RUBRICS FOR THE STUDENT OUTCOMES

STUDENT OUTCOME 1: An ability to apply knowledge of mathematics, science, and engineering						
PI #	**Performance Indicator [Weight]**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**Score**
		1 point	***2 points***	***3 points***	***4 points***	Max
PI1	**Application of Mathematics in Environmental Engineering Problem Analysis [2]**	Does not understand the connection between mathematical interpretation and chemical, physical, and/or biological processes and systems in environmental engineering and mathematical terms are interpreted incorrectly or not at all.	Not quite able to mathematically analyze environmental problems; occasionally utilizes incorrect math expressions; to some degree able to utilize calculus and complex variables in Environmental Engineering.	Reasonably able to mathematically analyze environmental engineering systems; utilizes correct math expressions most of the time; reasonably able to utilize calculus and complex variables in problem analysis.	Excellently combines mathematical and/or scientific principles to formulate models of chemical and/or physical and/or biological processes and/or systems relevant to Environmental Engineering problems	**8**
PI2	**Application of Scientific and Engineering Principles [1]**	Poor ability to combine scientific and engineering principles to formulate a mathematical model; has poor ability to formulate/distinguish chemical/physical and/or biological processes and systems models.	Can, to some degree, combine scientific and engineering principles to formulate a system model; to some degree able to formulate chemical/physical and/or biological processes and systems models.	Reasonably able to combine scientific and engineering principles to formulate a mathematical model; reasonably able to formulate chemical/ physical and/or biological processes and/or systems models	Quite able to combine scientific and engineering principles to formulate a solution model ; Quite able to formulate models of chemical, physical/ and/or biological processes and/or systems relevant to Environmental Engineering	**4**
PI3	**Subject Knowledge [1]**	Command of the course is generally poor; unable to analyze problems; Most of the time connection between problems and their solutions cannot be evaluated.	Has some command of the course; generally, understands fundamental concepts; able to analyze problems; but has some problems with reaching the solution. Occasionally incomplete/erroneous solutions are presented.	Has reasonable command of the course; understands fundamental concepts and their implications; generally able to analyze problems; utilize reasonably clear approaches and solutions.	Has full command of the course; understands all fundamental concepts and their implications; quite able to analyze problems; utilizes efficient approaches. Also solutions are always clearly presented.	**4**
OVERALL PERFORMANCE		**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED		**0-4**	**5-8**	**9-12**	**13-16**	**16**

STUDENT OUTCOME 2: An ability to design and conduct experiments, as well as to analyze and interpret data						
PI #	**Performance Indicator [Weight]**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**Score**
		1 point	***2 points***	***3 points***	***4 points***	Max
PI1	**Designing Experiment** **[1]**	Inability 1- to identify experimental goals; 2- to describe the experimental process and methods; 3- to specify procedures, equipment, tools and materials (0-24% achievement)	Independently and/or as a part of a team 1- to identify experimental goals; 2- to describe the experimental process and methods; 3- to specify procedures, equipment, tools and materials with major errors (25-49% achievement)	Independently and/or as a part of a team 1- to identify experimental goals; 2- to describe the experimental process and methods; 3- to specify procedures, equipment, tools and materials with moderate errors (50-74% achievement)	Independently and/or as a part of a team 1- to identify experimental goals 2- to describe the experimental process and methods; 3- to specify procedures, equipment, tools and materials with minor errors (75-100% achievement)	**4**
PI2	**Conducting Experiment** **[1]**	Inability 1- to follow the procedure; 2- to set-up of experiment; 3- to systematically and accurately collect date (0-24% achievement)	Independently and/or as a part of a team 1- to follow the procedure; 2- to set-up of experiment; 3- to systematically and accurately collect date with major errors (25-49% achievement)	Independently and/or as a part of a team 1- to follow the procedure; 2- to set-up of experiment; 3- to systematically and accurately collect date with moderate errors (50-74% achievement)	Independently and/or as a part of a team 1- to follow the procedure; 2- to set-up of experiment; 3- to systematically and accurately collect date with minor errors (75-100% achievement)	**4**
PI3	**Analyzing Data** **[1]**	Inability 1- to document collected date; 2- to calculate measurement errors systematically and to incorporate into data analysis; 3- to report data properly (0-24% achievement)	Independently and/or as a part of a team 1- to document collected date; 2- to calculate measurement errors systematically and to incorporate into data analysis; 3- to report data properly with minor errors (25-49% achievement)	Independently and/or as a part of a team 1- to document collected date; 2- to calculate measurement errors systematically and to incorporate into data analysis; 3- to report data properly with moderate errors (50-74% achievement)	Independently and/or as a part of a team 1- to document collected date; 2- to calculate measurement errors systematically and to incorporate into data analysis; 3- to report data properly with minor errors (75-100% achievement)	**4**
PI4	**Interpreting Data** **[1]**	Inability 1-to evaluate data, 2- to discuss data using related literature, 3- to compose a "1-sentence take-home message" about the experiment (0-24% achievement)	Independently and/or as a part of a team 1-to evaluate data, 2- to discuss data using related literature, 3- to compose a "1-sentence take-home message" about the experiment; with an ordinary perspective (25-49% achievement)	Independently and/or as a part of a team 1-to evaluate data, 2- to discuss data using related literature, 3- to compose a "1-sentence take-home message" about the experiment; with a scientific perspective (50-74% achievement)	Independently and/or as a part of a team 1- to evaluate data, 2- to discuss data using related literature, 3- to compose a "1-sentence take-home message" about the experiment; with a scientific and creative perspective (75-100% achievement)	**4**
OVERALL PERFORMANCE		**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED		**0-4**	**5-8**	**9-12**	**13-16**	**16**

