

Exhibit A:

School of Information Technology (ITK) Assessment Plan

ASSESSMENT PLAN - A – IS & CS School of Information Technology

| Program Outcomes: (a-k): | Delivery Methods/Strategies | Assessment Methods | Data Needed | Are Data Already Available? | What group(s) will be assessed? | Who will conduct/collect assessment data for the unit? | Timeline |
|--|---|---|---|--------------------------------|------------------------------------|--|---------------------|
| (a) IS: An ability to apply knowledge of computing and mathematics appropriate to the discipline. | ITK 177, ITK 178, ITK 254, ITK 261, ITK 272, ITK 353, ITK 354, ITK 372, ITK 378 | Use rubric to analyze programming assignments from ITK 178. | Programming assignments that pertain to student's understanding of computing and mathematics. | Yes | ITK 178 students | Assessment Committee using data collected by the instructors of the classes to be assessed | Even fall semesters |
| (a) CS: An ability to apply knowledge of computing and mathematics appropriate to the discipline. | ITK 168, ITK 179, ITK 225, ITK 261, ITK 279, ITK 326, ITK 328, ITK 356, ITK 378 | Use rubric to analyze programming assignments from ITK 279 | Programming assignments that pertain to student's understanding of computing and mathematics. | Yes | ITK 279 students | Assessment Committee using data collected by the instructors of the classes to be assessed | Even fall semesters |

| Rubric A | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
|---|-------------------------------------|---|--|
| Ability to apply knowledge of computing and mathematics to solve programming assignments | Programs produce incorrect answers. | Programs produce correct answers in most cases. | Programs produce correct answers in all cases. |

ASSESSMENT PLAN - B – IS & CS School of Information Technology

| Program Outcomes: (a-k): | Delivery Methods/Strategies | Assessment Methods | Data Needed | Are Data Already Available? | What group(s) will be assessed? | Who will conduct/collect assessment data for the unit? | Timeline |
|--|---|---|---|---|------------------------------------|---|----------------------|
| (b) IS & CS: An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution. | Lecture/Assignments/ Group and Individual Projects from the following courses: ITK 178 (IS)/179 (CS) ITK 261 (All) ITK 326(CS)/363 (IS)/ 378 (All) | Use rubric to analyze assignments from ITK 261. | 1) Example assignment illustrating the analysis of a problem 2) Example assignment illustrating the identification and definition of a solution | Most courses indicate having assignments that address these two factors. It will only be necessary to implement the collection of the data. | Students in ITK 261. | Assessment Committee using data collected by the instructors of the classes to be assessed | Odd spring semesters |

| Rubric B | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
|--|--|--|---|
| Analysis of a problem | Does not know how to perform an analysis of a defined problem or performs a very limited analysis. | Ability to analyze and identify the majority of the necessary components of a defined problem to develop a solution. | Able to fully analyze a defined problem and determine additional unspecified or hidden concerns. |
| Identification and definition of a solution | Cannot identify and define any solution to a defined problem or is only able to identify and define a very small part of the solution. | Identifies the key components of the solution to a defined problem and adequately defines the characteristics of the solution. | Identify and define a comprehensive solution to a defined problem, addressing all problem issues. |

ASSESSMENT PLAN - C School of Information Technology

| Program Outcomes: (a-k): | Delivery Methods/Strategie s | Assessment Methods | Data Needed | Are Data Already Available? | What group(s) will be assessed? | Who will conduct/collect assessment data for the unit? | Timeline |
|---|------------------------------------|--|--|--------------------------------|------------------------------------|--|---------------|
| (c) IS: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired standards. | | Rubric emphasizing design and implementation | Ten random programming assignments from ITK 178. | Yes | ITK 178 | Assessment Committee using data collected by the instructors of the classes to be assessed | Odd semesters |
| (c) CS: ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired standards. | | Rubric emphasizing design and implementation | Ten random programming assignments from ITK 279. | Yes | ITK 279 | Assessment Committee using data collected by the instructors of the classes to be assessed | Odd semesters |

