Spring 2006

Course portfolio for ARCH333/CNST305: Building Environmental Technical Systems

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Advanced Peer Review

Team Formation in a Multi-disciplinary Course Featuring a Service-Learning Project

May 18, 2005

Course History and Development

The course I will be investigating is the cross-listed course 'Building Environmental Technical Systems I' (ARCH-333/CNST-305). This course was created three years ago when two existing courses were merged; one offered by the Architecture program in the College of Architecture (Interior Architectural Systems) and one offered by the Construction Management program in the College of Engineering and Technology (Physical Environmental Systems I). Both of the original courses were required for the Bachelors degree offered by each program, as is the new course.

The mechanical systems course is a very important part of any construction management curriculum, as it is a required course to achieve accreditation by the American Council of Construction Education (ACCE). The problem faced by most departments is finding a qualified individual to teach the course. An informal survey of construction management departments nationwide identified only five individuals with a mechanical systems background teaching construction management courses in higher education. Typically, this is a course that is feared by both faculty and students alike. As a result, an individual, usually an assistant professor, is "assigned" to teach the course without much support on how best to deliver the material.

Recognizing the need to provide a quality educational environment, counterbalanced by the need to conserve resources, and, further, anticipating significant budget cuts in higher education, the Department of Architecture and the Construction Management Department met to discuss the sharing of resources. Out of these discussions, an agreement was reached such that the Architecture program would teach the building structures courses to both programs and, in return, the Construction Management program would teach the foundation course in mechanical systems to both programs. It was felt that this partnering agreement took advantage of the strengths of both programs, as both had experienced a great deal of teaching success in these specific areas. Students would be the ultimate beneficiaries, of course, in that they would be able to learn from those instructors who specialized in structural systems or mechanical systems.

I was originally hired, in part, to teach the mechanical systems courses for the Construction Management program at the University of Nebraska. I had previously spent nearly 20 years in the industry as a Design/Build mechanical contractor and knew the industry intimately. One of my first tasks within the program was to update and rewrite the course to make it more applicable to construction managers. Over the past eight years

I have taught the course on numerous occasions and, working with another colleague within the program, have continued to update and modify the class to keep it current.

Since the course was first taught in this new format, the course has evolved to include a service-learning project coupled with team-based learning. In teaching a wide diversity of students the fundamentals of mechanical systems, I have found it beneficial to have a project the students can use to apply the material presented in the classroom. Additionally, our industry has always used multi-disciplinary teams to solve this type of problems. Accordingly, I thought this teaching methodology would have the added benefit of preparing the students for the same type of team dynamics they would encounter was they entered professional practice and help them develop problem solving skills from a team perspective.

As a result of this shift in teaching methodology, it was necessary to restructure all of the lectures, homework, quizzes and examinations so they all revolved around the semester project. Moreover, the grading emphasis was restructured so the majority of the course grade was on the final project. Although the semester project grade was a team grade, it was also necessary to implement a method of peer evaluation, so that the teams could apportion the grade within the team based upon the amount of work and the quality of work done by each team member. From this restructuring, it became apparent that the team aspect of the course would be critical.

Identifying an Issue to Investigate

Due to the critical nature of team-based learning in this course, I propose to study the learning aspects of team-based learning, as I envision it in this course. Not having formally investigated this issue previously, I am left with a sense that some teams perform much better than other teams. I am looking for those criteria that separate the good teams from underperforming teams. Some of the issues that occur to me as I start this process include the following:

- Team size
- Academic diversity
- Discipline diversity
- Gender diversity
- Geographic diversity

How students' best learn in a team format is of great importance for a variety of reasons. From an academic standpoint, institutions are moving towards larger and larger classes in response to a reduction in funding and fewer professors available to teach. One way to overcome some of the problems inherent in large class instruction is to break the class down into smaller groups. Developing a methodology that allows for larger classes and still increases student learning would be of tremendous benefit to universities across the country.

From an industry perspective, teaching students how to work within teams to produce workable solutions is equally important. As mentioned previously, virtually all construction, engineering and architectural projects are conducted in a team format. A teaching methodology that helps students develop team and networking skills, team problem solving, and communication skills with clients would be exciting for the industry that hires our graduates. It is also worth noting that our industry has had a long history of relationship problems between architects, engineers and construction managers. Oftentimes, they view each other as obstacles to reaching a solution as opposed to partners in the process. We could do the industry an immeasurable service by working to break down these barriers before the students enter the industry.

