

Mappings – PEOs to SOs

Program Education Objectives (PEOs) or “Unit Goals”:

1. Graduates will be competent professionals, able to:
 - a) Employ a pallet of multiple hardware platforms and software development environments, integrated with the appropriate theoretical constructs, to develop practical solutions to technological problems, (b) Deploy those solutions, and (c) Provide for their maintenance and administration.
2. Graduates will be able to effectively integrate research methods, appropriate theory, and computational technology to analyze and solve problems encountered in the development of technological solutions.
3. Graduates will be able to assimilate new methodologies and advances in computer technology in an ever-evolving discipline.
4. Graduates will be effective in the elicitation of requirements for a software specification, and the written and oral communication of results to technical and non-technical colleagues and clients.
5. Graduates will be able to work independently and in collaboration with colleagues.
6. Graduates will be able to integrate the ethical standards of the profession and their professional knowledge and skills to contribute to society.

Student Outcomes (SOs) or “Measureable Outcomes”:

The nine student outcomes, encompassing all the ABET outcomes for Computer Science, are listed below:

- [a] An ability to apply knowledge of computing and mathematics appropriate to the discipline
- [b] An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- [c] An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- [d] An ability to function effectively on teams to accomplish a common goal
- [e] An understanding of professional, ethical, legal, security and social issues and responsibilities
- [f] An ability to communicate effectively with a range of audiences
- [g] An ability to analyze the local and global impact of computing on individuals, organizations, and society
- [h] Recognition of the need for and an ability to engage in continuing professional development
- [i] An ability to use current techniques, skills, and tools necessary for computing practice.
- [j] An ability to use and apply current technical concepts and practices in the core information technologies.
- [k] An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
- [l] An ability to effectively integrate IT-based solutions into the user environment.
- [m] An understanding of best practices and standards and their application.
- [n] An ability to assist in the creation of an effective project plan.

	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6
SO[a]	X	X	X			
SO[b]	X	X		X	X	
SO[c]		X		X		
SO[d]				X	X	
SO[e]						X
SO[f]				X		
SO[g]	X			X		
SO[h]		X				
SO[i]	X		X			
SO[j]	X	X				
SO[k]				X	X	
SO[l]	X	X		X		
SO[m]						X
SO[n]	X			X		X

Table [1] Program Educational Objectives and Student Outcomes

Mappings – Courses to SOs

Course	a	b	c	d	e	f	g	h	i	j	k	l	m	n
161	x	x	x						x	x				
257	x													
280	x	x	x						x	x				
285			x	x	x	x			x	x	x	x		x
290	x	x	x						x					
294	x		x			x		x	x	x		x		
315			x	x	x	x	x	x	x	x	x	x		
329			x		x							x	x	
375	x	x	x				x	x	x	x				
383	x	x	x	x	x	x			x	x	x	x		x
390	x	x	x						x	x				
391	x	x	x			x			x					
401		x	x					x	x	x				
409	x	x	x			x		x	x	x		x	x	
411	x	x	x	x		x		x	x	x	x	x	x	x
415		x	x					x	x	x	x	x	x	x
420			x	x	x	x			x	x	x	x	x	x
431	x	x	x					x	x	x		x		
439	x	x	x	x	x	x				x	x	x		
441	x	x	x	x				x	x	x				
447	x	x	x	x				x	x	x				
470	x	x	x	x				x	x	x				
479	x													
482	x				x		x	x					x	

Table [2] Course – Student Outcome Mapping

Specific Performance Indicators for each SO

(These are Measured by the Corresponding Rubric)