| Program Design Rubric | | | |
|---|---|---|---|
| Rubric C | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
| Modularity / Flexibility Coupling / Cohesion | -Uses static data and methods inappropriately. -Uses too few classes. -Classes have cyclical dependencies | -Uses static data and methods appropriately. -Divides program functionality among classes. | -Efficient use of static data and methods. -Optimizes class use |
| OO Design Encapsulation Inheritance Polymorphism | -Classes don't reflect problem -Class functionality is not self-contained -Data used by class is outside class -Methods that change object state are outside class -Re-implements functionality when it could have been inherited -Incorrectly abstracts problem concepts into inheritance structures -uses class when an interface would be better | -Classes adequately reflect problem -Class functionality is self-contained -Data used by class is inside class -Methods that change object state are inside class -Uses inheritance to reuse code -Correctly abstracts problem concepts into inheritance structures -Demonstrates correct use of interfaces | -Innovative use of classes to solve problem -Class functionality is self-contained -Data used by class is inside class - Methods that change object state are inside class - Implementation demonstrates high-level understanding of inheritance -Exceptional use of interfaces to decouple classes when optimal |
| Testing | -Testing not used | -Demonstrates use of unit testing | -Demonstrates use of unit, functional, and integration testing |

| Program Implementation Rubric | | | |
|---|---|--|--|
| Rubric C | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
| Parameter passing | -Results are re-calculated many times -Parameters are not passed to functions, or passed improperly | -Results calculated once -Functions receive intermediate results as parameters properly | -Code designed in modular fashion, makes extensive use of parameter passing |
| Code reuse | -Code not organized for reusability | -Portions of the code could be reused in another program or module | -Most or all of the code could be reused as another program or module |
| Code readability: Commenting Indentation Variable Naming | -No commenting, or minimal commenting not documenting what the code does -Poor or no indenting -Inconsistent or vague variable naming | -Embedded comments within routines, some header blocks explaining methods - Indenting standards followed -Most variable names are self-explanatory | -Code well documented with comments explaining what accomplishes and how -Indenting and white-space effectively used to delineate code blocks -Variable names clearly indicate purpose of variable, follow accepted naming conventions |
| API use | -Code does not utilize existing API functions | -Uses API functions at a level appropriate for course | -Goes beyond instruction to find novel API solutions to problems |
| Efficiency | -Code is much longer than necessary -Code is cobbled together & poorly arranged | -Code is fairly efficient and of appropriate length -Code is arranged in logical fashion | -Code is exceptionally efficient, well organized, and understandable |

| System Design Rubric | | | |
|--------------------------------------|--|---|---|
| Rubric C | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
| Abstraction | -Design abstracted to wrong levels | -Design abstracted properly at each level | -Design abstraction follows OO principles |
| Modularity / Flexibility | -Monolithic solution, or modules which don't fit problem statement | -Shows good understanding of modular design, appropriate number and types of modules | -Superb use of modules to satisfy system design problem -Shows ability to design modules as needed without excessive number of modules |
| Testing | -Testing not used | -Demonstrates use of unit testing | -Demonstrates use of unit, functional, and integration testing |
| Modeling Data Process | -Data flow diagrams incomplete, poor modeling of relationships between entities -No use of process modeling tools | -Data flow diagrams complete and most relationships correct -Process modeling tools used | -Data flow diagrams complete, relationships between entities correct in directionality and ordinality -Process modeling tools used to expedite and facilitate design |
| Use of SDLC | -Major steps in SDLC skipped or missing | -Performs all major steps in SDLC lifecycle, some incompletely or implemented | -All SDLC lifecycle steps implemented correctly |

| System Evaluation Rubric | | | |
|-------------------------------------|--|--|---|
| Rubric C | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
| Requests for Proposal | -RFPs are either too vague or too specific | -RFPs list only needed requirements | -RFPs are well-written and clearly state project requirements and scope while allowing vendor flexibility |
| Metrics | -Lacks evidence of understanding of basic system metrics | -Demonstrates appropriate use of basic evaluation metrics | -Demonstrates appropriate use of broad range of metrics |
| Make/Buy/Outsource Decisions | -Decisions lack structure or appropriate criteria | -Decisions are structured according to evaluation methodology and use appropriate criteria | -Decisions structure is based on problem and evaluation methodology and uses appropriate criteria |
| Quality Assurance / Testing | -Quality assurance is lacking or is unstructured | -Uses a quality assurance methodology | -Quality assurance methodology is appropriately applied to problem |