From an instructor's standpoint, using a teaching methodology that incorporates students teaching students within the class is bound to make teaching more effective and fun. This emphasizes the fact that teaching is a process and it really doesn't all flow from a single point at the front of a classroom. Solving a real-life problem through a service-learning project also addresses one of the most worrisome questions in any teacher's mind, 'Are they learning the material such that they can solve this problem in the real world?' In other words, this process really focuses on outcome, what the students know when the walk out the door.

Finally, from a student's perspective, team learning within a large classroom setting is bound to be more exciting, if done well. Team learning removes some of the isolation students often feel in the large class. Better yet, the isolation is removed within a team that contains students one would normally not interact with, inasmuch as students from the engineering college and the architecture college don't often interact. It is not lost on the students that they are solving a real-world problem. Inherently, students want to perform well and, in my opinion, genuinely want to acquire the skills they know they will need when they enter professional practice. They have the opportunity to solve a real-world problem, using this methodology, with virtually no risk, other than perhaps a poor grade.

Examining Issue History and Significance

The issue of how well the teams perform has been at the forefront of the class since we moved to this new format. In each of the three years we have used a service-learning project in this course, the clients have been thrilled with the quality produced by the students. Quite frankly, the first time I taught this class using this format, I significantly underestimated what the students could do, this limiting the effectiveness of the class and the teaching methodology.

Although the students have generally been very positive regarding the methodology used in this class, they have not been hesitant to express their concerns as well. For example, a number of students complained that the smaller groups were at a competitive disadvantage because larger teams had more resources to draw upon and could do more research and better distribute work loads. The result was that their proposals would be better than the smaller teams. From my own experience, team size has been a difficult

problem. The literature has long advocated teams of 5 to 8 for maximum effectiveness. At the same time, many colleagues are hesitant to form teams that large, fearing that the less assertive or prepared students can be left behind. Team size is one aspect I plan to investigate.

Another typical complaint is that some teams are “stacked” (their words, not mine) with really good students and some teams are forced to struggle “lesser” students. This is a more difficult question to address. In talking with colleagues I consider to be excellent teachers, I have gotten a wide spectrum of advice on this point. One colleague stated that he historically put one team together made up of the poorest performers. He thought it served as a motivator and put them into a “make or break” mode. He claimed some dramatic success with this strategy. Other colleagues advocated distributing higher performing students among the teams. This past semester, I spent a considerable amount of time analyzing the performance of the 90 students enrolled in the course. I decided to try distributing the higher performing students among the teams more or less equally.

A related problem is one of discipline diversity. Some students have been concerned that teams with more or less architects and/or construction managers (I have heard both sides of this argument) have an inherent advantage in this type of format. I don’t have much of a sense on this issue, which, by itself, is a good reason for more investigation.

Another change I have made involves using teams within the lecture portion of the class. I created a seating chart for the lecture hall (not an easy task as it was in a theater, but I found a way to make it work) and had the teams sit in lecture by teams. Additionally, I created a series of team activities for each lecture where the teams had to select the best possible solution from a series of solutions. Most of the problems were such that a number of answers could be considered correct, depending on your perspective of the problem. We then debated the answers in a large group. I think this process has a great deal of potential, but it needs further investigation as well.

Ideally, a vibrant team-based learning methodology in this class would address many of the problems found in large class instruction. At the same time, it would better prepare students for professional practice. I am unsure at this point how best to quantify whether or not team-based learning around a service learning project increases student learning. Team effectiveness, I suspect, is based on a number of criteria. Therefore, I will probably end up looking at a number of variables to see if I can gain some insight on the learning going on inside the teams.

Hypothesis

In Interaction Number 1, I posed the question "Is there an ideal team size and composition that enhances learning in this format?" This question is critical to the success of the course inasmuch as the course relies so heavily on team-based learning. From this question, I developed my hypothesis that 'There is an ideal size and composition of teams that will enhance learning in a course that utilizes service-learning semester projects in CNST-305/ARCH-333'.

The obvious problem with this hypothesis is that the level of learning among students in a team is impacted by a number of variables, many of which may have no bearing at all on the team structure. The question that then arises is "Can the other variables be kept constant such that we can accurately gauge the effect a team structure criteria has on learning"? If care is not taken on discerning between active criteria and passive criteria, I will end up measuring something besides the effectiveness of the team. Moreover, it may well be that the data will point me towards another hypothesis that must be considered.