STUDENT OUTCOME 3: An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability						
PI #	**Performance Indicator [Weight]**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**Score**
		1 point	***2 points***	***3 points***	***4 points***	Max
PI1	**Design Strategy [1]**	No design strategy; haphazard approach	Aware of strategies explicitly mentioned, but does not formulate strategies	Uses a design strategy with guidance	Develops a design strategy	**4**
PI2	**Engineering Application [2]**	No application of engineering and/or scientific principles	Applies engineering and/or scientific principles incompletely or incorrectly to design a practical process	Demonstrates rudimentary application of engineering and/or scientific principles	Applies engineering and/or scientific principles correctly to design practical processes	**8**
PI3	**Solutions [2]**	Unable to find solution	Only focuses on one solution to a problem; no optimization attempted	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	Develops several potential solutions and finds optimum	**8**
PI4	**Evaluate Results [2]**	Unable to determine whether a design is successful	Able to identify success or failure, but unable to interpret causes of poor performance	Successfully evaluates and interprets performance and uses the results to guide design process	Evaluates performance, gains insight into design and uses new insight to re-assess design strategy	**8**
PI5	**Tools [1]**	No use of computer tools and engineering resources	Incorrect use of computer tools and engineering resources	Minimal use of computer tools and engineering resources	Uses computer tools and engineering resources effectively	**4**
PI6	**Design Drawings [1]**	No design solution, or draws solution that is unsupported by design needs	Drawings is inaccurate	Drawings is incomplete	Draws accurate solutions supported by design needs	**4**
PI7	**Documentation [1]**	Incomplete documentation	Design is done, but procedures and equations are not documented or referenced	Design is done incompletely without the proper equations and without references	Supports design procedure with documentation and references	**4**
OVERALL PERFORMANCE		**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED		**0-10**	**11-20**	**21-30**	**31-40**	**40**

STUDENT OUTCOME 4: An ability to function on multidisciplinary teams						
PI #	**Performance Indicator [Weight]**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**Score**
		1 point	***2 points***	***3 points***	***4 points***	Max
PI1	**Focus on the task [1]**	Rarely focuses on the task and does not have any idea about what needs to be done. Talks about irrelevant issues and causes distraction.	Focuses on the task some of the time. Other group members must occasionally warn and remind this person to stay focused on the task.	Focuses on the task and has an idea about what needs to be done most of the time. Other members can count on this person.	Consistently stays focused on the task, understands what needs to be done and is always on top of things. Very self-directed.	**4**
PI2	**Contribution to the multidisciplinary team work [2]**	Does not collect any relevant information for the team, does not contribute to the multidisciplinary team work, no useful suggestions to address the team's needs.	Collects information only when requested. Tries to contribute and offer some ideas, but not well developed and not clearly expressed.	Collects basic, useful information related to the project, occasionally offers useful ideas to meet the team's needs.	Collects and presents a lot of relevant information. Offers well-developed and clearly expressed ideas directly related to the group's purpose.	**8**
PI3	**Taking responsibility [1]**	Does not perform assigned tasks, often misses meetings and, when present, does not have anything constructive to say. Relies on others to do the work.	Performs assigned tasks but needs many reminders, attends meetings regularly but generally does not say anything constructive, sometimes expects others to do his/her work.	Performs assigned tasks satisfactorily, attends meetings regularly, is generally reliable and usually participates effectively.	Performs all tasks very effectively, attends all meetings, is very reliable and exhibits leadership skills.	**4**
PI4	**Communication with other team members [2]**	Often argues with team mates, doesn't let anyone else talk, occasional personal attacks and "put-downs", wants to have things done his way and does not listen to alternate approaches.	Usually does much of the talking, pay little attention when others talk, and often assumes their ideas will not work. No personal attacks but sometimes patronizing.	Generally, listens to others' points of view, always uses appropriate and respectful language. Tries to make a definite effort to understand others' ideas.	Always listens to others and their ideas, helps them develop their ideas while giving them full credit, always helps the team reach a fair decision.	**8**
OVERALL PERFORMANCE		**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED		**0-6**	**7-12**	**13-18**	**19-24**	**24**