ASSESSMENT PLAN - D- IS & CS School of Information Technology

| Program Outcomes: (a-k): | Delivery Methods/Strategies | Assessment Methods | Data Needed | Are Data Already Available? | What group(s) will be assessed? | Who will conduct/collect assessment data for the unit? | Timeline |
|--|--------------------------------|-------------------------------------|---|--------------------------------|------------------------------------|---|--------------------|
| (d) IS & CS: An ability to function effectively on teams to accomplish a common goal. | ITK 378 | Systems Project PEER evaluations | Summary project results PEER evaluation summary | Yes | ITK 378 students | Assessment Committee using data collected by the instructors of the classes to be assessed | Odd fall semesters |

| Rubric D | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
|---|---|---|---|
| An ability to function effectively on teams to accomplish a common goal. | <p>Students do not have the ability to work effectively on an information systems development project within a group environment.</p> <p>An average grade below 60% in a class project assignment.</p> <p>Unsatisfactory PEER evaluation.</p> | <p>Students have the ability to work effectively on an information systems development project within a group environment.</p> <p>An average grade of 60% to 85% in a class project assignment.</p> <p>Satisfactory PEER evaluation</p> | <p>Students provide positive leadership capabilities working on an information systems development project within a group environment.</p> <p>An average grade above 85% in a class project assignment.</p> <p>Excellent PEER evaluation for leadership direction</p> |

ASSESSMENT PLAN - E– IS & CS School of Information Technology

| Program Outcomes: (a-k): | Delivery Methods/Strategies | Assessment Methods | Data Needed | Are Data Already Available? | What group(s) will be assessed? | Who will conduct/collect assessment data for the unit? | Timeline |
|--|--|-----------------------|--|---|------------------------------------|--|-------------------|
| (e) IS & CS: An understanding of professional, ethical, legal, security and social issues and responsibilities. | Various ITK courses through lectures, readings, projects, assignments, and other learning experiences. ITK 160 & ITK 350 ITK 191 & ITK 367 | Course tests | Pertinent test questions with student responses. | Not currently; questions will be provided by the Assessment Committee | IS and CS: ITK 160 students | Assessment Committee using data collected by the instructors of the classes to be assessed | Odd fall semester |

| Rubric E | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
|--|--|---|--|
| Understands ethical/legal issues and responsibilities | Fewer than 70% of the questions answered correctly | Between 70% and 85% of the questions answered correctly | Over 85% of the questions answered correctly |
| Understands security issues and responsibilities | Fewer than 70% of the questions answered correctly | Between 70% and 85% of the questions answered correctly | Over 85% of the questions answered correctly |
| Understands social issues and responsibilities | Fewer than 70% of the questions answered correctly | Between 70% and 85% of the questions answered correctly | Over 85% of the questions answered correctly |

Scale (level of performance)

Questions will be chosen that will be scored as either correct or incorrect. There will be no partial credit questions. A minimum of two or three relevant questions will be placed into each final exam of the identified courses. An effort will be made to have a proportional mix of questions across the three dimensions. (For example if there are six total questions in a testing period, then there will be two each from each dimension.)

Acceptability Standard

The results of the identified questions will be aggregated across all identified courses for each testing period. Question results for all students taking the exams will be included in the accumulation. Correct answer percentages will be computed for each dimension and for an overall score. An aggregate score below 70% will be considered Does Not Meet Expectations; an aggregate score of 70% up to 85% will be considered to Meet Expectations and an aggregate score at 85% or better will be considered Exceeds Expectations.

ASSESSMENT PLAN - F School of Information Technology

| Program Outcomes: (a-k): | Delivery Methods/Strategies | Assessment Methods | Data Needed | Are Data Already Available? | What group(s) will be assessed? | Who will conduct/collect assessment data for the unit? | Timeline |
|---|--|--|--|--|--|--|-----------------------|
| (f) An ability to communicate effectively with a wide range of audiences in writing. | ENG 101, ENG 249, ITK 160, ITK 191, ITK 279, ITK 363, ITK 367, ITK 378 | Use a rubric to analyze papers collected from relevant courses. | Ten Random Samples of student writing. | Yes | ITK 279 students (CS) ITK 363 students (IS) | Assessment Committee using data collected by the instructors of the classes to be assessed | Even spring semesters |
| (f) IS & CS: An ability to communicate effectively with a wide range of audience orally. | COM 110, ITK 160, ITK 191, ITK 327, ITK 378 | A small group of faculty will use a rubric to analyze student presentations in relevant courses. | Data from ten random presentations. | Yes. Arrangements need to be made for appropriate faculty to attend presentations. | ITK 378 students | Assessment Committee using data collected by the instructors of the classes to be assessed | Odd fall semesters |

| Writing Rubric | | | |
|----------------------------|--|---|--|
| Rubric F | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
| Clarity/Precision | Too vague or too detailed, losing perspective, attention to length rather than substance. Information may be inaccurate. | Occasionally difficult to understand, detailed but losing overall picture, or clear at a high level but missing details | Completely clear and precise |
| Organization | Not well-organized, consistent flow missing | Micro-structure well defined but lacking macro-structure, or vice versa | Logically organized |
| Audience | Not catered to intended audience (wrong assumptions about audience, trying to target all types of audiences) | Not consistently aiming at the audience, occasionally too detailed or too vague | Aimed exactly at the appropriate audience |
| Mechanics and Style | Many spelling and grammar errors, no logical flow | Occasional spelling errors and awkward wording, but overall good | No spelling or grammar errors. Flowing language. |
| Visual aids | No visual aids/too many visual aids. Very poor visual aids. | Could have used more/less visual aids for some parts. One or two visual aids are poorly chosen or confusing. | Appropriate number of well-chosen visual aids that enhance communication |

| Oral Communication Rubric | | | |
|----------------------------------|--|--|--|
| Rubric F | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
| Clarity | Not assertive or clear overall | Occasionally trying to sound too technical or intentionally vague but good overall | Clear and easy to understand |
| Organization | Not well organized, no logical flow | Occasionally losing flow but good overall | Logically organized |
| Audience | Not aimed at audience, reflected speaker's know-how rather than audience | Trying well, but could have taken more efforts to direct talk at audience | Aimed exactly at the appropriate audience |
| Engaging the audience | Not captivating, could not engage audience leading to no significant feedback | Good beginning and end but not as engaging in between, not enough interaction with audience | Interesting. Keeps the audience awake and involved |
| Delivery | Spoke too fast/too slow overall, did not address intended questions, inappropriate attire, took significantly longer or shorter than allotted time | Generally good, but spoke too fast/too slow OR too many pauses, occasionally awkward body language | Calm. Clear diction. Good tone. Good pacing. Appropriate attire and personal grooming. |

ASSESSMENT PLAN - G- IS & CS School of Information Technology

| Program Outcomes: (a-k): | Delivery Methods/Strategies | Assessment Methods | Data Needed | Are Data Already Available? | What group(s) will be assessed? | Who will conduct/collect assessment data for the unit? | Timeline |
|---|--------------------------------|---|---|--------------------------------|------------------------------------|--|--------------------|
| (g) IS & CS: An ability to analyze the local and global impact of computing on individuals, organizations, and society | ITK 160 | Selected ITK 160 student test questions | Test scores that demonstrate students' understanding of the local and global impact of computing on individuals, organizations, and society | Yes | ITK 160 students | Assessment Committee using data collected by the instructors of the classes to be assessed | Odd fall semesters |

| Rubric G | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
|---|----------------------------|------------------------------|----------------------|
| Ability to analyze the local and global impact of computing on <i>individuals</i> | Test score < 70 | Test score between 70 and 85 | Test score > 85 |
| Ability to analyze the local and global impact of computing on <i>organizations</i> | Test score < 70 | Test score between 70 and 85 | Test score > 85 |
| Ability to analyze the local and global impact of computing on <i>society</i> | Test score < 70 | Test score between 70 and 85 | Test score > 85 |

ASSESSMENT PLAN - H

School of Information Technology

| Program Outcomes: (a-k): | Delivery Methods/Strategies | Assessment Methods | Data Needed | Are Data Already Available? | What group(s) will be assessed? | Who will conduct/collect assessment data for the unit? | Timeline |
|--|--|--|--|---|--|---|-------------------------------|
| (h) Recognition of the need for and an ability to engage in continuing professional development | <p>Comments from ITK 398 surveys</p> <p>Alumni survey</p> <p>Professional organization memberships</p> <p>Discussion of the need for and ability to engage in continuing professional development throughout the program. Students will participate in a survey after their internship experience.</p> | <p>Internship surveys, alumni surveys, memberships in professional organizations</p> | <p>ITK 398 surveys</p> <p>Alumni survey data</p> <p>Surveys of professional organization memberships</p> | <p>Yes</p> <p>Yes</p> <p>No, but can be easily obtained</p> | <p>Random sample of 20 students from ITK 398</p> | <p>Assessment Committee using data collected by the instructors of the classes to be assessed</p> | <p>Once per academic year</p> |

| Rubric H | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
|--|--|--|--|
| <p>Students' demonstrates the ability: (1) to gather the necessary information and use that information to solve real problems and (2) recognizes the need to engage in continuing professional development</p> | <p>Did not collect any information that relates to the topics; couldn't solve the assigned problems independently; did not recognize the need for continuing professional development; collected very little information; could understand some of new concepts/technology; or didn't recognize need for continuing professional development</p> | <p>Collected some basic information – most relates to the topic; could understand new concepts/ technology and then apply the knowledge to a new world problem with supervisor's help; recognize some need for continuing professional development</p> | <p>Collected a great deal of information-all relates to the topic; could understand new concepts/technology and then apply the knowledge to a real world problem without supervisor's help</p> |

| Rubric I | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
|--|---|---|---|
| Select a practical problem | Selects a problem irrelevant to any practical issues and/or elects a problem a little related to practical issues | Selects a problem very close to practical issues | Applies the latest design and analysis frameworks and methodologies |
| Apply current design & analysis methodologies | Does not apply any or only some of the latest or recent design and analysis frameworks and methodologies | Applies recent design and analysis frameworks and methodologies | Applies a lot of cutting-edge skills and technologies |
| Apply current technologies, skills & tools | Does not apply any cutting-edge skills and technologies or applies a little cutting-edge skills and technologies | Applies some cutting-edge skills and technologies | Completely solves the problem |
| Effectively solve a practical problem | Does not solve or only partially solves the problem | Solves most parts of the problem | Applies the latest design and analysis frameworks and methodologies |

ASSESSMENT PLAN - J - CS School of Information Technology

| Program Outcomes: (a-k): | Delivery Methods/Strategies | Assessment Methods | Data Needed | Are Data Already Available? | What group(s) will be assessed? | Who will conduct/collect assessment data for the unit? | Timeline |
|--|--|---|--|--------------------------------|--|--|-----------------------|
| (j) CS: An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices | ITK 168, ITK 179, ITK 279, ITK 327, ITK 328, ITK 326 | Assess student design documents from ITK 326. Percent correct answers on selected ITK 279 test questions | 10 random samples of student project design documents. | Yes Yes | ITK 326 students ITK 279 students | Assessment Committee using data collected by the instructors of the classes to be assessed | Even spring semesters |

| ITK 326 Design Documents | | | |
|--------------------------------------|---|---|--|
| Rubric J (CS) | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
| Data modeling | Too much redundancy in modeling data, poor modeling leading to inefficient databases | Models data correctly, no redundancy in data models | Creates efficient data models and identifies higher order similarities and redundancies leading to efficient data representation |
| Overall system design | Inefficient design due to inappropriate choice of work flow, redundant data flows, too much use of expensive processes like database access | Chooses algorithms appropriately leading to non-redundant system models, models each process efficiently | Identifies higher order inter-process relationships to create efficient models at macro and unit levels, anticipates future enhancements and incorporates them into current models |
| Use of appropriate algorithms | Identifies incorrect work flow, chooses inefficient algorithms, does not minimize expensive processes | Chooses appropriate work flows, identifies efficient algorithms to maximize efficiency and minimize expensive processes | Designs optimal work flows over several units, reduces expensive processes at unit and system levels |

| ITK 279 Test Questions | | | |
|---|--|--|--|
| Rubric J (CS) | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
| Thinking about algorithmic solutions | Does not think systematically, brute force approach to solution | Thinks about the problem in an algorithmic/modular way, may/may not arrive at the correct solution but thinking is logical | Identifies similarities with past solutions and reapply techniques to solve current problem, attention to correctness and efficiency |
| Applying known algorithms/principles | Unable to identify applicability of existing algorithms | Identifies underlying algorithms correctly and uses them appropriately | Identifies novel use of existing algorithms for efficiency and elegance |
| Choice of algorithms | Does not know which algorithms to choose from, does not identify correctly the parameters behind choosing correct algorithms | Chooses efficient algorithm out of many and systematically explains decisions | Thinks about algorithmic and space efficiency, clearly explains considerations in both and chooses the best one |

ASSESSMENT PLAN - J - IS School of Information Technology

| Program Outcomes: (a-k): | Delivery Methods/Strategies | Assessment Methods | Data Needed | Are Data Already Available? | What group(s) will be assessed? | Who will conduct/collect assessment data for the unit? | Timeline |
|---|----------------------------------|--|--|-----------------------------|--|--|----------------------|
| (J) IS: An understanding of processes that support the delivery and management of information systems within a specific application environment. | ITK261, ITK341, ITK 363, ITK 365 | Five random samples of selected analysis and design assignments from ITK 261, 341, - | Assignments that pertain to student's understanding of systems development life cycle. | Yes | ITK 261 students ITK 341 students | Assessment Committee using data collected by the instructors of the classes to be assessed | Odd spring semesters |

| Rubric J (IS) | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
|---|--|--|---|
| Understand the deliverables in each development phases in developing information systems | Does not understand the deliverables in information systems development processes. | Understands major deliverables in information systems development processes and is able to produce major documents of the deliverables. | Fully understands the deliverables in information systems development processes and is able to produce the comprehensive documents of the deliverables. |
| Understand the process of the management of information systems | Does not understand the processes of managing information systems development. | Identifies the major processes of managing information systems development and adequately defines the characteristics of management practices. | Fully understands the processes of managing information systems development and completely defines the characteristics of management practices. |

ASSESSMENT PLAN - K - CS

School of Information Technology

| Program Outcomes: (a-k): | Delivery Methods/Strategies | Assessment Methods | Data Needed | Are Data Already Available? | What group(s) will be assessed? | Who will conduct/collect assessment data for the unit? | Timeline |
|---|------------------------------------|---|------------------------------------|--------------------------------|--|--|--|
| (k) CS: An ability to apply design and development principles in the construction of software systems of varying complexity. | ITK 168, ITK 179, ITK 279, ITK 326 | Use a rubric to assess student projects/programs. | Student software projects/programs | Yes | ITK 279 students ITK 326 students | Assessment Committee using data collected by the instructors of the classes to be assessed | Even fall semesters Even spring semesters |

| Design of Software Systems | | | |
|-----------------------------------|---|---|--|
| Rubric K (CS) | Does Not Meet Expectations | Meets Expectations | Exceeds Expectations |
| Abstraction | Incorrect abstractions, partial or no use of definitive design principles | Identifies modules/units appropriately, follows design principles | Designs using OO principles, identifies correct APIs to minimize redundancy, maximize reuse and model accuracy |
| Data modeling | Arbitrary data models, no attempt to identify relationships and redundancies | Non-redundant data models, identifies relationships correctly | Incorporates implementation considerations to design theoretically and practically efficient data models |
| Interface modeling | Arbitrary choice of interface design, does not reflect usage patterns, inconsistent UI | Model identifies and utilizes usage patterns, appropriate use of UI elements, consistency in UI | UI modeling based on actual user studies and interviews, consistency in UI |
| Documentation | Does not create/maintain design documents, does not follow accepted standards, incomplete documentation of design choices | Creates and maintains design documents regularly, follows accepted practices | Always maintains complete documentation of design and implementation, represents documentation textually and graphically to clearly explain current and facilitate future design choices |
| Choice of technology | Does not know why a certain language is being used, cannot justify use of libraries | Is able to argue effectively the choice of design language, identifies and justifies use of existing frameworks | Identifies and justifies technology beyond the requirements of the course, maximizes code reuse by identifying existing reliable frameworks |
| Facilitating testing | Does not test software, testing is arbitrary and incomplete | Uses design, data and process flow to design test cases systematically | Designs and documents test cases, identifies appropriate test cases to maximize testing while optimizing time |