Developing Methods of Inquiry

My hypothesis is based, in part, on my knowledge of the construction industry. I know that the design and construction of a building always takes a multi-disciplinary team. The question then becomes, 'Will the same team structure that works in industry also work in the classroom?' Certainly, part of the reason I want to use multi-disciplinary teams on a real-life project is because I want the students from Architecture to teach the students from Construction Management and vice versa. I also want to prepare my students for the organizational structure that they will experience once they graduate. Finally, I also know from my industry experience that some of these multi-disciplinary teams are very successful and some, quite frankly are failures. What differentiates a successful multi-disciplinary team from an unsuccessful team?

Certainly, there are some facets of team structure that are fairly well known. Others are based upon "common knowledge", which may or may not be accurate. For example, I know that teams that are too large are not functional in that some students then get "lost" and don't fully participate. I also know that teams that are too small don't have the resources necessary to fully investigate the problem at hand. What I don't know and need to investigate is the following:

- What is the most effective team size for this class format?
- To what extent does the discipline diversity of the team enhance the learning environment?
- To what extent does past scholastic diversity of the team enhance the learning environment?

The primary goal of the course is to empower the students to apply the fundamentals of mechanical systems. Accordingly, I have chosen to require each team to submit a

complete proposal, as a semester project, in response to a Request for Proposal (RFP). The RFP is generated by the client (owner) of the building and defines the recommendations that the client expects to receive relative to their building. As such, all of the lectures and all three of the examinations are based upon the semester project. I use the lectures and particularly the examinations to point the students in the correct direction for the semester project. It should also be noted that, as in industry, there is no such thing as a correct answer. There is a pool of right answers and a corresponding pool of wrong answers and their job is to select the best possible right answer for this specific project.

Because each answer is unique, and due to the fact that the semester project requires knowledge from all aspects of the course, I plan on using the performance of the teams on the semester project to prove my hypothesis. Using the semester project performance as the indicator assumes that the semester project is a fair indicator of team-learning.

There are a number of secondary resources that will undoubtedly provide useful information in studying this issue. For example, there are a number of books and articles on team-learning that should provide some insight into the question of team structure. Additionally, I am sure there are a number of other faculty members that are using team-based learning that could add their knowledge of team structure. Finally, I plan on having a team critique session at the end of the semester to explore the student's perspective of what worked or what didn't work regarding team based learning.

Data Collection

Historically, the class has had approximately 100 students enrolled, one-half from the Architecture program and the other one-half from the Construction Management program. Due to the large class size, it should be possible to divide the class into enough different teams to study how team structure relates to the grade on the semester project. Under most circumstances, most classes should generate 15 to 25 teams, which should produce an acceptable sample. If this proves not to be the case, I can always sample across semesters.

In carefully considering all of the possible dependent variables for this class, I have decided to limit my Peer Review project to the following dependent variables for team structure:

- Team size
- The Architect/Construction Manager ratio for each team

The independent variables I am considering include the following:

- Grade on the proposal
- Grade on the drawdel
- The overall grade on the semester project
- The peer assessment of each team member.

As I stated previously, this analysis is based upon the assumption that the semester project fairly measures the extent the student teams integrated and applied the course material. This assumption in itself contains a number of problems that bear further investigation, perhaps in a different Peer Review project.

A quick word on drawdels and the proposal is probably necessary. A drawdel is, by definition, half drawing and half model. The requirements for the drawdel are contained in the attached grading rubric (link to Appendix 1). Architects are typically more comfortable with this assignment, as they are required in a number of their courses and are generally used, in one form or another, in industry. A typical drawdel produced in this class is shown at right (link to Appendix 2). Construction Managers, on the other hand, are generally more comfortable with the written proposal. The requirements of the written proposal are contained in the attached grading rubric (link to Appendix 3). A written response to a Request for Proposal is the most common method of acquiring projects in industry.

Data Collection

The data I chose to collect relates to how each team performed on various components of the semester project, the only aspect of the course performed by the teams. The teams were formed from the recitation sections. As related earlier, I used teams of different sizes in an attempt to ascertain if there was an optimal team size for this type of project. As the course stabilized, through the drop and add process, I ended up with 5 six-person teams, 5 five-person teams and 8 four-person teams.

I also segregated the teams by the Architect – Construction Manager Ratio. These ratios also varied somewhat, again principally due to students changing their recitation sections through the drop and add process.

As can be seen from the data, based only upon the project grade, the four-person teams performed less well than the six or five-person teams. The six-person team performed the best overall, followed by the five-person team. Interestingly, the six-person team performed the best on the written report, while the five-person team performed the best on the drawdel. The four-person teams lagged the performance of both the five-person and six-person teams for both the written report and the drawdel.

