identify the most important topic covered to date and what concept is still the most confusing. They are useful to identify common problem areas among the students and address those problems prior to exams.

Additionally, a 1-page mid-term evaluation is collected roughly half-way through the semester. Questions included in this survey include ones that are similar to those in the short papers as well as multiple-choice questions about how students feel about different parts of the course, such as homework, help sessions, and teaming assignments. This evaluation explicitly asks students to take a look at their own performance and what they can do to enhance their learning. Using this information, changes to how the material is presented to the class can be made immediately, allowing for the course to be better tailored to the current class.

On the last day of class, a detailed evaluation form developed by me is provided to the students. This evaluation asks students to rate specific course and teaching components, as well as gives specific feedback on elements of each one. The evaluation form is broken up so that an overall rating is given to each individual course component (such as organization, lecturing, interaction) and then students are asked to circle one of five rating levels from SA (strongly agree) to SD (strongly disagree) indicating how well they agree with particular statements regarding that course component. Towards the end of the form, an overall course information section then requests information about the workload, pace of the course, and how much each student believes they have learned throughout the semester.

The detailed results for each course are also included in Appendix A.4. The questions under each major category allows for better interpretation of the ratings. For example, some students had low scores for teaming activities due to personality conflicts with their team. Other times, students will give a course component a relatively low overall ranking while giving high marks to the individual questions regarding that component of the teaching process. This result indicates that the student is expressing an opinion about something slightly different than what is normally interpreted by that component.

These results provide a good indication of the results from the official evaluation forms. Also, this evaluation form provides very detailed information about both the course and teaching methodology, which is not readily available from the official evaluation forms. As the results are immediately available, improvements can be implemented immediately for the following semester in repeating classes. For example, from feedback at end of 345 fall 1999, the faculty associated with the course met and selected a new textbook to be used starting the summer of 2000. Similarly, the feedback received at the end of Spring 2000 in CVEN 444 was utilized in modifying the course content and structure for section taught in Fall 2000, before official evaluations were available.
5.2 Peer-Reviews

Our department has a formal yearly peer-review process, where a committee of 2 senior faculty members reviews my teaching within the context of my research and service duties in the department. The committee reviews all teaching materials for courses taught in the past year, all student evaluations, and includes classroom visit to observe an actual lecture. My peer reviews have always been positive, and I include in Appendix A.6 a letter from my most current peer-reviewer, Dr. Jim Morgan. These reviews have also proven an invaluable source of insight into my teaching that I could not receive from the student evaluations. For example, the peer review after my second year of teaching was able to determine that occasionally weaker evaluation ratings were actually a reflection of a lack of preparation of the students for the course material. In response to this insight, I’ve incorporated 2 strategies into my teaching process. First, I clearly spell out what the pre-requisite knowledge for the class is, including implied knowledge that may not be listed as a course pre-requisite in the catalog. Examples include an expectation that students have basic geometry and matrix manipulation skills prior to taking the structural analysis course. My second strategy is the giving a background probe questionnaire on the first day of class. This questionnaire is anonymous so the students can feel comfortable answering honestly. I then have a much truer picture of the academic background and abilities of my class before proceeding.

6 Honors and Awards

My teaching efforts have recently been recognized through both the departmental Zachry Award for Excellence in Teaching and the national ASCE ExCEED New Faculty Excellence in Teaching awards. Descriptions of these awards is given below.

- 2003 ExCEEd New Faculty Excellence in Teaching Award from the American Society of Civil Engineers (ASCE). This award was established by ASCE's Project ExCEEd (Excellence in Civil Engineering Education) and the Committee on Faculty Development to recognize and reward outstanding new faculty.

