

## Student Outcome Rubric

Code  
MUP09

College: [Engineering](#) Department: [Civil and Environmental Engineering](#) Program: [Civil Engineering](#)

**Outcome (a):** *An ability to apply Knowledge of mathematics, science and engineering*

### Rubric #1

	Satisfactory	Developing	Unsatisfactory
KPI (1)	Able to successfully combines mathematical and/or scientific principles to formulate models and systems relevant to civil engineering	Chooses a mathematical model or scientific principle that applies to an engineering problem, but has trouble in model development	Does not understand the connection between mathematical models and the system or process to be analyzed or designed
KPI (2)	applies concepts of integral and differential calculus and/or linear algebra to solve civil engineering problems	Shows nearly complete understanding of applications of calculus and/or linear algebra in problem-solving	Does not understand the application of calculus and linear algebra in solving civil engineering problems
KPI (3)	Shows appropriate engineering interpretation of mathematical and scientific terms	Most mathematical terms are interpreted correctly	Mathematical terms are interpreted incorrectly or not at all
KPI (4)	Translates academic theory into engineering applications and accepts limitations of mathematical models of physical reality	Some gaps in understanding the application of theory to the problem and expects theory to predict reality	Does not appear to grasp the connection between theory and the problem
KPI (5)	Executes calculations correctly by hand and using mathematical software	Minor errors in calculations by hand and through applying math software	Calculations not performed or performed incorrectly by hand and does not know how to use math software
KPI (6)	Correctly analyzes data sets using statistical concepts	Minor errors in statistical analysis of data	No application of statistics to analysis of data

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**Outcome (b):** *An ability to design and conduct experiments, analyze and interpret data*

### Rubric #2

	<b>Satisfactory</b>	<b>Developing</b>	<b>Unsatisfactory</b>
KPI (7)	Observes good laboratory safety procedures	Unsafe lab procedures observed infrequently	Practices unsafe, risky behaviors in lab
KPI (8)	Formulates an experimental plan of data gathering to attain a stated objective (develop correlation, test a model, ascertain performance of equipment, etc.)	Develops a simplistic experimental plan of data gathering, does not recognize entire scope of study (e.g. not all parameters affecting the results are investigated)	No systematic plan of data gathering; experimental data collection is disorganized, even random, and incomplete
KPI (9)	Carefully documents data collected	Data collected are not all documented, units are missing, or some measurements are not recorded	Data are poorly documented
KPI (10)	Develops and implements logical experimental procedures	Experimental procedures most often followed, but occasional oversight leads to loss of experimental efficiency and/or loss of data	Does not follow experimental procedure
KPI (11)	Can select appropriate equipment and instruments to perform the experiment	Needs some guidance in selecting appropriate equipment and instrumentation	Cannot select the appropriate equipment and instrumentation required to run the experiment(s)
KPI (12)	Is able to operate instrumentation and process equipment	Is tentative in operation of instruments and process equipment	Does not operate instrumentation and process equipment, does so incorrectly or requires frequent supervision

KPI (13)	Analyzes and interprets data carefully using appropriate theory; if required, translates theory into practice or applies to process model(s)	Applies appropriate theory to data when prompted to do so, but misinterprets physical significance of theory or variable involved; makes errors in unit conversions	Makes no attempt to relate data to theory
KPI (14)	Is aware of measurement error and is able to account for it statistically	Is aware of measurement error but does not account for it statistically or does so at a minimal level	Is unaware of measurement error
KPI (15)	Seeks information for experiment(s) from multiple sources	Seeks information for experiment(s) from a few sources - mainly from the textbook or the instructor	Seeks no extra information for experiments other than what is provided by instructor

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**Outcome (c):** *An ability to design a system, component or process to meet desired needs within realistic constraints*

### Rubric #3

	<b>Satisfactory</b>	<b>Developing</b>	<b>Unsatisfactory</b>
KPI (16)	Develops a design strategy, decomposition of work into subtasks, development of a timetable	Uses a design strategy with guidance	No design strategy; haphazard approach
KPI (17)	Suggests new approaches and improves on what has been done before	Can follow a previous example competently	Cannot design processes or individual pieces of equipment without significant amounts of help
KPI (18)	Develops several potential solutions and finds optimum	Can develop and compare multiple solutions to a problem, but does not usually arrive at the best result; conducts optimization but neglects one or two key aspects	Only focuses on one solution to a problem; no optimization attempted
KPI (19)	Understands how areas interrelate and demonstrates ability to integrate prior knowledge into a new problem	Can use prior knowledge to design individual pieces of equipment competently when guided to do so	Unable to relate prior knowledge to the design problem
KPI (20)	Uses computer tools and engineering resources effectively	Minimal or incorrect use of computer tools and engineering resources	No use of computer tools and engineering resources
KPI (21)	Supports design procedure with documentation and references	Design is done, but procedures and equations are not documented or referenced	Design is done incompletely without the proper equations and without references