I also attempted to measure the number of “underperformers” found within each team. To measure the number of underperformers, I analyzed the students peer review of their work and the work of their fellow team members. The peer review form (link to Appendix 4) requires students to evaluate their own work and the work of their fellow team members in four key areas. I take this evaluation and place it into a grading matrix (link to Appendix 5) and distribute the total project grade based upon the peer evaluation within a team. For example, if a four-person team received a project grade of 90, but it had one team member that did not perform their fair share of the work as determined by their fellow team members, the grades would be redistributed such that the team average would still be a 90. However, the three students who did the majority of the work would

receive grades above a 90 and the one student who did not do their fair share of the work would receive a grade less than 90. If a students overall grade was lowered by their fellow team members by ½ grade or more, I considered them an underperformer for the purpose of this study.

My concern with identifying underperformers, was to test the long held believe that you shouldn't make your team too large because inevitably a student will get lost in the team concept and not learn at the same rate as the other students.

The data for the course is shown in the following table.

ARCH-333/CNST-305					
Team Format	Report Grade	Drawdel Grade	Total Project Grade	Arch/CM Ratio	No. of Underperformers
Six Person Teams					
Team 1	89.7	92.1	90.3	3/3	0
Team 2	97	89.8	95.2	3/3	2
Team 5	90	98.3	92.1	3/2	1
Team 6	91.6	92.6	91.8	3/3	2
Team 17	90.6	83.7	88.9	3/3	0
AVE.	91.8	91.3	91.7		1
Five Person Teams					
Team 3	89.3	91.8	89.9	2/3	1
Team 4	85.9	94.7	88.1	3/2	1
Team 10	92.7	95.9	93.5	2/3	1
Team 11	91.1	89.4	90.7	3/2	1
Team 13	90.7	94.3	91.6	2/3	0
AVE.	89.9	93.2	90.8		0.8
Four Person Teams					
Team 7	90.7	89.8	90.5	3/1	1
Team 8	82.6	91.3	84.8	2/2	1
Team 9	89.7	95.9	91.3	3/1	1
Team 12	91	89.1	90.5	2/2	2
Team 14	85.9	90.4	87	2/2	1
Team 15	88.1	88	88.1	2/2	0
Team 16	92.2	87.5	91	1/3	1
Team 18	90.7	93.1	91.3	1/3	1
AVE	89.6	89.6	89.6		1

On the surface, the number of underperformers seems consistent from team to team, regardless of team size, although the five-person teams had a slightly lower average of underperformers. The data, I believe, takes on a new perspective when the number of underperformers is compared to the Architect/Construction Manager ratio. Three observations become apparent. First, all of the five-person teams had a fairly even Architect/Construction Manager ratio and they also had the lowest average of underperformers. Secondly, all of the teams that had no underperformers had perfectly balanced teams (i.e., the same number of architects to construction managers). Finally, the data shows that all of the teams that only one architect or one construction manager also had an underperformer. Moreover, in 100% of the instances, the underperformer was the architect or construction manger that was in the minority.

Reflection

This unexpected result casts some doubt on the wisdom of forming teams with only one member from a discipline present. It is worth noting again that one of the primary reasons the two colleges decided to put these two courses together was to force the architects and construction managers to interact more, as they will when the enter industry. The problem we have observed in industry is that architects and contractors often have very poor, adversarial relationships. It is believed that higher education can help to address that long-standing industry problem by helping the students establish the foundation for a professional relationship through multi-disciplinary, team-based problem solving. These preliminary test results seem to indicate that poor relationships may be precipitated in environments that are unbalanced or unequal. Interestingly, this is very similar to the complaints often heard in industry where contractors often remark that the environment is fair there either due to the fact that the architect is in a position to write the contract conditions upon which the construction is performed.

An important clue to this phenomenon appeared in the Student Learning Assessment Survey (link to Appendix 6), completed by the students at the conclusion of the semester. On a number of the written comments, individuals who were obviously from a four-person team complained about their perception that they weren't as competitive as their colleagues in a larger team. The reason usually given was that the larger teams had a better opportunity to spread the work load and, therefore, could do more research, spend more time on the drawdel, etc. This "non-competitive" theme was found on a number of the assessment forms. The exact same point was made by several of the four-person teams during their exit critique after the semester project was turned in for grading. Those points notwithstanding, the students gave the course very high evaluations in terms of what they thought they learned and the format in which the learning took place. The very high evaluations from both architecture and construction management students seem to indicate that the team-based learning approach, revolving around a real-life service-learning project seems to resonate among the students. Those that addressed that issue on the Student Learning Assessment Survey particularly liked the fact that they were being asked to perform in the classroom in exactly the same manner that they will be expected to perform in industry.