- 2002-2003 Zachry Award for Excellence in Teaching from the Department of Civil Engineering at Texas A&M University. Contributions from Bartell Zachry ’54 and the Zachry Foundation make possible these awards for superior teaching at the undergraduate level. Recipients are selected based on communication skills, classroom creativity, ability to motivate students and active involvement with students beyond the classroom setting.
7 Teaching Goals: Short-Term and Long-Term

• Continue working with MEEN 363 Dynamics and Vibrations course material to make it more relevant to civil engineering students.
• Improve communication to student of expectations and why
• Track students improvement of writing skills using results from grading chart
• Track student performance in follow-on courses to determine effectiveness of my course in preparing students for their future challenges.

Appendices
A1. Sample syllabus
A2. Sample board notes: CVEN 444 – Design of Concrete Structures
A3. Grading chart for student reports
A4. Student evaluation results
A5. Unsolicited letters from students
A6. Peer review letter
A.1 – Sample Syllabus

CVEN 345 Theory of Structures Spring 2002

Course Information:

Instructor:
Name: Lectra N. Barrios
Office: Room 709E, CE/TTI Building
Telephone: 845-0290
Email: barrios@ce.tamu.edu
Office hours: TR 1:00 – 5:00, other times by appointment

Lectures:
TR 8:00am – 9:15am Room 118, CEB

Communication:
Questions and discussions are encouraged during class period and office hours. Please use e-mail for making appointments and other communication purposes.

The course web site is located at: http://ce.tamu.edu. Relevant class information, including announcements and assignments, will also be posted on the web. You are expected to check the announcements at least once every 24hrs during the week.

Course Objectives:
(1) To develop an understanding of the basic principles of structural analysis, (2) to become familiar with methods of analysis of beams, trusses, and rigid frames, and (3) to study the method of virtual work in determining deflections of structures, influence lines, and analysis of indeterminate structures.

Course Topics:
- Introduction and Mathematical Models of Structures
- Stress Concentration
- Torsion of Shafts
- Statically Indeterminate Trusses
- Method of Sections
- Statically Indeterminate Beams and Frames
- Shear and Bending Moment Diagrams
- Stress Analysis
- Deflections, Double Integration Method for beams, Virtual Work Method for all
- Analysis of Indeterminate Structures by Flexibility Method
- Influence Lines for Determinate and Indeterminate Structures
- Approximate Analysis of Indeterminate Structures
- Analysis of Structures by Stiffness Method

Prerequisites:
- ENGR 221: You should be familiar with the solution of various systems of equations and basic matrix manipulations
- CVEN 302: You should be familiar with the solution of various systems of equations and basic matrix manipulations
- CVEN 305: You should be familiar with the solution of various systems of equations and basic matrix manipulations

Textbook:

CVEN 345 Theory of Structures Spring 2002

Grading:
Final grades will be based upon the overall average to be determined as follows:
- Homework: 20%
- Quizzes and Participation: 10%
- Examinations (2): 20% each
- Final Examination (cumulative): 30%

where: 90 – 100: A; 80 – 89.9: A-; 70 – 79.9: B; 60 – 69.9: C; 50 – 59.9: D; 0 – 59.9: F. Note that I do not grade on a strict curve; instead, I believe in using a criterion or competency-based grading system. In either event, no “do-overs” will be made at the end of the semester. For more information regarding grading policy, please refer to the web site. That information is considered part of the course syllabus.

Please note that your homework papers are GRADED, NOT CORRECTED. Occasionally, your paper will be “corrected”, noting all errors. At other times they may only be checked for completeness.

Exam Schedule:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wednesday 2/26</td>
<td>7:00pm - 8:30pm</td>
</tr>
<tr>
<td>2</td>
<td>Tuesday 4/15</td>
<td>7:00pm - 8:30pm</td>
</tr>
<tr>
<td>Final</td>
<td>Monday 5/5</td>
<td>1:00pm - 3:00pm</td>
</tr>
</tbody>
</table>

Attendance and Quizzes:
- Attendance and class participation are required. In order to pass the course, you will be required to meet at least 75% of class periods. Attendance will be taken at the start of class. No late arrivals will be accepted. If you have a scheduled university absence, you must present the excuse before the date of the event and make arrangements to turn in any assignments due on that date by the assigned deadline.