STUDENT OUTCOME 5: An ability to identify, formulate, and solve engineering problems						
PI #	**Performance Indicator [Weight]**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**Score**
		1 point	***2 points***	***3 points***	***4 points***	Max
PI1	**Identification of the problem [1]**	Most students are unable to identify problems (even those that were explicitly discussed in class)	Most students struggle with identification of the problem	Most students identify and describe issues associated with the situation of interest	Most students identify and describe issues associated with the situation of interest and assemble new information from multiple sources	**4**
PI2	**Formulation of the problem [1]**	Most students are unable to describe environmental engineering problem solving approaches	Most students struggle with the identification of engineering principles necessary for formulation of the problem	Most students demonstrate sufficient ability to formulate the problem by using basic mathematical, science and engineering knowledge	In addition to formulation of the problem, most students examine different approaches to solving the problem in order to choose the more effective approach	**4**
PI3	**Solution to the problem [1]**	Most students are unable to provide a correct answer/solution	Most students are able to provide a nearly correct answer within reasonable and logical range, but need improvement on problem solving ability	Most students demonstrate clear ability to solve problems	In addition to providing a solution, most students assess solutions relative to measures of effectiveness and feasibility	**4**
OVERALL PERFORMANCE		**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED		**0-3**	**4-6**	**7-9**	**10-12**	**12**

STUDENT OUTCOME 6: An understanding of professional and ethical responsibility						
PI #	**Performance Indicator [Weight]**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**Score**
		1 point	***2 points***	***3 points***	***4 points***	Max
PI1	**Understand the code of ethics for environmental engineers [2]**	No/limited awareness about professional ethics and specifically for environmental engineering profession	Generally aware of professional ethics but not specifically explain the ethical codes for environmental engineering profession	Somewhat aware of the concept of code of ethics for environmental engineering but cannot fully explain the concept	Fully aware of the concept of code of ethics for environmental engineering and can explain the concept efficiently	**8**
PI2	**Define and evaluate the environmental ethical issues concerning a decision [1]**	No evidence in defining and evaluating environmental ethical issues Incapable of answering any questions related to the subject	Serious deficiencies in defining and evaluating environmental ethical issues Only rudimentary questions are answered. Not able to elaborate or explain the subject	Reasonable understanding and mostly effective in defining and evaluating the environmental ethical issues Most decisions and recommendations are supported and can be justified. Some elaboration and explanations about the subject is given	Clear and complete understanding in defining and evaluating the environmental ethical issues Decisions and recommendations are supported and discussed along with the elaboration and explanation of the subject	**4**
PI3	**Acknowledge the others work consistently [1]**	Acknowledge himself/herself and omits others/teammates	Unfair acknowledgement of others/teammates	Fairly consistent acknowledgement of others/teammates	Fully consistent acknowledgement of others/teammates	**4**
OVERALL PERFORMANCE		**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED		**0-4**	**5-8**	**9-12**	**13-16**	**16**