In reviewing this year's data, it is clear that data needs to be kept for future classes to see if the trends uncovered in this portfolio reappear over time. However, for next year's class, I have already decided to make the following changes:

- Rely more upon five and six-person teams and less upon four-person teams.
- Avoid teams with only a single discipline present
- Create seven and eight-person teams to see if there is an upper limit on team effectiveness

Undoubtedly, there will be some other, smaller changes made in the class as the class evolves to more of a team-based learning model. The data seems to support my hypothesis that there is an optimal team size, although I don't think that the data collected to date answers the question yet. In my opinion, the data seems to indicate that the optimal team size is probably within a range and that the range is higher than I probably anticipated when I started this process.

I am already in the process of putting together next year's class and I have selected a new service-learning project that will undoubtedly be the most challenging project yet faced by the students. Due to the project's size and complexity, the student teams will have to work at a high degree of efficiency. This portfolio has given me some important insights, as well as some much needed confidence, that the students teams can perform at the level required to meet the expectations of our new client and meet the learning expectations of the class.

Evaluation Form for Drawdel

ARCH-333/CNST-305 Semester Project

	Excellent			Good			Average			Poor
	A+	A	A-	B+	B	B-	C+	C	C-	D/F
	10	9.5	9.2	8.9	8.5	8.2	7.9	7.5	7.2	6-0
Craft										
The drawdel should display a high level of craft comparable to a studio model										
The drawdel should be integrated into the overal presentation board										
The presentation board should be well designed										
Legibility										
The presentation board should be easy to read and understand										
Well organized components of the board (graphics, text, etc)										
All components relevance to the project should be explained										
All graphs, pertinent images and elements should be clearly labeled										
Clarity of Design										
Presentation board should sell your design & explain the reason for the design										
Methods of presentation (plans, sections, etc) should be legible and show										
evidence of a functional design										
Identication of Audience										
Presentation board should be geared toward the owner and work to gain their interest										
Information on the board should be relevent										
Calculations and numbers should only be used if they are understandable or explained										

TOTAL POINTS (Maximum of 120) _____

THE LARSON BUILDING RENOVATION PROPOSAL

JARED ARGO MIKE BARNARD ROY LEY TONI WATTS

EXISTING WALL SECTION 1/2"=1'

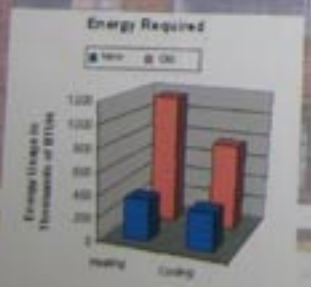
EXISTING FLOORPLANS 1/32"=1'

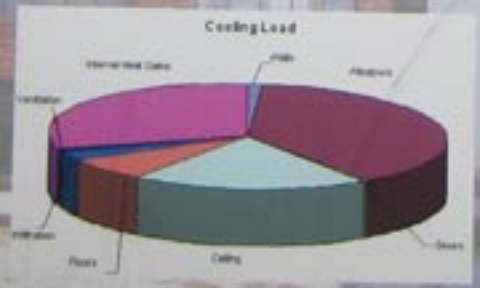
PROPOSED WALL SECTION 1/2"=1'

PROPOSED FLOORPLANS 1/32"=1'

CURRENT COLUMN SECTION	R-VALUE
Outside surface conductance of air	0.17
Brick 21" at 0.2 R/inch	4.2
Inside surface conductance of air	0.68
Total R-value	5.03

CURRENT ROOF SECTION	R-VALUE
Outside surface conductance of air	0.17
Roofing/Roofing	0.75
1 ½" Wood Decking	1.27
1 ½" Air space	1.01
½" Gypsum Wall Board	0.45
Inside surface conductance of air	0.61
Total R-value	3.64





PROPOSED ROOF SECTION	R-VALUE
Outside surface conductance of air	0.17
Asphalt Shingles	0.44
Felt	0.06
1 ½" Wood Decking	1.25
2 ½" Air space filled with insulation 4.3 R/inch	10.75
½" Gypsum wall board	0.45
Inside surface conductance of air	0.61
Total R-value	13.73

PROPOSED COLUMN SECTION	R-VALUE
Outside surface conductance of air	0.17
Brick 21" at 0.2 R/inch	4.2
1 ½" non-reflective air space	1.11
Paper Barrier	0.06
½" Plywood sheathing	0.62
2 ½" Wood 3 bd wall with insulation 4.3 R/inch	10.75
½" Gypsum wall board	0.45
Inside surface conductance of air	0.68
Total R-Value	12.39