Homework Policy:
- Please note that your homework papers are GRADED, NOT CORRECTED. Occasionally, your paper will be “corrected”, noting all errors. At other times they may only be checked for completeness. Or only 1 problem will be corrected while others merely checked for completeness.
- Homework will be assigned via course web site. You are responsible for getting the assigned homework and reading from the week in sufficient time to complete it by the due date. If you leave it to the last minute and the network is down, you will still be held accountable for not completing the assigned work.
- Homework must be turned in at the beginning of class day due and will be considered late otherwise. Late problem sets without an excuse are accepted up to one week only and will be worth half-credit. For excessive assignments, you must attach a note on a separate paper in effect to the front of the assignment and present for a signature.

Note on Syllabus:
- The syllabus is subject to change without notice. The instructor reserves the right to change the course content and/or requirements. Please check the course web site regularly for updates.
A.1 – Sample Syllabus

CVEN 345 Theory of Structures Spring 2003

- Homework should be presented in a neat and professional manner. The following format is required in this course, to both maintain an acceptable level of professionalism and to ensure that your work is graded accurately:
  1. All work should be submitted on one side of the page only.
  2. All problems must be shown in a legible and neat format. Use clear handwriting to ensure that your work is readable.
  3. Your name, course, and section number, and date should be placed at the top of the first page or on a cover page. All other pages of solutions set should be stapled together.
  4. Each problem should be solved on a separate page. The body of the problem solution will consist of the following sections, though they need not be explicitly labeled:
     a. Problem: Describe the problem number.
     b. Solution: Present a methodical and logical manner the steps and calculations necessary to obtain the required information. The final answers should be clearly identified.
     c. Required: State what you intend to find in the problem. Be specific and exact.

All pages of the solution set should be stapled together.

- Failure to comply with these requirements will result in a warning during the first 2 weeks of the semester and grades of 0 for subsequent violations.

- You may discuss the homework assignment with other students. In fact, I encourage you to interact actively with each other, as it will help you understand the materials better. However, the final product must be your own work. I will adhere to the university policy on cheating and plagiarism. Please refer to "Scholarly Dishonesty" in the Texas A&M University Student Guide.

- You are also encouraged to check your answers using the program Visual Analyze. You will also be required to utilize Visual Analyze to complete your project assignment. Please refer to http://www.covx.tamu.edu/CVEN345/index.htm under the heading "HOW TO".

Re-Grading Policy:
- Great care is taken to ensure that your homework problems and exams are graded correctly, fairly, and consistently. However, there may be instances when a mistake has been made in grading your work. If you feel that there has been a mistake, you must submit the work for re-grading within one week after it has been returned to you. Any work submitted after this one-week period will not be regraded. This policy includes major errors.

- When you resubmit the work for re-grading, you must attach a formal written statement indicating where you feel you lost extra points. You must then sign this statement. The entire problem is then open to re-grading, and you may end up with a higher or lower score than before.

- If the issue is just a question of adding up the points incorrectly, you still must attach a written statement to that effect, but no re-grading of individual problems will occur.

- Discussions about grades will not be conducted in person. However, I will be happy to discuss the material and concepts covered in the course with you during office hours.

---

CVEN 345 Theory of Structures Spring 2003

Tentative Schedule of Topics:

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<tr>
<th>Class</th>
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<td>21 Mathematical Models &amp; Review Equilibrium</td>
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<td>23 Review Equilibrium: Determinacy and Stability. Start Static Determinate Trusses</td>
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# A.2 – Sample Board Notes: CVEN 444 – Design of Concrete Structures

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## OBJECTIVES

1. List Assumptions in Beam Flexure Calcs.
2. Classify Assumptions as Basic or Design Based
3. Explain Whitney’s Stress Block
4. Derive Capacity Moment Curvature Envelope

## BASIC DESIGN RELATIONSHIP

\[
\phi R_a > \alpha_t S_i
\]