KPI (22)	Develops a solution that includes economic, safety, environmental and other realistic constraints	Includes only minor or cursory consideration of economic, safety, and environmental constraints	No consideration of economics, safety, and environment
KPI (23)	Applies engineering and/or scientific principles correctly to design practical processes	Applies some engineering and or scientific principles	No application of engineering and/or scientific principles
KPI (24)	Recognizes practical significance of design outcome/answer	Gives an answer, but does not check its practicality	Design is incomplete, no answer is given
KPI (25)	Thinks holistically: sees the whole as well as the parts	Does not think holistically: does not see the integration of the pieces clearly	Has no concept of the process as a sum of its parts

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**Outcome (d): The ability to function on multidisciplinary teams**

### Rubric #4

	Satisfactory	Developing	Unsatisfactory
KPI (26)	Routinely present at team meetings or work sessions. Contributes a fair share to the project workload.	Absent occasionally, but does not inconvenience group Sometimes depends on others to complete the work; contributes less than fair share	Is absent from team meetings or work sessions >50% of the time
KPI (27)	Is prepared for the group meeting with clearly formulated ideas	Prepares somewhat for group meetings, but ideas are not clearly formulated	Does not contribute to group work at all or submits own work as the group's
KPI (28)	Cooperates with others (outside of the discipline)	Occasionally works as a loner or interacts to a minor extent with extra-disciplinary team members	Routinely fails to prepare for meetings
KPI (29)	Shares credit for success with others and accountability for team results	Makes subtle references to other's poor performance or sometimes does not identify contributions of other team members	Does work on his/her own; does not value team work
KPI (30)	Shares information with others and provides assistance to others	Sometimes keeps information to himself/herself; not very willing to share	Claims work of group as own or frequently blames others
KPI (31)	Demonstrates the ability to assume a designated role in the group	Takes charge when not in the position to lead	Hides in the background; only participates if strongly encouraged
KPI (32)	Values alternative perspectives and encourages participation among all team members	Persuades others to adopt only his/her ideas or grudgingly accepts the ideas of others	Does not willingly assume team roles

KPI (33)	Remains non-judgmental when disagreeing with others/seeking conflict resolution; does not "point fingers" or blame others when things go wrong	Sometimes criticizes ideas of other team members or blames others for errors	Does not consider the ideas of others and is openly critical of the performance of others
KPI (34)	Is courteous group member	Is not always considerate or courteous towards team members	Is discourteous to other group members
KPI (35)	Has knowledge of technical skills, issues and approaches germane to disciplines outside of civil engineering	Has some knowledge of other disciplines, but gets lost in discussions with extra-disciplinary team members	Has no knowledge of disciplines outside of civil engineering

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**Outcome (e):** *An ability to identify, formulate and solve model engineering problems*

### Rubric #5

	Satisfactory	Developing	Unsatisfactory
KPI (36)	Demonstrates creative synthesis of solution and creates new alternatives by combining knowledge and information	Demonstrates solution with integration of diverse concepts or derivation of useful relationships involving ideas covered in course concepts; however, no alternative solutions are generated	Demonstrates solutions implementing simple applications of one formula or equation with close analogies to class/lecture problems
KPI (37)	Can relate theoretical concepts to practical problem solving	Connects theoretical concepts to practical problem-solving when prompted	Does not see the connection between theory and practical problem solving
KPI (38)	Can predict and defend problem outcomes	Occasionally predicts and defends problem outcomes	Is unable to predict or defend problem outcomes
KPI (39)	Uses appropriate resources to locate information needed to solve problems	Uses limited resources to solve problems	Uses no resources to solve problems
KPI (40)	Takes new information and effectively integrates it with previous knowledge	Must be assisted in integrating previous knowledge and new information	Has no concept of how previous knowledge and new information relate
KPI (41)	Demonstrates understanding of how various pieces of the problem relate to each other and the whole	Is missing some of the pieces of the whole problem	Does not realize when major components of the problem are missing
KPI (42)	Formulates strategies for solving civil engineering problems	Has some strategies for problem-solving, but does not apply them consistently	Has no coherent strategies for problem solving