Student Outcomes	Performance Indicators
[a]	<ul style="list-style-type: none"> ● Students understand the foundations of math, logic, and statistics. ● Students can apply this knowledge to algorithm development. ● Students can apply this knowledge to data analysis.
[b]	<ul style="list-style-type: none"> ● Students are able to formulate and decompose a problem into appropriate components. ● Students are able to solicit and formulate software and hardware requirements specifications. ● Students are able to estimate resources required for the proposed solution.
[c]	<ul style="list-style-type: none"> ● Ability to Conceptualize ● Ability to Develop ● Ability to Validate
[d]	<ul style="list-style-type: none"> ● Organization and Responsibilities ● Interaction ● Productivity
[e]	<ul style="list-style-type: none"> ● Students will demonstrate understanding of intellectual property issues. ● Students will demonstrate working knowledge of a code of ethics. ● Students value fairness in making judgments involving discrimination between people and groups. ● Students appreciate the need for proper etiquette and proactive social behavior in professional situations.
[f]	<ul style="list-style-type: none"> ● Preparing Documents and Presentation Materials ● Presentation Delivery
[g]	<ul style="list-style-type: none"> ● Students will demonstrate understanding of various ways in which computing technology impacts individuals, organizations, and society. ● Students will demonstrate ability to analyze and reason about the impact of advances in computer technology ● Students will demonstrate an understanding of the responsibilities of a computing technology professional with respect to individuals and society
[h]	<ul style="list-style-type: none"> ● Students will demonstrate recognition of the need for continuing professional development ● Students will demonstrate familiarity with means for continuing professional development ● Students will demonstrate ability to independently identify and assimilate new information ● Students will demonstrate an ability to criticize and evaluate the quality of new information
[i]	<ul style="list-style-type: none"> ● Ability to do task-specific research to learn new techniques, skills, and tools. ● Students will demonstrate competence with multiple current platforms for computing and development. ● Students will demonstrate competence with a selected set of tools (defined in cooperation with advisory board)
[j]	<ul style="list-style-type: none"> ● Ability to identify and evaluate relevance of new technical concepts and practices in the core information technologies. ● Students will understand and be able to apply current technical concepts and practices in the core information technologies.
[k]	<ul style="list-style-type: none"> ● Students will demonstrate competence in the process of understanding and formally specifying user requirements ● Students will demonstrate use of tools for modeling user needs ● Students will demonstrate ability to develop software from user requirements
[l]	<ul style="list-style-type: none"> ● Students will demonstrate knowledge of current IT solutions ● Student will demonstrate ability to collect user requirements and recognize failures in existing IT solutions ● Student can apply knowledge of current technologies to integrate solutions
[m]	<ul style="list-style-type: none"> ●

[n]	<ul style="list-style-type: none"> • An ability to analyze problems, elicit and describe requirement specifications that are appropriate to the solutions. • An ability to design, code construct and evaluate a software system, process, module, or program to meet desired needs. • An ability to communicate effectively with a wide range of audiences.
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Table [3] Student outcomes and performance indicators

Rubric A

for assessing Student Outcome [a]

“An ability to apply knowledge of computing and mathematics appropriate to the discipline”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Students understand the foundations of math, logic, and statistics.	<ul style="list-style-type: none"> • Students are able to: <ul style="list-style-type: none"> • model and critique complex processes using math expressions, logic, and statistics; • construct formal proofs; • apply models to solve problems. 	<ul style="list-style-type: none"> • Students are able to <ul style="list-style-type: none"> • produce simplified models for processes • understand and reproduce mathematical definitions • apply standardized solution formulas. 	<ul style="list-style-type: none"> • Students are able to recite mathematical definitions but are unable to relate these concepts to typical problems instances. Students are unable to apply standard math techniques or formulas. 	
Students can apply this knowledge to algorithm development.	<ul style="list-style-type: none"> • Students can translate a complex model into code, analyze its complexity and efficiency, and provide formal verification of its correctness. 	<ul style="list-style-type: none"> • Students can implement mathematical algorithms and can correctly code logical expressions. 	<ul style="list-style-type: none"> • Students can implement limited mathematical solutions that operate correctly under normal conditions. 	
Students can apply this knowledge to data analysis.	<ul style="list-style-type: none"> • Students can use statistical concepts to characterize and interpret data and results and apply the conclusions to support algorithm development. 	<ul style="list-style-type: none"> • Students can apply elementary statistics to data sets and draw straightforward conclusions. 	<ul style="list-style-type: none"> • Students can recite definitions of statistical concepts but cannot draw valid conclusions from computed statistics. 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 20 or better.