**MATERIAL PROPERTIES**

\[ f'_C \quad \varepsilon \]

**CONCRETE**

\[ f_s \quad \varepsilon \]

**STEEL**

\[ \psi \]

**Yield**

**Ultimate**

**Cracking**

**- CAPACITY ENVELOPE**

## FLEXURAL BEHAVIOR

\[ \psi = \text{CURVATURE} \]

\[ N.A. = \text{NEUTRAL AXIS} \]

\[ M = f' I \]

\[ y = \text{depth pt. interest} \]

## STRESS-STRAIN @ SECTION

\[ A_s \]

\[ f_c' \]

\[ f_s \]

\[ M \]

\[ T \]

\[ \text{STRAIN} \]

\[ \text{STRESS} \]

\[ \text{FORCE} \]

## MOMENT-CURVATURE

\[ \psi \]

**Ultimate**

**Yield**

**Cracking**

**- CAPACITY ENVELOPE**

## BASIC ASSUMPTIONS

1. Linear Strain
2. Perfect Bond
3. Indiv. f - ε

**DON'T CHANGE**
### A.2 – Sample Board Notes: CVEN 444 – Design of Concrete Structures

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#### DESIGN ASSUMPTIONS

4. \( f_t = 0 \) for ultimate
5. \( \varepsilon_{cu} = 0.003 \)
6. Any \( f - \varepsilon \) that gives equivalent \( C \)

**FOR SIMPLIFICATION**

#### REVIEW: TRANSFORM SECTION

- **Steel:** \( A_s \)
- **Concrete:** \( bh \times A_s \)
- **Total Area:** \( bh + (n-1)A_s \)

#### UNCRACKED SECTION

- Limiting \( f_t \): Cracking
  \[ f_{\text{con}} = 7.5 \sqrt{f_{\text{c}}} = f_r \]
- Use Elastic Analysis

#### Find Neutral Axis

\( A_I \times x = \sum A_i \times x_i \)

\[ \frac{[bh + (n-1)A_s]}{nA_s} = \left( \frac{bh}{2} \right) + (-A_s)(d) + (nA_s)(d) = \left( \frac{bh}{2} \right) + (n-1)A_s d \]

#### Find Moment of Inertia

\[
I = \sum \left[ I_{o,i} + A_i \left( \frac{x_i}{2} - x \right)^2 \right] \\
= \frac{bh^3}{12} + (bh) \left( \frac{d}{2} - x \right)^2 + (n-1)A_s \left( d - \frac{x}{2} \right) \]

#### FIND CRACKING LIMIT

- Need \( M_{cr} \)
- \( M_{cr} = \frac{f_r I}{\gamma_r} = \frac{f_r I}{h - x} \)
- \( \gamma_{cr} = \frac{E_f}{h - x} = \left( \frac{f_r}{E_c} \right) \)

---

**Diagram:**

- Diagram of a cross-section with labeled areas and expressions for moment of inertia and neutral axis calculation.
### A.3 – Grading Chart

**Team Project: Grade Chart**

**CVEN 345-502**  
**Spring 2003**

| PARAMETER | Inadequate  
| Value = 0 | Adequate  
| Value = 1 | Good  
| Value = 2 | Excellent  
| Value = 3 |
| --- | --- | --- | --- | --- |
| **Organization** | | | | |
| Title Page Complete | | | | |
| Sections Presented in right order | | | | |
| Figures, tables, Eqns. numbered | | | | |
| Calculations in appendix | | | | |
| Sub-Total: | $\frac{\text{Tot}}{12}$ | $\times 10\%$ | | |
| **Writing** | | | | |
| Grammar  
(ex: spelling, sentence fragments, verb-subject agreement, run-on sentence…) | | | | |
| Style  
(ex: consistent use verb tenses, main ideas emphasized, well structured presentation of ideas, logical connections between sections…) | | | | |
| Sub-Total: | $\frac{\text{Tot}}{6}$ | $\times 20\%$ | | |
| **Content** | | | | |
| Executive summary | | | | |
| - Self-contained? | | | | |
| - Includes main conclusions? | | | | |
| Introduction | | | | |
| - Presents overview of problem | | | | |
| - Effective outline | | | | |
| Problem Description | | | | |
| - Problem accurately described | | | | |
| - Assumptions given | | | | |
| - Relevant theory presented | | | | |
| Results | | | | |
| - Clearly presented | | | | |
| - Effective format used (tables, graphs…) | | | | |
| - Explained in text | | | | |
| - Compared with expected results | | | | |
| - Emphasize main implications | | | | |
| Conclusions and Recommendations | | | | |
| - Brief summary of results & issues | | | | |
| - Clear recommendations | | | | |
| Appendices | | | | |
| - Separated based on content | | | | |
| - Calculations easily followed | | | | |
| Sub-Total: | $\frac{\text{Tot}}{48}$ | $\times 70\%$ | | |

**OVERALL TOTAL:**
A.4 – Student Evaluations

I. Final Course Evaluations – Official

In all those courses, student evaluations are a major formal vehicle I use to improve my instruction. The university has an official evaluation that is required at the end of each course. Instructors are scored on a 5-point scale, with 5 being excellent and 1 being poor. The questions asked in all evaluations are:

Q1: Class Preparation: The class activities are well prepared and organized
Q2: Assignments: The examinations, assignments, projects, etc. aid me in achieving class objectives
Q3: Communications: The instructor clearly explains material so I can understand it.
Q4: Responsiveness: The instructor is open to my questions and effectively answers them
Q5: Academic Concern: The instructor seems to care that I learn this material
Q6: Availability: The instructor willingly makes time to help other students and me
Q7: Fairness in Grading: The instructor is fair and consistent in evaluating my performance
Q8: Environment: The instructor maintains a good learning environment for me

Courses taught listed under the Department of Mechanical Engineering (MEEN) have four additional questions:

Q9: Sets High Standards: The instructor sets high standards for the class
Q10: Emphasize Thinking: The instructor emphasizes thinking rather than just memorizing and/or routine calculation processes
Q11: Enhanced Thinking: The instructor enhanced my thinking skills to continually learn
Q12: Relate to other fields: The instructor related the subject matter to other fields

A. All courses in chronological order:

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Average: 4.30, 3.96, 4.08, 4.45, 4.44, 4.33, 4.07, 4.18, 4.40, 4.37, 3.78, 3.94, 4.23
A.4 – Student Evaluations

B. Individual undergraduate courses taught multiple times:

- CVEN 345 – Theory of Structures

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- CVEN 444 – Design of Reinforced Concrete

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- MEEN 363 – Dynamics and Vibrations

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The nine main sections of the evaluation form are:

- Q1: Course Organization
- Q2: Lecturing
- Q3: Interaction
- Q4: Textbook
- Q5: Handouts/Web
- Q6: Testing
- Q7: Assignments
- Q8: Teaming and Projects
- Q9: Attitude towards students

A summary of the results collected from these evaluations is given in the tables below. The weighted average was calculated using 5 points for each excellent, 4 points for very good, 3 for good, 2 for fair, and 1 for poor. The averages for each course are also provided, though as it incorporates information about textbook, it is not so much indicative of teaching performance as it is an indication of overall course performance.

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Average 4.03 4.18 4.24 2.66 4.38 3.57 3.80 3.70 4.56 3.90

III. Student Comments

- CVEN 345 – Theory of Structures
  “You are an excellent teacher. You demand a lot from us.”
  “The tests were tricky, but it was necessary in order to really test our knowledge and make the test short enough. Did an excellent job interacting with the students.”
  “Very helpful and giving of time after class”
“Cares about what we learn.”
“You could stop by her office anytime and get help.”

• CVEN 444 – Design of Concrete Structures
  “She responds quickly to emails and was always ready to help students. This is a very important quality, especially when working on the project.”
  “She enjoyed teaching and making sure the students learned.”
  “She had the class well organized and the notes and in-class examples were very good.”
  “Cared that the students knew the material. Very open to questions.”

• MEEN 363 – Dynamics and Vibrations
  “The relaxed class atmosphere really helped.”
  “The instructor is very open and is able to involve the entire class. She is very approachable and her desire for teaching is very apparent”
  “The professor is very helpful and understanding. The grading was fair as she emphasized concepts.”
  “She is very helpful and cares about the students learning the material”
  “She was very engaged and truly cared about the students learning. The exam questions that ‘stretched’ out minds were great”

The following Student Reviews are posted on Pick-A-Prof

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**Strengths**
Are you a sissy baby? Do you cry when professors require you to go above and beyond to make an A? Are only in engineering because you hope to make good money when you graduate? If you answered yes to any of these questions, don’t take Dr. Barosso for MEEN363. You will fail. However, if you are not a slacker and are truly interested in learning this material I would implore you to do whatever necessary to get into her class. I heard all the horror stories about her class, how she was a soulless witch bent on failing as many students as possible. All lies. She is willing to spend any amount of time necessary to help you. Three computing assignments are assigned each semester. I probably spent two hours in her office per project, asking questions. She always made sure that when I left her office, I had no questions. Despite the rumors, she is an excellent teacher and more organized than I could ever hope to be. As far as the difficulty of the class goes, yes, the class is hard. Test problems will challenge your knowledge, but they are not impossible and she gives gracious amounts of partial credit and ludicrous amounts of extra-credit (if you’re willing to work for it). This semester (03C) she gave us chance to put 5 extra credit points onto our FINAL average. As far as the Computing Projects go, she practically writes ALL the MatLab code you need. If you’ve never used MatLab before, get in a group with someone who has and learn it. I went into this semester thinking 363 would be my worst class, but now it is by far my favorite thanks to Dr. Barosso.

**Drawbacks**
None - 11/17/2003
A.5 – Student Letters – Unsolicited

CVEN 345 – Theory of Structures

Barroso, Luciana

From: natalie bartosh [aggiechic02@yahoo.com]
Sent: Tuesday, June 18, 2002 12:12 PM
To: lbarroso@civil.tamu.edu
Subject: letter of recommendation

Dr. Barroso,
I just wanted to thank you for all your help during 345 this past semester. Even though I’m an environmental major and not particularly interested in structures, I could feel your enthusiasm for the material and feel that I’ve learned a lot from you. You demanded a lot from us, but all the assignments really helped me learn the material. You were also my first woman professor, which I thought was great. I also really appreciate all the advice you gave me for graduate school. I am graduating this December and am applying to UT and A&M for grad school. Can you please write a letter of recommendation for me? I can stop by your office to discuss this tomorrow morning (wed) or next week after Tuesday.

Thanks,
Natalie Bartosh

MEEN 363 – Dynamics and Vibrations

Barroso, Luciana

From: Cockerham John David [johncockerham@neo.tamu.edu]
Sent: Friday, December 13, 2002 3:44 PM
To: Luciana Barroso - Mail
Subject: I thank you

Hi Dr. Barroso, I just wanted to thank you for the excellent job you did teaching us this semester. I know many people complained about how hard some of the problems were (I was one of these people at the start), but now I realize what you were trying to do. I think that you did an excellent job of trying to get us to use what we learned and apply it to problems that we hadn’t seen, or were a little harder than what we did in class. Instead of spoonfeeding us you tried to push us to get a good comprehension of the material. I realize this now, and I realize how good of a job you did, because at the start, if I were to look at the problems we would be solving, I would think it was impossible. Now I feel comfortable solving these problems, and I feel like I have learned so much this semester! Thank you for the great job you did!
Sincerely,
John Cockerham
A.5 – Student Letters – Unsolicited

Barroso, Luciana

From: Nick Worley [n.worley@verizon.net]
Sent: Sunday, December 14, 2003 3:29 PM
To: 'Barroso, Luciana'
Subject: RE: Equilibrium question

Follow Up Flag: Follow up
Flag Status: Flagged

Dr. Barroso,

I eventually figured it out. That last sentence you wrote really helps me.