KPI (43)	The answer is correct and properly labeled	The answer is nearly correct, but properly labeled (within reasonable and logical range of the correct answer-it's in the "ballpark")	The answer is incorrect and not checked for its reasonableness
KPI (44)	The solution is correct and checked in other ways when it can be; the interpretation is appropriate and makes sense	The solution is correct, but not checked in other ways	No attempt at checking the obviously incorrect solution--no commentary

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**Outcome (f): An understanding of professional and ethical responsibility**

### Rubric #6

	Satisfactory	Developing	Unsatisfactory
KPI (45)	Student understands and abides by the International Civil code of Ethics	Student is aware of the existence of the Civil engineering Code of Ethics and other bases for ethical behavior	Student is not aware of any civil engineering codes for ethical behavior
KPI (46)	Participates in class discussions and exercises on ethics and professionalism	Does not take the discussion of ethics seriously but is willing to accept its existence	Does not participate in or contribute to discussions of ethics; does not accept the need for professional ethics
KPI (47)	Demonstrates ethical behavior among peers and faculty	Does not model ethical behavior among peers and faculty	Student has been caught cheating or plagiarizing the work of others
KPI (48)	Takes personal responsibility for his/her actions	Doesn't recognize the need to take personal responsibility for his/her actions	Blames others for own issues and problems
KPI (49)	Is punctual, professional, and collegial; attends classes regularly	Sometimes exhibits unprofessional behavior; is sometimes absent from class without reason	Is frequently absent from class and is generally not collegial to fellow students, staff, and faculty
KPI (50)	Evaluates and judges a situation in practice or as a case study, using facts and a professional code of ethics	Evaluates and judges a situation in practice or as a case study using personal understanding of the situation, possibly applying a personal value system	Evaluates and judges a situation in practice or as a case study using a biased perspective without objectivity
KPI (51)	Uses personal value system to support actions, but understands the role of professional ethical standards for corporate decisions	Uses personal value system to support actions, but confuses personal ethics with professional ethics	Uses personal value system to support actions to the exclusion of all other ethical standards

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**Outcome (g):** *An ability to communicate effectively (written)*

### Rubric #7

	<b>Satisfactory</b>	<b>Developing</b>	<b>Unsatisfactory</b>
KPI (52)	Articulates ideas clearly and concisely	Articulates ideas, but writing is somewhat disjointed, superfluous or difficult to follow	Text rambles, points made are only understood with repeated reading, and key points are not organized
KPI (53)	Organizes written materials in a logical sequence to enhance the reader's comprehension (paragraphs, subheading, etc.)	Material are generally organized well, but paragraphs combine multiple thoughts or sections and sub-sections are not identified clearly	Little or no structure or organization; no subheadings or proper paragraph structure used
KPI (54)	Uses graphs, tables, and diagrams to support points-to explain, interpret, and assess information	Uses graphs, tables, and diagrams, but only in a few instances are they applied to support, explain or interpret information	Graphs, tables or diagrams are used, but no reference is made to them
KPI (55)	Written work is presented neatly and professionally	Work is not neatly presented throughout	Work is not presented neatly
KPI (56)	Grammar and spelling are correct	One or two spelling/grammar errors per page	Spelling/grammar errors present throughout more than 1/3 of the paper
KPI (57)	Figures are all in proper format	Figures are present but are flawed-axes mislabeled, no data points, etc.	No figures or graphics are used at all
KPI (58)	Uses good professional writing style	Style is informal or inappropriate, jargon is used, improper voice, tense...	The writing style is inappropriate for the audience and for the assignment
KPI (59)	Conforms to the prescribed format (if any)	The prescribed format is only followed in some portions of the paper	The prescribed format is not followed

## Student Outcome Rubric

College: **Engineering** Department: **Civil and Environmental Engineering** Program: **Civil Engineering**