Rubric B

for assessing Student Outcome [b]

“An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Students are able to formulate and decompose a problem into appropriate components.	<ul style="list-style-type: none"> • Students are able to decompose a problem for efficient implementation, modify the problem definition as new information arrives, and conduct feasibility studies. 	<ul style="list-style-type: none"> • Students are able to cast a problem as a computing problem, adequately decompose the problem into components, and formulate solution strategies. 	<ul style="list-style-type: none"> • Students are able to produce computing formulations only for simple problems that do not require decomposition. 	
Students are able to solicit and formulate software and hardware	<ul style="list-style-type: none"> • Students are able to develop comprehensive requirements specifications, flexibly integrate new information 	<ul style="list-style-type: none"> • Students are able to solicit requirements from users, seek information needed 	<ul style="list-style-type: none"> • Students are able to develop simple system requirements specifications. 	

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requirements specifications.	into them, and estimate behavior of possible solutions.	for the solution, and produce a specification document.		
Students are able to estimate resources required for the proposed solution.	<ul style="list-style-type: none"> Students are able to evaluate the space, time, and financial demands of the solution. 	<ul style="list-style-type: none"> Students are able to map problems components to appropriate languages, platforms, and hardware. 	<ul style="list-style-type: none"> Students are able to select adequate resources but their choices may not be the most practical or justified. 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 12 or better.

Rubric C for assessing Student Outcome [c]

“An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Ability to Conceptualize	<ul style="list-style-type: none"> Able to construct standard design documents to support the approach to a project. 	<ul style="list-style-type: none"> Able to produce an ad-hoc logical plan and organization of approach. 	<ul style="list-style-type: none"> Appreciated by project colleagues for contribution, but unable to document role. 	
Ability to Develop	<ul style="list-style-type: none"> Able to engage in research to find multiple alternatives to well-understood technologies and development methodologies, and use them to produce solutions to a problem. 	<ul style="list-style-type: none"> Able to apply software engineering principles to produce multiple solutions to a problem, using two or more high level languages. 	<ul style="list-style-type: none"> Able to produce code in a high-level language to implement a given solution to a problem. 	
Ability to Validate	<ul style="list-style-type: none"> Able to produce metrics for testing/verification and can identify and minimize sources of experimental uncertainty. 	<ul style="list-style-type: none"> Able to create a structured set of tests and use them to validate a system’s specifications and identify a system’s faults. 	<ul style="list-style-type: none"> Students are able to measure system performance 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 12 or better.

Rubric D for assessing Student Outcome [d]

“An ability to function effectively on teams to accomplish a common goal”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Organization and Responsibilities	<ul style="list-style-type: none"> Students recognize team dynamics and work in leadership and non-leadership roles. Students are able to delegate and accept responsibilities effectively. 	<ul style="list-style-type: none"> Students can demonstrate the ability to assume a designated role in the group 	<ul style="list-style-type: none"> Team Roles, leadership roles can be identified 	
Interaction	<ul style="list-style-type: none"> Students can value alternative perspectives 	<ul style="list-style-type: none"> Diversity of strengths mutually respected Sharing and acceptance of ideas 	<ul style="list-style-type: none"> Dominating individual; limits participation of others. Little contribution to group. Intolerant of other ideas and perspectives 	

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Productivity	<ul style="list-style-type: none"> • Students are competent with tools used for team projects. • Students can mentor others 	<ul style="list-style-type: none"> • Students can work with others on teams to solve computer system and software problems • Students can contribute a fair share to the project workload 	<ul style="list-style-type: none"> • Students can routinely present at team meetings or work sessions • Students can share information with others 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 20 or better.