Evaluation Form

ARCH-333/CNST-305 Semester Project

Fall 2004

	Excellent			Good			Average			Poor
	A+	A	A-	B+	B	B-	C+	C	C-	D/F
	10	9.5	9.2	8.9	8.5	8.2	7.9	7.5	7.2	6-0
Clear expression of thought										
Depth of coverage (covers all aspects of course)										
LEED Energy Rating analysis & heating/cooling loads										
Reasonableness of Cost/Benefit ratio										
Meets the needs of the Owner (constructibility, etc.)										
Creativity and imagination										
Grammar, neatness, & professionalism										

TOTAL POINTS (Maximum of 70) _____

ARCH-333/CNST-305

PEER EVALUATION DOCUMENT

PARTNER EVALUATION

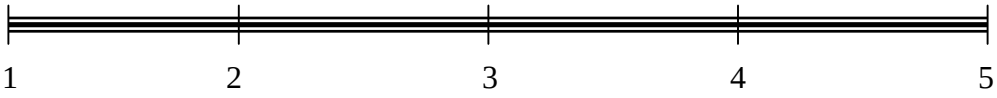
Group projects are sometimes looked upon as being "unfair". However, they often accurately reflect the type of team dynamics that you can expect in industry. Through the use of peer evaluation, your perception of the quantity of work that you performed and that of your partners is analyzed against the perception of your partners. Through this process, hopefully, equity is achieved. These evaluations are a serious statement and are used to distribute 33% of your semester project grade. In order for this process to work effectively there is the need for you to be honest and objective. Your ratings and comments are confidential and are destroyed once your grade has been calculated.

These peer evaluations must be submitted to me or to Megan Lutz by 5:00 P.M. on Tuesday, November 23, 2004. Complete the evaluation and place it in a white sealed envelope. Evaluations not in a sealed envelope will not be considered. If you do not submit an evaluation it will be assumed that you did not perform your fair share of the work and your grade for the semester project will be lowered two letter grades.

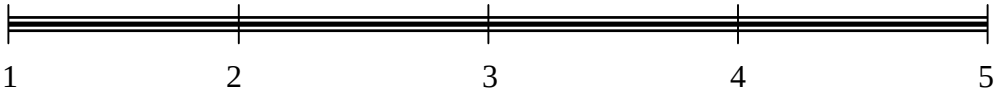
A "1" is the lowest grade while a "5" is the highest grade

YOUR NAME _____

1. I performed my share of the team's work



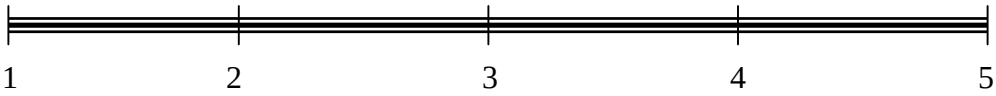
2. I provided relevant and timely information and research to the topic under study.



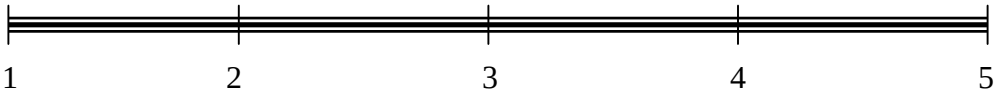
3. I was cooperative and worked with the group to reach common goals.

Partner 1's Name _____

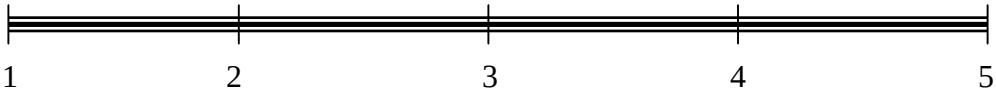
1. This partner performed their share of the team's work.



2. This partner provided relevant and timely information and research to the topics under study.

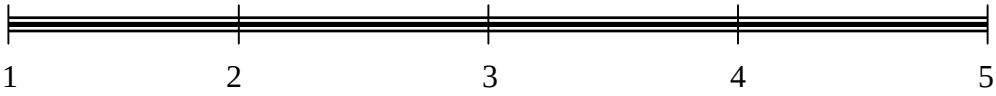


3. This partner was cooperative and worked with the group to reach common goals

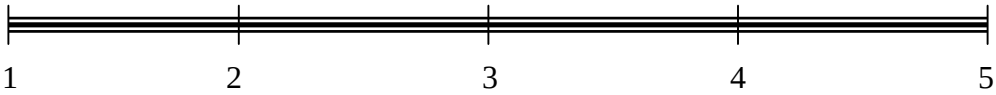


Partner 2's Name _____

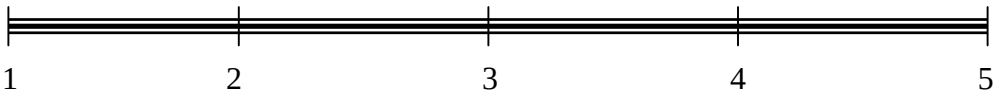
1. This partner performed their share of the team's work.



2. This partner provided relevant and timely information and research to the topics under study.

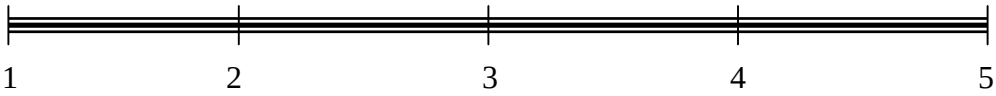


3. This partner was cooperative and worked with the group to reach common goals

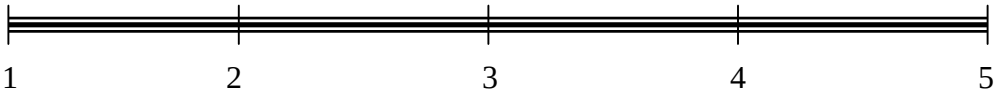


Partner 3's Name _____

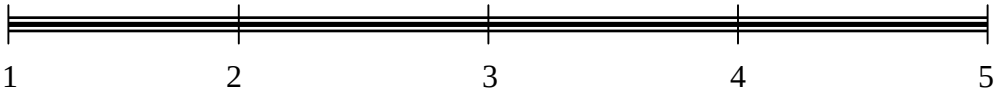
1. This partner performed their share of the team's work.



2. This partner provided relevant and timely information and research to the topics under study.

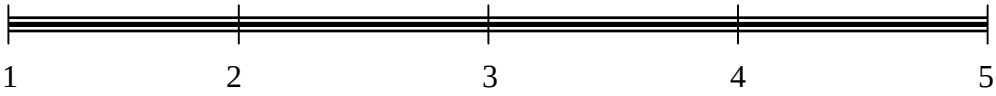


3. This partner was cooperative and worked with the group to reach common goals

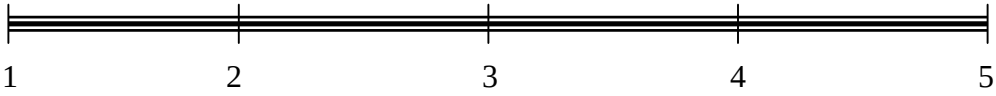


Partner 4's Name _____

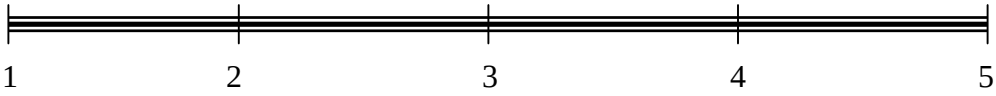
1. This partner performed their share of the team's work.



2. This partner provided relevant and timely information and research to the topics under study.



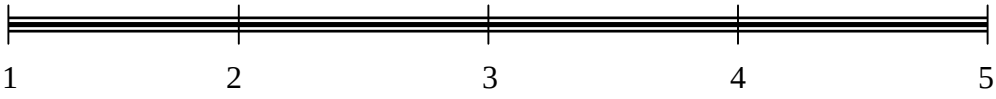
3. This partner was cooperative and worked with the group to reach common goals



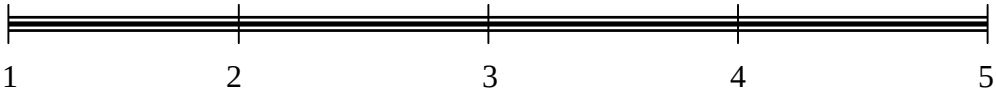
Partner 5's Name _____

4. This partner performed their share of the team's work.

5. This partner provided relevant and timely information and research to the topics under study.



6. This partner was cooperative and worked with the group to reach common goals



Team 'X'

EVALUATION MATRIX FOR PEER REVIEW EVALUATION

Description	Student A	Student B	Student C	Student D	Student E
Rating from Team Member #1	15	15	15	15	15
Rating from Team Member #2	13	14	11	14	13
Rating from Team Member #3	14	9	15	11	14
Rating from Team Member #4	13	13	12	12	12
Rating from Team Member #5	15	15	13	13	15
Total Rating for Team Member	70	66	66	65	69
% Score based on Total Points of all members	0.208333333	0.196428571	0.196428571	0.193452381	0.205357143
Grade of Group Project	86	86	86	86	86
% of Partner Evaluations	0.33	0.33	0.33	0.33	0.33
Number of Team Members	5	5	5	5	5
Final Grade for Individual	87.1825	85.49321429	85.49321429	85.07089286	86.76017857

STUDENT LEARNING ASSESSMENT - COLLEGE OF ENGINEERING AND TECHNOLOGY

This student evaluation is intended to provide an accurate and fair process that allows you to evaluate your performance, the course, the instructor, and the classroom. Due to the significance of this evaluation, your thoughtful and constructive input is appreciated. The instructor will not see this evaluation until after the final course grades are submitted.

GENERAL INFORMATION

[1] My year in college is: Freshman Sophomore Junior Senior Graduate Student

[2] My overall grade point average is: 4.0 to 3.5 3.5 to 3.0 3.0 to 2.5 2.5 to 2.0 Below 2.0

[3] I am enrolled for the following number of credit hours this semester

More than 18 hours 15 to 17 hours 12 to 14 hours 9 to 11 hours Less than 9 hours

[4] I currently work the following number of hours per week at a job:

More than 40 hours 30 to 40 hours 20 to 30 hours 10 to 20 hours Less than 10 hours

[5] This course is my major field of study: Yes No

Instructor: _____ Course/Section: _____

Semester: _____ Classroom Building/Location: _____

Using a number 2 pencil, please respond to the following statements using the scale below:

1 = Strongly Disagree 2 = Disagree 3 = Indifferent 4 = Agree 5 = Strongly Agree

If question is not applicable, mark "N/A"

	SD	D	I	A	SA	N/A
STUDENT						
[6] I see myself as a motivated student in this course.						
[7] I was academically prepared to take this course.						
[8] I was challenged to think in this course.						
[9] My course grade will be a fair representation of my learning.						
[10] I treated the instructor fairly and respectfully.						
COURSE	SD	D	I	A	SA	N/A
[11] Before taking this course, my interest in this subject was very high.						
[12] I understand the objectives of this course.						
[13] The organization of the course topics is reasonable and logical.						
[14] The pace at which course topics are covered is reasonable.						
[15] This course helped me improve my rational thinking, problem-solving and decision-making ability.						
[16] After taking this course, my interest in this subject is very high.						
COURSE MECHANICS	SD	D	I	A	SA	N/A
[17] The textbook, workbook, and/or lesson notes help me understand course material.						
[18] The method (or methods) of presenting information in class enhances my learning.						
[19] The coursework helps me understand and apply the subject matter.						
[20] The amount of coursework is reasonable for what I am expected to learn.						
[21] Testing methods fairly measure my understanding of the course material.						
INSTRUCTOR	SD	D	I	A	SA	N/A
[22] The instructor is prepared for class and is concerned about his or her preparation.						
[23] The instructor makes good use of class time.						
[24] The instructor is enthusiastic and interested in teaching this course.						
[25] The instructor treats students in a professional manner.						
[26] New concepts and examples are clearly explained at a level students can comprehend.						
[27] The instructor motivated me to understand and apply course concepts.						
[28] The instructor provides useful feedback on how I am doing in the course.						
[29] The instructor is accessible for help outside of the classroom.						
CLASSROOM	SD	D	I	A	SA	N/A
[30] The classroom physical environment (e.g., temperature, lighting, acoustics) is comfortable for learning.						
[31] The classroom is free from outside distractions.						
[32] The classroom design and furnishings do not interfere with my learning.						
[33] The classroom has adequate instructional equipment and technology.						
ADDITIONAL QUESTIONS - INSTRUCTOR'S OPTION	SD	D	I	A	SA	N/A
[34]_____						
[35]_____						
[36]_____						
[37]_____						

Please complete the written questions on the other side of this form

WRITTEN COMMENTS - Please provide brief and legible comments to the below questions.

Please write only in the white space below. Do not write in the shaded areas.

[1] What are 1 or 2 specific things that helped you learn in this class?

[2] What are 1 or 2 specific things that caused a problem with your learning in this class?

[3] Please provide 1 or 2 practical suggestions on ways to help improve student learning in this course.

[4] Other comments that you would like to make:

[5] ADDITIONAL QUESTION - Instructor's option