"Typically, your best bet is to use as your primary equilibrium equation the one that most closely corresponds to the DoF you are interested in. For example, if your DoF is a translation in the x, then equilibrium in the x is the best choice. If the DoF is rotation, then a moment equilibrium is your best choice."

It very hard to describe, but I was getting equivalent EoMs for both of the free body diagrams. I understand now why that is.

I did that bad boy with Newtons! I checked it with Michael Delaney (he did Lagrange) and we got the same thing. Whoop!

I just wanted to say that I think you are a magnificent teacher. The lecture structure you have is superb. No assigned homework makes the class much more bearable and you lecture in a way that makes me actually WANT to do the homework to compare to the lecture examples. Tests are hard, but that’s what application is for I s’pose. Thanks for a great semester, Merry Christmas!

-Nick

Barroso, Luciana

From: Zach Cummings - Mail [porsche-928@neo.tamu.edu]
Sent: Sunday, December 14, 2003 3:21 AM
To: Dr. Luciana Barroso
Subject: Linkage

Follow Up Flag: Follow up
Flag Status: Flagged

I was curious about a linkage problem that may appear on the test.

If a 3-bar linkage problem were to appear on the final, would you rather us work it out geometrically or using vectors, or would you care?

Also, I was wondering if you could post solutions to some of the handouts that cover rigid body vibrations.

And one last clarification, we are allowed 3 formula sheets, front and back, correct?

Is anything forbidden from being on them?

I don't know if it's the massive amount of dark chocolate I ate or the lack of sleep that it caused that's making me say this, but, for the first time since ever since taking this class, I'm optimistic about my chances of passing it. I actually feel like I know what I'm doing now. You have been an absolutely fantastic professor Dr. Barroso. I hope to take more classes from you in the future.

Are you teaching 345 any time soon?

-Zach
February 19, 2003
TO: Whom It May Concern
FROM: James R. Morgan, Associate Professor
RE: Recommendation of Dr. Luciana Barroso

I am pleased to write this recommendation letter for my colleague, Dr. Luciana Barroso. I am currently serving on the departmental peer review of teaching committee for Dr. Barroso. In this capacity, I have visited her classroom to observe her teaching firsthand, and I have reviewed her statement on teaching philosophy. I was quite impressed with her classroom performance, especially with the extremely high percentage of class participation (even from most of the back row students) that was sustained throughout the class period. Most of the class was devoted to working through a single (but involved) problem. Luciana alternated between having the students work on a piece of the problem and a class discussion of the next step in the solution. When the students got stuck, she shared their pain, let them struggle with the options, ultimately took the blame for the mistaken direction, and credited one of their classmates for helping them out. Although this clearly is a good learning environment, it would be easy for a student (or visitor) to misinterpret the events as lack of preparation or lack of understanding. It is rare for a faculty member to show this much courage in a classroom.

I have been able to observe with interest the nature of handouts, class examples, and exams she provides her classes. Since we teach similar (and sometimes the same) courses, and because she makes class resources available on a course website that we both use, I also am able to comment on the quality of the materials she prepares for her students. Her course website is very thorough and organized, and includes a large number of detailed sample solutions. It also is apparent that she spends a great deal of time preparing materials for the class, including supplemental examples requested by students or rising from questions during office hours. Perhaps the most impressive thing about the classes taught by Dr. Barroso is the level of learning achieved by her students. Each of her exams ranges from the expected straightforward problems to very challenging problems (ones that any of us would be pleased to see our students work). It is a tribute to her teaching ability that her students are able to attempt the most challenging problems, and that she is constantly trying to find ways to make more of them successful at solving them.

I am proud to have Dr. Luciana Barroso as a colleague and recommend her highly. Please contact me at jim-morgan@tamu.edu if there are questions or if I can provide further information.