**Outcome (g): An ability to communicate effectively (oral)**

### Rubric #7'

	<b>Satisfactory</b>	<b>Developing</b>	<b>Unsatisfactory</b>
KPI (60)	Plans and delivers an oral presentation effectively; applies the principle of "(tell them)3" --well organized	Presents key elements of an oral presentation adequately, but "tell them" not clearly applied	Talk is poorly organized, e.g. no clear introduction or summary of talk is presented
KPI (61)	Presentation has enough detail appropriate and technical content for the time constraint and the audience	Presentation contains excessive or insufficient detail for time allowed or level of audience	Presentation is inappropriately short or excessively long; omits key results during presentation
KPI (62)	<p>Presents well mechanically:</p> <ul style="list-style-type: none"> <li>• Makes eye contact</li> <li>• Can be easily heard</li> <li>• Speaks comfortably with minimal prompts (notecards)</li> <li>• Does not block screen</li> <li>• No distracting nervous habits</li> </ul>	<p>Has some minor difficulties with the mechanical aspects of the presentation</p> <ul style="list-style-type: none"> <li>• Eye contact is sporadic</li> <li>• Occasionally difficult to hear or understand speaking</li> <li>• Overuses prompts or does not use prompts enough-occasionally stumbles or loses place; appears to have memorized presentation</li> <li>• Occasionally blocks screen</li> <li>• Some nervous habits (um, ah, clicking pointer, etc.)</li> </ul>	<p>Major difficulties with the mechanical aspects of the presentation</p> <ul style="list-style-type: none"> <li>• No eye contact</li> <li>• Difficult to hear or understand speaking</li> <li>• Reads from prepared script</li> <li>• Blocks the screen</li> <li>• Distracting nervous habits (um, ah, clicking pointer, etc.)</li> </ul>

KPI (63)	Uses proper American English	Occasionally uses an inappropriate style of English-too conversational	Uses poor English
KPI (64)	Uses visual aides effectively	Visual aides have minor errors or are not always clearly visible	Multiple slides are unclear or incomprehensible
KPI (65)	Professional appearance	Appearance is too casual for the circumstances	Appearance is inappropriate
KPI (66)	Listens carefully and responds to questions appropriately; is able to explain and interpret results for various audiences and purposes	Sometimes misunderstands questions, does not respond appropriately to the audience, or has some trouble answering questions	Does not listen carefully to questions, does not provide an appropriate answer, or is unable to answer questions about presentation material

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**Outcome (h):** *the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context*

### Rubric #8

	Satisfactory	Developing	Unsatisfactory
KPI (67)	Is familiar with the current trends in the civil and environmental engineering discipline	Is aware of current events in society	Is unaware of current events
KPI (68)	Respects the historical aspects of civil engineering solutions and their impacts	Is aware of historical aspects of civil engineering solutions, but is not influenced by them	Is unaware of historical effect of civil engineering solutions
KPI (69)	Reads and is familiar with the content of periodicals that are relevant to understanding the global and societal impact of civil engineering	Is aware of the existence of technical periodicals - would know where to look to find them	Is not familiar with any technical periodicals
KPI (70)	Has a personal perspective on the importance (or lack thereof) of civil engineering in today's world	Is interested in civil engineering because of what the discipline offers him/her personally	Isn't sure why he/she is studying civil engineering

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**Outcome (i):** *A recognition of the need for and an ability to engage in lifelong learning*

### Rubric #9

	Satisfactory	Developing	Unsatisfactory
KPI (71)	Demonstrates ability to learn independently	Requires guidance as to expected outcome of task or project	Requires detailed or step-by-step instructions to complete a task
KPI (72)	Goes beyond what is required in completing an assignment and brings information from outside sources into assignments	Completes only what is required	Has trouble completing even the minimum required tasks
KPI (73)	Learns from mistakes and practices continuous improvement	Sometimes is able to avoid repeating the same mistakes	Is unable to recognize own shortcomings or deficiencies
KPI (74)	Demonstrates capability to think for one's self	Does not always take responsibility for own learning	Assumes that all learning takes place within the confines of the class
KPI (75)	Demonstrates responsibility for creating one's own learning opportunities	Seldom brings information from outside sources to assignments	Shows little or no interest in outside learning resources
KPI (76)	Is able to understand, interpret, and apply learned materials and concepts in a format different from that taught in class (e.g. different nomenclature, understand equation from different textbook)	Has some trouble using materials and concepts that are in a different format from that taught in class	Cannot use materials outside of what is explained in class
KPI (77)	Participates and takes a leadership role in professional and technical societies available to the student body	Occasionally participates in the activities of local professional and technical societies	Does not show any interest in professional and/or technical societies

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**Outcome (i): a knowledge of contemporary issues**