STUDENT OUTCOME 7: An ability to communicate effectively

PI #		Performance Indicator [Weight]	Unsatisfactory	Developing	Satisfactory	Outstanding	Score
			1 point	*2 points*	*3 points*	*4 points*	Max
PI1	ORAL PRESENTATION	**Organization [1]**	Poor or non-existent organization. Does not clearly introduce the purpose of the presentation Presentation is choppy and disjointed; no apparent logical order of presentation. Ends without a summary or conclusion.	Somewhat organized. Introduces the purpose of the presentation Student jumps around topics. Several points are confusing. Ends with a summary or conclusion; little evidence of evaluating content based on evidence.	Generally well organized. Introduces the purpose of the presentation clearly. Most information presented in logical sequence; A few minor points may be confusing. Ends with an summary of main points showing some evaluation of the evidence presented	Extremely well organized. Introduces the purpose of the presentation clearly and creatively. Student presents information in logical, interesting sequence which audience can follow. Ends with an accurate conclusion showing thoughtful, strong evaluation	4
PI2		**Content [1]**	No reference is made to literature or theory. Thesis not clear; information included that does not support thesis in any way.	Explanations of concepts and/or theories are inaccurate or incomplete. Little attempt is made to tie in theory. There is a great deal of information that is not connected to the presentation thesis.	For the most part, explanations of concepts and theories are accurate and complete. Some helpful applications of theory are included.	Speaker provides an accurate and complete explanation of key concepts and theories, drawing upon relevant literature. Applications of theory are included to illuminate issues.	4
PI3		**Research Effort [1]**	Did not utilize resources effectively; did little or no fact gathering on the topic.	Used the material provided in an acceptable manner, but did not consult any additional resources.	Did a very good job of researching; utilized materials provided to their full potential; solicited one type of research to enhance project; at times took the initiative to find information outside of the school.	Went above and beyond to research information; solicited material in addition to what was provided; brought in personal ideas and information to enhance project; and utilized more than one types of resources to make project effective.	4
PI4		**Use of Communication Aids [1]**	Student uses superfluous graphics, no graphics, or graphics that are so poorly prepared that they detract from the presentation. Font is too small to be easily seen	Occasional use of graphics that rarely support presentation thesis; visual aids were not colorful or clear Choppy, time wasting use of multimedia; lacks smooth transition from one medium to another. Font is too small to be easily seen.	While graphics relate and aid presentation thesis, these media are not as varied and not as well connected to presentation thesis. Font size is appropriate for reading.	Graphics are designed reinforce presentation thesis and maximize audience understanding; use of media is varied and appropriate with media not being added simply for the sake of use. Visual aids were colorful and large enough to be seen by all be even	4
PI5		**Use of Language [1]**	Presenter is obviously anxious and cannot be heard or monotone with little or no expression.	Audience occasionally has trouble hearing the presentation; seems uncomfortable.	Clear articulation but not as polished; slightly uncomfortable at times Most can hear presentation.	Poised, clear articulation; proper volume; steady rate; enthusiasm; confidence; speaker is clearly comfortable in front of the group.	4
PI6		**Eye Contact [1]**	Student reads all or most of report with no eye contact.	Some eye contact, but not maintained and at least half the time reads most of report	Student maintains eye contact most of the time but frequently returns to notes.	Maintains eye contact; seldom returning to notes; presentation is like a planned conversation.	4
PI7		**Questions and Answers [1]**	Demonstrates incomplete knowledge of the topic by responding inaccurately and inappropriately to questions.	Demonstrates some knowledge of rudimentary questions by responding accurately to questions.	Demonstrates knowledge of the topic by responding accurately and appropriately addressing questions. At ease with answers to all questions but fails to elaborate.	Demonstrates extensive knowledge of the topic by responding confidently, precisely and appropriately to all audience questions.	4
PI8		**Length of Presentation [1]**		Within 2-5 minutes of allotted time +/–	Within 2 minutes of allotted time +/–	Within 30 seconds of allotted time +/–	4
OVERALL PERFORMANCE			**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED			**0-8**	**9-16**	**17-24**	**25-32**	**32**

STUDENT OUTCOME 7: An ability to communicate effectively							
PI #		**Performance Indicator [Weight]**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**Score**
			1 point	***2 points***	***3 points***	***4 points***	Max
PI1	**WRITTEN REPORT**	**Statement of Purpose [1]**	Generally unclear; Incomplete, unfocused, or absent.	Not consistently clear; stated in a single sentence.	Clear but may sometimes digresses in the paper ; stated in a single sentence.	Readily apparent to the reader; concisely stated in a single sentence, which is engaging, and thought provoking.	**4**
PI2		**Content [1]**	No reference is made to literature or theory. Thesis not clear; information included that does not support thesis in any way.	Explanations of concepts and/or theories are inaccurate or incomplete. Little attempt is made to tie in theory. There is a great deal of information that is not connected to the thesis.	For the most part, explanations of concepts and theories are accurate and complete. Some helpful applications of theory are included.	The report provides an accurate and complete explanation of key concepts and theories, drawing upon relevant literature. Applications of theory are included to illuminate issues.	**4**
PI3		**Organization [1]**	Ideas are not logically. organized.	In general, ideas are arranged logically, but sometimes ideas fail to make sense together.	The ideas are arranged logically to support the central purpose.	The ideas are arranged logically to support the purpose. Transitions link paragraphs. It's easy to follow the line reasoning.	**4**
PI4		**Conclusion [1]**	There is little or no indication that the writer tried to synthesize the information or draw conclusions based on the literature; no suggestions for future research.	Some of the conclusions, however, are not supported; weak or trite suggestions for future research.	Some of the conclusions, however, are not supported. Suggestions for future research offered.	The writer makes succinct and precise conclusions based on the review of literature. Suggestions for future research offered.	**4**
PI5		**Reference Quality [1]**	There are virtually no sources that are professionally reliable. Over-reliance on tertiary sources; spotty documentation of facts in text.	Most of the references are from sources that are not peer reviewed and have uncertain reliability. Several relevant secondary sources, more than one tertiary source; some facts not referenced; displays minimal effort in selecting quality sources.	Although most of the references are professionally legitimate, a few are questionable (e.g., trade books, internet sources, popular magazines, …) Several relevant secondary sources, revealing adequate research.	References are primarily peer reviewed professional journals or other approved sources; Numerous relevant scholarly sources (and primary sources, where available and appropriate) demonstrating extensive, in-depth research; little reliance on tertiary sources.	**4**
PI6		**Citation Format [1]**	Format of the document is not recognizable as approved format; References or Works Cited list were not cited in the text. pattern of citation errors.	There are several errors in the approved format. References or Works Cited list were not cited in the text.	The approved format is used with minor errors. Some formatting problems exist, or some components are missing. No more than one or two citation errors.	Approved format is used accurately and consistently in the paper and on the "References" page. The references in the list match the in-text citations and all were properly encoded in the format.	**4**
OVERALL PERFORMANCE			**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED			**0-6**	**7-12**	**13-18**	**19-24**	**24**

STUDENT OUTCOME 8: The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context						
PI #	**Performance Indicator [Weight]**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**Score**
		1 point	***2 points***	***3 points***	***4 points***	Max
PI1	**Identify key terms in terms of societal, global and economical, context. [2]**	No/limited awareness about environmental policies based on main factors such as societal, economical, technical etc.	Generally aware of environmental policies but not specifically explain the related main factors/subfactors.	Somewhat aware of the assessment of main factors for decision makers of environmental policies but cannot fully explain the multicriteria decision analysis.	Fully aware of the assessment of main factors for decision makers of environmental policies and can explain the multicriteria decision analysis.	**8**
PI2	**Demonstrate societal, global, and economic impacts of engineering projects. [1]**	No evidence in future or implemented environmental policies. Incapable of answering any questions related to the subject.	Serious deficiencies in establishing a new environmental policy. Only rutin questions on existing policies are answered.	Reasonable understanding and mostly effective in establishing the environmental policies. Holistic approach is made but most decisions and recommendations cannot be proved.	Clear and complete understanding in steps of the environmental ethical policies. Decisions and recommendations are supported by proving of the outcomes related target and objectives of the plans.	**4**
OVERALL PERFORMANCE		**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED		**0-3**	**4-6**	**7-9**	**10-12**	**12**

STUDENT OUTCOME 9: A recognition of the need for, and an ability to engage in life-long learning						
PI #	**Performance Indicator [Weight]**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**Score**
		1 point	**2 points**	**3 points**	**4 points**	Max
PI1	**Following up of the scientific/professional literature, the technological developments and the modern engineering tools [2]**	No/limited knowledge and evidence in following up on contemporary environmental issues	Generally aware of environmental issues and problems but not deeply concern for technological developments	following related literature but not enough knowledge about engineering tools and contemporary developments	following and completely understanding of environmental engineering problems equipped and supported with new engineering tools, developments and literature	**8**
PI2	**Attendance to seminars, conferences, workshops and exhibitions and professional memberships relating to the field [1]**	No attendances to environmental activities and no professional membership	No engagements to environmental organizations and associations, informed about environmental engineering related meetings and seminars but no attendances	No engagements to environmental organizations and associations, attendance to environmental related meetings at least once a term period	attendance to one meeting and one symposium per semester and membership to national or international organizations related in environmental areas	**4**
PI3	**Subscription to environmental related professional magazines, periodicals, journals, etc. [1]**	no subscription to any national or international publications	one national environmental issues related magazine subscription but no regular reading and following other environmental related publications	one national and one international environmental profession related journal subscription but no reading regularly other published articles, papers, publications, etc., related to environmental issues	at least two national and one international profession related journal or periodical subscription and also reading regularly other published articles, papers, magazines, etc., related to national and international environmental issues,	**4**
OVERALL PERFORMANCE		**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED		**0-4**	**5-8**	**9-12**	**13-16**	**16**