Rubric E

for assessing Student Outcome [e]

“An understanding of professional, ethical, legal, security and social issues and responsibilities”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Students will demonstrate understanding of intellectual property issues.	<ul style="list-style-type: none"> Students can articulate understanding of multiple points-of-view in an intellectual property issue. 	<ul style="list-style-type: none"> Students can cite a particular point-of-view relating to an intellectual property issue. 	<ul style="list-style-type: none"> Students have no more than a personal opinion regarding intellectual property issues. 	
Students will demonstrate working knowledge of a code of ethics.	<ul style="list-style-type: none"> Students can identify and articulate appropriate elements of a code of ethics in reference to a specific situation. 	<ul style="list-style-type: none"> Students cite ad-hoc ethical standards or recognize elements of a code of ethics in reference to a situation. 	<ul style="list-style-type: none"> Students are unable to identify the ethical issues in a situation. 	
Students value fairness in making judgments involving discrimination between people and groups.	<ul style="list-style-type: none"> Students can recognize biases in decision-making, and can justify an appropriate bias and avoid an inappropriate bias. 	<ul style="list-style-type: none"> Students can recognize situations where discrimination can arise. 	<ul style="list-style-type: none"> Students are unable to recognize a situation where discrimination is an issue. 	
Students appreciate the need for proper etiquette and proactive social behavior in professional situations.	<ul style="list-style-type: none"> Students can suggest remedies for specific situations which create a hostile work environment. 	<ul style="list-style-type: none"> Students can recognize activities which create a hostile work environment. 	<ul style="list-style-type: none"> Students cannot recognize activities which create a hostile work environment. 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 15 or better.

Rubric F1

for assessing Student Outcome [f]

“An ability to communicate effectively with a range of audiences”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Preparing Documents and Presentation Materials	<ul style="list-style-type: none"> Citations provide insightful connections to existing work 	<ul style="list-style-type: none"> Presentation is free from distracting errors Citations provide accurate connections to existing work 	<ul style="list-style-type: none"> Presentation is organized Citations are inappropriate or incomplete 	
Presentation Delivery	<ul style="list-style-type: none"> Engaging the audience / motivate Answers technical and non-technical questions at the appropriate level for each. Visual aids are original and enhance the presentation 	<ul style="list-style-type: none"> Students will demonstrate ability to deliver formal oral presentations Appropriate visual aids are provided Answers questions 	<ul style="list-style-type: none"> Visual aids are distracting or non-existent Inadequate development No eye contact Improper tone of voice 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 15 or better.

Rubric F2 for assessing Student Outcome [f]

“An ability to communicate effectively with a range of audiences”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Document style and delivery	<ul style="list-style-type: none"> • Papers accepted • Using advanced tools for visualization, graphing, etc. 	<ul style="list-style-type: none"> • Adequately reporting technical material • Proper format is used for citations • Appropriate document style used 	<ul style="list-style-type: none"> • Able to appropriately document the requirements 	
Subject Knowledge	<ul style="list-style-type: none"> • Insightful connections to existing work are made • Communicates a clear, specific, and full understanding of the topic 	<ul style="list-style-type: none"> • Accurate connections to existing work are made; citations • Communicates adequate understanding of topic 	<ul style="list-style-type: none"> • Citations are inappropriate or incomplete • Communicates little or no understanding of topic 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 18 or better.

Rubric G for assessing Student Outcome [g]

“An ability to analyze the local and global impact of computing on individuals, organizations, and society”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Students will demonstrate understanding of various ways in which computing technology impacts individuals, organizations, and society.	<ul style="list-style-type: none"> • Key concepts, definitions, and facts associated with positive and negative impacts of computer technology are thoroughly identified, defined and described. • Significant facts and supporting details obtained through appropriate research are included and accurately described. • Has little or no factual inaccuracies. 	<ul style="list-style-type: none"> • Key concepts, definitions, and facts associated with positive and negative impacts of computer technology are adequately identified, defined and described. • Adequate attempts at supporting arguments based on facts or research 	<ul style="list-style-type: none"> • Given a scenario, student is not able to identify any key concepts or ways of potential impact of computing on individuals and society. • Supporting arguments are improvised and not based on facts or research. 	
Students will demonstrate ability to analyze and reason about the impact of advances in computer technology	<ul style="list-style-type: none"> • Identifies and logically organizes almost all relevant evidence. • Uses appropriate and comprehensive critical thinking skills and habits of mind to analyze, evaluate and synthesize evidence. • Reaches informed conclusions based on the evidence. 	<ul style="list-style-type: none"> • Identifies and organizes most of the relevant evidence. • Uses partial critical thinking skills and habits of mind to analyze, evaluate and synthesize evidence. • Reaches informed conclusions based on the evidence. 	<ul style="list-style-type: none"> • Identifies some relevant evidence. • Uses unclear, inappropriate or incomplete critical thinking skills and habits of mind to analyze, evaluate and synthesize evidence. • Reaches incomplete or inaccurate conclusions based on the evidence. 	
Students will demonstrate an understanding of the responsibilities of a computing technology professional with respect to individuals and society	<ul style="list-style-type: none"> • Students can recognize and suggest appropriate remedies for activities involving computing technology which affect adversely users of computing technology 	<ul style="list-style-type: none"> • Students can recognize activities involving computing technology which affect adversely users of computing technology, but cannot come up with adequate plans to counter them. 	<ul style="list-style-type: none"> • Students cannot recognize activities involving computing technology which affect adversely users of computing technology. 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 18 or better.

Rubric H for assessing Student Outcome [h]

“Recognition of the need for and an ability to engage in continuing professional development”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Students will demonstrate recognition of the need for continuing professional development	<ul style="list-style-type: none"> Students are able to identify the competencies and knowledge required by particular application domains 	<ul style="list-style-type: none"> Students are able to demonstrate knowledge of the history of computing and the rapidly evolving nature of the computing discipline. 	<ul style="list-style-type: none"> Students know what skill sets are currently desired by employers 	
Students will demonstrate familiarity with means for continuing professional development	<ul style="list-style-type: none"> Students can use libraries, online repositories, and web tools for effectively and efficiently identifying information pertinent to given target criteria 	<ul style="list-style-type: none"> Students are familiar with computer-related professional organizations (ACM, IEEE), publications, and conferences. Students know about various avenues for professional development past the undergraduate college experience. 	<ul style="list-style-type: none"> Students are not adequately familiar with computer-related professional organizations (ACM, IEEE), their chapters, publications, and conferences. Students are not adequately familiar with possible certifications 	
Students will demonstrate ability to independently identify and assimilate new information	<ul style="list-style-type: none"> Able to articulate how new information relates to prior knowledge. Appropriately categorizes and classifies information. Analyzes new content by decomposing, comparing and contrasting, recognizing patterns, and interpreting information. Able to draw reasonable generalizations on observations and research results. Able to gain in depth mastery of a new development tool without instructor guidance 	<ul style="list-style-type: none"> Able to access information effectively and efficiently from a variety of sources. Students demonstrate the ability to research topics using the web, library, and professional publications. Ability to determine pertinence and to organize logically almost all the results of his/her research. Able to gain limited working mastery of a new development tool without instructor guidance 	<ul style="list-style-type: none"> Limited ability to access information from a variety of sources. Limited ability to determine pertinence and to organize the results of his/her research. Able to gain working mastery of a new development tool only under instructor guidance. 	
Students will demonstrate an ability to criticize and evaluate the quality of new information	<ul style="list-style-type: none"> Students demonstrate ability to reflect on their learning process and their own understanding 	<p>Students demonstrate ability to reason by</p> <ul style="list-style-type: none"> questioning assumptions, using lateral thinking, and making inferences. 	<ul style="list-style-type: none"> Students do not question the authority of information source or are oblivious to it. 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 35 or better.

Rubric I for assessing Student Outcome [i]

“An ability to use current techniques, skills, and tools necessary for computing practice”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Ability to do task-specific research to learn new techniques, skills, and tools.	<ul style="list-style-type: none"> Students are able to research, identify, and learn to use new techniques and tools in non-trivial applications. 	<ul style="list-style-type: none"> Given specific tasks, students are able to research and successfully identify applicable and appropriate tools. Students are able to demonstrate understanding of their functionality and reason about suitability 	<ul style="list-style-type: none"> Students can collect information about relevant techniques and applicable tools but not able to discern functionality and reason about suitability 	
Students will demonstrate competence with multiple current platforms for computing and development.	<ul style="list-style-type: none"> Students are able to use at least two different hardware platforms for computing. Students are able to use at least two fundamentally different programming languages for computing. Students are able to use at least two different software development platforms. 	<ul style="list-style-type: none"> Students are able to use only one hardware platform or only one programming language or only one tool for software development. 	<ul style="list-style-type: none"> Students are aware of existing technology, but have limited experience utilizing it 	
Students will demonstrate competence with a selected set of tools (defined in cooperation with advisory board)	<ul style="list-style-type: none"> Students are well-read on the latest technology under development. Students can use most of the state-of-the-art techniques and tools in the field. 	<ul style="list-style-type: none"> Students are cognizant of a variety of state-of-the-art techniques and tools in the field, but they can only use a very limited subset of them. 	<ul style="list-style-type: none"> Students are cognizant of a few developments in techniques and tools in the field, but do not necessarily understand them well. 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 25 or better.

Rubric J for assessing Student Outcome [j]

“An ability to use and apply current technical concepts and practices in the core information technologies.”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Ability to identify and evaluate relevance of new technical concepts and practices in the core information technologies.	<ul style="list-style-type: none"> Students are able to research, identify, and learn to apply new technical concepts and practices in non-trivial applications. 	<ul style="list-style-type: none"> Given specific tasks, students are able to research and successfully identify applicable technical concepts and practices Students are able to demonstrate understanding of their relevance and reason about suitability 	<ul style="list-style-type: none"> Students can collect information about relevant applicable technical concepts and practices but not able to discern relevance and reason about suitability 	
Students will understand and be able to apply current technical concepts and practices in the core information technologies.	<ul style="list-style-type: none"> Students are able to explain current technical concepts and practices in the core information technologies. Students can apply most of the technical concepts and practices in the core information technologies. 	<ul style="list-style-type: none"> Students have basic knowledge of current technical concepts and practices in the core information technologies. Students can apply a limited subset of the technical concepts and practices in the core information technologies. 	<ul style="list-style-type: none"> Students are aware of some technical concepts and practices in the core information technologies, but knowledge is superficial. 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 11 or better.

Rubric K for assessing Student Outcome [k]

“An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
<ul style="list-style-type: none"> Students will demonstrate competence in the process of understanding and formally specifying user requirements 	<ul style="list-style-type: none"> Students understand the importance of good requirements specification and can produce formal documents related to requirements, feasibility, design, etc. They communicate effectively with the user to be sure that all parties can understand requirements. 	<ul style="list-style-type: none"> Students understand how to create formal documents related to specification of user requirements, but some elements are either missing or not stated clearly 	<ul style="list-style-type: none"> Students can specify some requirements, but are incomplete or vague, or only informal. Their communication with the user is not very effective. 	
<ul style="list-style-type: none"> Students will demonstrate use of tools for modeling user needs 	<ul style="list-style-type: none"> Students have a good understanding of charts, diagrams, and other tools related to system design and can properly and completely construct them and explain what they represent. 	<ul style="list-style-type: none"> Students understand how to make use of some formal tools related to system design, but they may have parts that are incomplete or vague. 	<ul style="list-style-type: none"> Students cannot properly construct charts, diagrams, and other tools related to system design. 	
<ul style="list-style-type: none"> Students will demonstrate ability to develop software from user requirements 	<ul style="list-style-type: none"> Students do an excellent job at developing systems or software based on a complete understanding of all types of user requirements, creating systems which are adaptable, easy to maintain, and delivered on time and “within budget” 	<ul style="list-style-type: none"> Students do a good job of developing software or systems based on user requirements, but do not always create systems that are robust enough for potential changes. 	<ul style="list-style-type: none"> Students can develop software or systems, but they do not incorporate all of the user requirements, or some of them are incorrectly done. 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 11 or better.

Rubric L for assessing Student Outcome [l]

“An ability to effectively integrate IT-based solutions into the user environment.”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
Students will demonstrate knowledge of current IT solutions	<ul style="list-style-type: none"> Capable of collecting information on current IT solutions and understanding their application. Capable of determining using current technologies for creating IT solutions. 	<ul style="list-style-type: none"> Understands the current state of IT solutions and have exposure to their use. 	<ul style="list-style-type: none"> Incapable of identifying current IT solutions or use them for addressing a IT need. 	
Student will demonstrate ability to collect user requirements and recognize failures in existing IT solutions	<ul style="list-style-type: none"> Capable of communicating with user to determine IT needs. Capable of understanding written communications detailing solution specifications. Able to analyze an IT system to determine its components and how they are connected. 	<ul style="list-style-type: none"> Can review and analyze specifications with some recognition of user needs. Can recognize core components of an IT system and the functions of these components 	<ul style="list-style-type: none"> Lacks ability to effectively communicate with users to determine IT needs. Capable of recognizing the major functions of an IT system but incapable of identifying individual components. 	

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Student can apply knowledge of current technologies to integrate solutions	<ul style="list-style-type: none"> Capable of combining the knowledge of current IT solutions with understanding of existing user needs. Capable of integrating the IT solutions identified to meet user needs. 	<ul style="list-style-type: none"> Understands the function of IT-based solutions Capable of introducing solutions into a user environment 	<ul style="list-style-type: none"> Has some understanding of IT solutions but lacks the ability to effectively integrate them into the user environment. 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 12 or better.

Rubric M
for assessing Student Outcome [m]

“An understanding of best practices and standards and their application.”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
	•	•	•	
	•	•	•	
	•	•	•	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of ?? or better.

Rubric N
for assessing Student Outcome [n]

“An ability to assist in the creation of an effective project plan.”

Criteria	Good (5 points each)	Average (3 points each)	Below Average (1 pt each)	Score
An ability to analyze problems, elicit and describe requirement specifications that are appropriate to the solutions.	<ul style="list-style-type: none"> Students are heavily engaged in the productive practice of software development to classify and solve major problems across a wide range of software areas 	<ul style="list-style-type: none"> Students are engaged in the productive practice of software development and solve problems for a range of software areas. 	<ul style="list-style-type: none"> Students are moderately engaged in the productive practice of software development and can assist in solving problems from a range of software areas. 	
An ability to design, code construct and evaluate a software system, process, module, or program to meet desired needs	<ul style="list-style-type: none"> Students are very capable to use contemporary techniques, skills, and tools technical necessary designing, and evaluating software 	<ul style="list-style-type: none"> Students are capable to use contemporary techniques, skills, and tools technical necessary designing, and evaluating software 	<ul style="list-style-type: none"> Students can assist in using contemporary techniques, skills, and tools technical necessary designing, and evaluating software 	
An ability to communicate effectively with a wide range of audiences	<ul style="list-style-type: none"> Communicates a clear, specific, and full understanding of the topic 	<ul style="list-style-type: none"> Communicates adequate understanding of topic 	<ul style="list-style-type: none"> Communicates little or no understanding of topic 	
Total				

Threshold: 70% of the students tested within a two year window should achieve a score of 11 or better.

TEMPLATE Data Collection Table for Rubric X Student Outcome [X]

Course:			Semester:		
Number of Students:			Number of Students who satisfied all performance indicators:		
Performance Indicator					
Methods of Assessment and Detailed Performance <i>copy/paste example questions, assignments, etc in this table</i>					
Use of Results:					
Performance Indicator					
Methods of Assessment and Detailed Performance <i>copy/paste example questions, assignments, etc in this table</i>					
Use of Results:					
Performance Indicator					
Methods of Assessment and Detailed Performance <i>copy/paste example questions, assignments, etc in this table</i>					
Use of Results:					