### Rubric #10

	Satisfactory	Developing	Unsatisfactory
KPI (78)	Has knowledge of current events in the civil engineering discipline and in society	Has some knowledge of current events	Has no clue about issues and events in the world
KPI (79)	Has a good perspective on the current job market	Has a somewhat narrow perspective on the current job market	Hopes that a job will fall into his/her lap
KPI (80)	<p>Able to discuss in-depth major political issues at national, state and local levels</p> <ul style="list-style-type: none"> <li>• Can summarize essence of several issues; take and defend a position on them</li> <li>• Is able to evaluate political solutions, or scenarios using a series of different measures - e.g., economic, quality of life; number of individuals affected; political ramifications; etc.</li> </ul>	<p>Able to comment on major political issues, but is not familiar enough with them to defend a position on them</p> <ul style="list-style-type: none"> <li>• Can summarize the facts of the issues</li> <li>• Can only comment on possible alternative political solutions, or scenarios using a few different measures - e.g., economic, quality of life; number of individuals affected; political ramifications; etc.</li> </ul>	<p>Unable to comment on political solutions or is unaware of world and local happenings</p>



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**Outcome (k):** *an Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice*

### Rubric #11

	Satisfactory	Developing	Unsatisfactory
KPI (81)	Safe lab procedures are followed	Unsafe lab procedures observed infrequently	Practices unsafe, risky behaviors in lab
KPI (82)	Formulates an experimental plan of data gathering to attain a stated objective (develop correlation, test a model, ascertain performance of equipment, etc.)	Develops a simplistic experimental plan of data gathering, does not recognize entire scope of study (e.g. not all parameters affecting the results are investigated)	No systematic plan of data gathering; experimental data collection is disorganized, even random, and incomplete
KPI (83)	Carefully documents data collected	Data collected are not all documented, units are missing, or some measurements are not recorded	Data are poorly documented
KPI (84)	Develops and implements logical experimental procedures	Experimental procedures most often followed, but occasional oversight leads to loss of experimental efficiency and/or loss of data	Does not follow experimental procedure
KPI (85)	Is able to learn and implement civil simulation software. Uses computer-based and other resources effectively in assignments/projects.	Needs some guidance in selecting and implementing appropriate equipment and simulation tools	Cannot select the appropriate equipment and simulation tools required to run the experiment(s)
KPI (86)	Is confident in operation of instruments and process equipment. Maintains current, state-of-the-art abilities in PC use	Is tentative in operation of instruments and process equipment	Does not operate instrumentation and process equipment, does so incorrectly or requires frequent supervision

KPI (87)	Applies appropriate theory to data and interprets physical significance of theory or variable involved	Applies appropriate theory to data when prompted to do so, but misinterprets physical significance of theory or variable involved; makes errors in unit conversions	Makes no attempt to relate data to theory
KPI (88)	Is aware of measurement error and does account for it statistically	Is aware of measurement error but does not account for it statistically or does so at a minimal level	Is unaware of measurement error
KPI (89)	Seeks information on problems from multiple resources	Seeks information for experiment(s) from a few sources - mainly from the textbook or the instructor	Seeks no extra information for experiments other than what is provided by instructor

## Civil Engineering Program - CE- Rubrics

### **Outcome (a): an ability to apply Knowledge of mathematics, science and engineering**

**KPI (1):** Apply mathematical and scientific principles to formulate models and systems relevant to civil engineering

**KPI (2):** solve computer engineering problems by using the concepts of integral and differential calculus and/or linear algebra

**KPI (3):** appropriate engineering interpretation of mathematical and scientific terms

**KPI (4):** Translates academic theory into engineering applications

**KPI (5):** Executes calculations correctly

**KPI (6):** Analyzing data using statistical concepts

### **Outcome (b): An ability to design and conduct experiments, analyze and interpret data**

**KPI (7):** laboratory safety procedures

**KPI (8):** experimental plan of data gathering

**KPI (9):** Data documentation

**KPI (10):** Development and implementation of logical experimental procedures

**KPI (11):** Selection of appropriate equipment and instruments to perform the experiment

**KPI (12):** Operation of instrumentation and process equipment

**KPI (13):** The analysis and interpretations of data using appropriate theory

**KPI (14):** Awareness of measurement errors

**KPI (15):** Seeking information for the experiment

**Outcome (c): An ability to design a system, component or process to meet desired needs within realistic constraints**

**KPI (16):** Developing a design strategy

**KPI (17):** Use of approaches

**KPI (18):** Developing solutions

**KPI (19):** Understanding how areas interrelate and demonstrates ability to integrate prior knowledge into a new problem