STUDENT OUTCOME 10: A knowledge of contemporary issues						
PI #	**Performance Indicator [Weight]**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**Score**
		1 point	***2 points***	***3 points***	***4 points***	Max
PI1	**Following up the major political issues at national and international levels [1]**	No/limited awareness about major political issues at neither national nor international level.	Generally aware of major political issues at national or international levels but cannot specifically list or describe major political issues.	Aware of the major political issues at national and international levels.	Can list, describe and discuss major political issues at national and international levels.	**4**
PI2	**Ability to describe the impact of major political issues on the practice of environmental engineering [1]**	Little or no understanding of (or interest in) the major political issues directly related to the practice of environmental engineering.	Moderate understanding of the impacts of several of the major political issues on the practice of environmental engineering.	Able to describe the impacts of several of the major political issues on the practice of environmental engineering.	Able to discuss, in-depth, the major political issues and summarize the impacts on the practice of environmental engineering.	**4**
PI3	**Awareness of the major economic issues influencing environmental engineering applications [1]**	No knowledge of economic concerns for environmental engineering applications.	Some understanding of the economic concerns influencing environmental engineering applications.	Good understanding of economic issues influencing environmental engineering applications.	Recognize and identify major economic issues and their influences on environmental engineering applications.	**4**
PI4	**Awareness of environmental issues in ethical, societal and global context [1]**	Unable to describe environmental issues in ethical, societal and global context.	Has a narrow perspective on environmental issues in ethical, societal and global context.	Able to explain environmental issues in ethical, societal and global context.	Has a deep understanding of the immediate and long-term environmental issues in ethical, societal and global context.	**4**
OVERALL PERFORMANCE		**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED		**0-4**	**5-8**	**9-12**	**13-16**	**16**

STUDENT OUTCOME 11: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice						
PI #	**Performance Indicator [Weight]**	**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**Score**
		1 point	***2 points***	***3 points***	***4 points***	Max
PI1	**Finding needed information/outside resources [1]**	Often does not even use the course textbook to help solve problems or homework	Looks only to class resources in solving problems and homework	Seeks information on problems from limited resources	Seeks information on problems from multiple resources	**4**
PI2	**Interpreting needed information/outside resources [2]**	Is not willing to use outside resources unless required	Requires assistance in interpretation of information from a small number of outside resources	Is able to interpret and understand information from limited number of outside resources	Is able to interpret and understand information from a variety of resources	**8**
PI3	**Selecting/using tools [2]**	Is not able to identify and/or use the right tools for a particular problem or project	Needs some guidance in selecting and/or using appropriate tools for a particular problem or project	Can usually identify and/or use tools that might fit a particular problem or project	Can identify and/or use appropriate tools effectively in assignments or projects	**8**
PI4	**Computer skills [1]**	Struggles with simple tasks in PC use and/or is unable to use current software packages	Can perform simple tasks requiring PC use and /or use of current software packages	Can perform necessary tasks requiring PC use and /or use of current software packages	Maintains current, state-of-the-art abilities in PC use and use of current software package	**4**
PI5	**Using specialized engineering tools, such as simulations, graphical techniques, etc. [2]**	Uses in assignments or classroom work when guided by the instructor	Uses in assignments or classroom work without help of the instructor	Uses in design projects where the professor chooses, restricts, or helps in the selection of the tools. Students analyze and validate the results.	Uses in design projects where students make an appropriate choice of the tool. Students analyze and validate the results.	**8**
PI6	**Using other modern tools and instruments for Environ Engineering applications [1]**	Cannot use other modern tools and instruments for Environmental Engr.	Poor or improper use of other modern tools and instruments for Environmental Engr.	Satisfactory use of other modern tools and instruments for Environmental Engr.	Extensive use of other modern tools and instruments for Environmental Engr.	**4**
PI7	**Using library resources [1]**	Does not use the library	Requires assistance in locating materials from the library	Understand the use of the library	Understand the organization and use of the library	**4**
OVERALL PERFORMANCE		**Unsatisfactory**	**Developing**	**Satisfactory**	**Outstanding**	**TOTAL**
POINTS REQUIRED		**0-10**	**11-20**	**21-30**	**31-40**	**40**