**KPI (20):** Using computer engineering tools

**KPI (21):** Supporting design procedure with documentation and references

**KPI (22):** Developing a solution that includes realistic constraints

**KPI (23):** Applying engineering and/or scientific principles correctly to design practical processes

**KPI (24):** Recognizing practical significance of design outcome/answer

**KPI (25):** Thinking holistically

**Outcome (d): The ability to function on multidisciplinary teams**

**KPI (26):** Presentation and workload contribution

**KPI (27):** Preparation for group meetings

**KPI (28):** Cooperation

**KPI (29):** Sharing credit of success

**KPI (30):** Sharing information and providing Assistant

**KPI (31):** Role in a group

**KPI (32):** Encouraging participation among all team members

**KPI (33):** Conflict Resolution

**KPI (34):** Courteous group member

**KPI (35):** Knowledge of technical skills, to disciplines outside of civil engineering

**Outcome (e): An ability to identify, formulate, and solve engineering problems**

**KPI (36):** Solutions creativity alternatives

**KPI (37):** practical problem solving using theoretical concepts

**KPI (38):** predict and defend problem outcomes

**KPI (39):** The uses of appropriate resources needed to solve problems

**KPI (40):** The integration of new information with previous knowledge

**KPI (41):** The understanding of how various pieces of the problem relate to each other and the whole

**KPI (42):** Strategies for solving problems

**KPI (43):** Correction of the answer

**KPI (44):** Solutions: other ways

**Outcome (f): An understanding of professional and ethical responsibility**

**KPI (45):** Civil Engineering code of Ethics understanding

**KPI (46):** In class discussions and exercises on ethics and professionalism

**KPI (47):** Ethical behavior among peers and faculty

**KPI (48):** Personal responsibility for his/her actions

**KPI (49):** Punctual, professional, and collegial

**KPI (50):** The use of facts and a professional code of ethics to Evaluate a situation in practice or as a case study

**KPI (51):** The use of personal value system to support actions, and the understanding of the role of professional ethical standards for corporate

**Outcome (g): An ability to communicate effectively (written)**

**KPI (52):** Articulation of ideas

**KPI (53):** The organization of the written materials

**KPI (54):** The Use of graphs, tables, and diagrams

**KPI (55):** The presentation of the written work

**KPI (56):** Grammar and spelling

**KPI (57):** Figures format

**KPI (58):** Writing style

**KPI (59):** Prescribed format (if any)

**Outcome (g'): An ability to communicate effectively (oral)**

**KPI (60):** Oral presentation delivery

**KPI (61):** Presentation details and appropriate technical content for the time constraint and the audience

**KPI (62):** Presentation mechanical aspects

**KPI (63):** English language

**KPI (64):** Visual aides

**KPI (65):** Appearance

**KPI (66):** Questions

**Outcome (h):** the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context

**KPI (67):** Awareness of current trends and events

**KPI (68):** Historical aspects of engineering solutions

**KPI (69):** Technical periodicals

**KPI (70):** Personal Perspective in civil engineering

**Outcome (i):** a recognition of the need for and an ability to engage in lifelong learning

**KPI (71):** Independent learning

**KPI (72):** Assignment completion

**KPI (73):** Continuous improvement

**KPI (74):** Capability to think for one's self

**KPI (75):** Responsibility for creating one's own learning opportunities

**KPI (76):** Applying learned materials and concepts in a format different from that taught in class

**KPI (77):** Participation in professional and technical societies

**Outcome (j):** a knowledge of contemporary issues

**KPI (78):** knowledge of current events in the computer engineering discipline

**KPI (79):** Current job market

**KPI (80):** Ability to discuss major political issues at national, state and local levels

**Outcome (k): Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice**

**KPI (81):** Lab procedure

**KPI (82):** experimental plan of data gathering

**KPI (83):** Data documentation

**KPI (84):** Development and implementation of logical experimental procedures

**KPI (85):** Simulation Tools

**KPI (86):** Instruments Operation

**KPI (87):** Relate data to theory

**KPI (88):** Measurement awareness of errors

**KPI (89):** Seeking information

a	An ability to apply Knowledge of mathematics, science and engineering
b	An ability to design and conduct experiments, analyze and interpret data
c	An ability to design a system, component or process to meet desired needs within realistic constraints
d	The ability to function on multidisciplinary teams
e	An ability to identify, formulate, and solve engineering problems
f	An understanding of professional and ethical responsibility
g	An ability to communicate effectively
h	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context
i	A recognition of the need for and an ability to engage in lifelong learning
j	A knowledge of contemporary issues
k	Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice