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وزارة التعليم العالي
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Teacher's Quality Manual



2015-2016

*This handbook is adapted from Almajmaah University.

MPP ROAD MAP FOR PROGRAM ACCREDITATION

- After coming back from summer vacation; in the three weeks before the beginning of the first semester, several sessions will be held for all faculties to practice how to do course objectives, learning outcomes, level of learning, and mapping.
- Therefore, by the first week of the academic semester, MPP will have program vision, mission, objectives, and learning outcomes, as well as each course catalogue data including objectives and learning outcomes.
- During the first week of the semester, each MPP student will be handed a copy of the program vision, mission, objectives, and learning outcomes.
- Each faculty member will give each student a copy of the course catalogue he is teaching. A statement that the student receives such a copy will be signed by the student.
- The faculty will spend the first week explaining to the students the meaning of the program and course objectives and learning outcomes, the competencies and their level of learning, the different requirements to pass the specific course, and the procedure to implement and evaluate the outcomes. One or two seminars on accreditation and program continuous improvement will be given to the students to put them in the mode of Program Continuous Quality Improvement.
- Several committees will be formed to look at interrelated courses; regarding the contents, overlapping, credit hours, prerequisites, etc.
- The Department Quality Committee (DQC), through discussions with the different groups, will decide which course will cover which outcomes and in what level.
- The DQC with consultation with the academic groups will set up a map for implementing program objectives which may call for reduction of credit hours of some courses, or even eliminating one or two courses in order to introduce the Computer soft skills; this needs the support of all faculties.
- Each semester, starting the first semester 1431/1432, graduating seniors will be asked to respond to questionnaire (Graduating Senior Exit Survey).

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- Student Advisory Committee will be performed from well-spoken students. This committee will have meetings with the DQC in order to have informal feedback about the MPP program.
- Each Fall, 1, 2 and 5 year out alumni will be identified and email (home or work address) lists will be created. Email (handout to home or work address) will be sent providing information and request to respond to questionnaire (Former Student Survey). 1 and 2 year out questionnaire includes questions on program outcomes.
- Request includes asking alumnus to ask supervisor to fill out questionnaire also (Employer Survey). Other way is to identify and prepare a list of the employers of our graduates and correspond with them directly.
- Questionnaires (Surveys) will be hosted on the internet.
- Responses obtained by semester's end are processed.
- Placement data will be obtained each semester.
- DQC will set up the assessment rubrics for each program outcome and each faculty member will get a copy of this assessment rubrics.
- DQC will set up the program assessment methods/metrics for each program outcome, followed by a seminar and open discussion for all faculty members.
- DQC will prepare "Course Assessment Form" that will be filled by the faculty. "Student Sign Off Form for MPP Course" will also be prepared.
- Early Spring Semester, DQC receives data and reviews and sorts information. DQC is responsible for directing the data to the appropriate place, such as curriculum committee, academic groups, etc., and obtaining a written response on any action taken in response to the data.
- Any action to be taken should be known by the end of spring semester and should be in place by beginning of the next fall.
- This cycle will produce a time history which should show improvements in the program over time. After several cycles pass, this result can be demonstrated graphically.
- Additionally, individual course data will also be processed at the same time and DQC will process that data each Fall semester from the previous year. DQC will forward that data to the appropriate faculty member in charge.
- By the end of Fall 1435/1436, Self-Study Report will be written.

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Assessment Glossary

Assessment Criteria: Stated levels of performance for each assessment method that will be used to guide decisions and set priorities for improvement.

Assessment Method: An instrument or other type of data collection technique designed to elicit evidence to measure an outcome indicator or series of outcome indicators. Portfolios, alumni surveys, peer surveys, employer surveys, rubrics, faculty rating forms, course evaluations, focus groups, pre- and posttests, senior design projects, placement data, self-assessments, documented subjective evidence, exit interviews, classroom assessment techniques, etc. are examples of assessment methods.

Audit: An independent review and evaluation of the outcomes of the quality assurance processes an institution or part of an institution, or a form of a program.

Benchmarks: Points of comparison or levels of performance used for establishing objectives and assessing performance. Benchmarks may be current levels of performance at an institution, standards established by an external agency, or standards of performance at another institution or group of institutions selected for comparison.

Course: A systematic program of study normally over a period of one semester or calendar year and designed to develop specified learning outcomes as part of a program.

Course Specification: A detailed description of a course including the topics or units of work to be studied, the intended learning outcomes and the methodology and resources used to develop those outcomes including details of staffing text and reference material, and requirements for resources and equipment. A course specification includes methods of student assessment and course evaluation including indicators and benchmarks to be used.

Course Portfolio: A collection of documents and notes describing the development, conduct, evaluation and changes in a course. A course portfolio is an ongoing record of what happens in a course and how it is developed and modified over time as a result of feedback during delivery, changing circumstances, and reviews of effectiveness. It should include original specification and amendments to those specifications, data on indicators including results of evaluations of teaching effectiveness and indicators and achievement of benchmarks relating to learning outcomes. A portfolio should include copies of annual course reports, and summary information about any significant events affecting the conduct or effectiveness of the course. Information contained in course portfolios serves as a primary source of information in the periodic (normally five-six yearly) self-study reports and external reviews for program accreditation.

Course Reports: Reports prepared on the effectiveness of a course including data on indicators and interpretations of evidence on the achievement of learning outcomes, and changes planned in response to that evidence and changing circumstances. Course reports are normally prepared by an instructor each time a course is offered for consideration by program coordinators subsequent course instructors. Copies of Course reports should be

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included in course portfolios, and form an important part of the information considered in periodic self-studies and external reviews.

Goal: A statement outlining the broad ideas of the program. The University and College goal statements are examples of goals. Goals show where you want to go. There should only be a few of these because they are your major program goals. For example, you might think of these key words when writing your goal statements: theory/knowledge (of engineering principles), practice/application (of engineering principles), awareness (of role in society), and communication (of engineering principles; interpersonal).

Indicator: Measurable examples of an outcome either through observation, self-report, or score. Think of these as a rubric to tell you if your outcomes were achieved. You might wish to develop phrases that could be answered with “yes” or “no.” An item on an instrument would be an example of an outcome indicator. Indicators should be as specific as directly related as possible to the aims and objectives to which they relate. However direct measures of some of the most important objectives such as quality of students learning are sometimes difficult to find. Consequently indirect evidence such as student evaluations of programs, employment outcomes, and employer surveys must sometimes be used. Since indirect indicators can be subject to other influences it is usual to use several different but related indicators for important objectives, and to interpret these using some independent system to verify the interpretation.

Internal Quality Assurance: Processes of quality assurance carried out within and by or for a higher education institution. It includes not only the processes of monitoring and review that an institution manages itself, but also its use of outside people from other institutions, from industry or the professions, or from other accreditation or quality assurance agencies to review and provide advice on its programs and activities. Internal quality assurance is normally comprehensive, dealing with inputs, processes and outcomes, with all areas of an institution’s activities, and with staff and students in all parts of the institution.

Learning Outcome: A statement derived from an objective that describes what specific result will occur if the objectives are met. Typically, outcomes are student related and state what knowledge and skills are to be acquired and demonstrated by each student by the end of the department's program.

Level: The intellectual standard and complexity of learning expected as students progress through a program of study. The degree of difficulty or complexity of learning increases as students advance through a program and these increases are defined by descriptions of the learning outcomes that are expected.

Major Change in Program: A change that significantly affects the learning outcomes, structure, organization or delivery of a program or the basis for its accreditation.

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Mission: A brief general statement setting out the principal policy objectives for the development of an institution or a program. While stated in general terms a mission statement should be sufficiently precise to serve as a guide to planning and decision making at all levels of the organization, and should actually be used as a basis for decision making.

Objective: A statement derived from a goal that is a more specific application of that goal and explains what will occur in terms of knowledge, skills, or abilities if an objective is met. An objective is a statement of how a department is to support the institutional, college and program missions. Objectives are maps of how you are going to get where you want to go.

Outputs: The product of an institution's activities, normally expressed in quantitative terms. Outputs usually refer to quantitative measures of what is produced by an institution, such as the number of graduates or the number of staff research publications.

Practice: An activity that may be a part of a student's educational experience and provides opportunities to learn.

Peer Review: External evaluation and report on a program, institution or part of an institution by expert evaluators from similar institutions or professions who are specialists in the field concerned or with higher education generally.

Processes: The administrative arrangements, policies, and organizational procedures carried out by an institution in planning, reviewing and delivering its programs. Processes are what is done in an institution to use the inputs available to it to produce its outputs and outcomes. The term includes teaching processes, assessment procedures, and processes for managing research and community activities as well as a wide range of other activities that have direct or indirect impact on educational programs.

Program: A coherent program of study followed by students in an academic field or leading to a professional qualification, the successful completion of which qualifies them for an academic award. A program may include electives or different strands, and may include some courses that also taught in other programs. However to be organized as a program it must be made up of a coordinated group of courses designed to develop a single set of related learning outcomes, and lead to an academic award.

Program Specification: A detailed description of a program including its intended learning outcomes and the methodology and resources used to develop those outcomes. A program specification includes summary descriptions of required and elective courses, methods of student assessment and program evaluation, and the staffing, resources and equipment required. In professional program the program specification should include descriptions of the processes to be used to ensure the continuing relevance of components of the program to the field concerned. Mechanisms should be included in all programs to

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ensure that the elements of the program remain up to date with the latest research and other developments in the field.

Program Portfolio: A collection of documents and notes describing the development, conduct, evaluation and changes in a program. A program portfolio is an ongoing record of what happens in a program and how it is developed and modified over time as a result of changing circumstances and reviews of effectiveness. It should include original program specifications and amendments in specifications, data on indicators including summaries for each evaluation of teaching effectiveness and indicators and achievement of benchmarks relating to learning outcomes. A portfolio should include copies of annual (or other) program reports, and summary information about any significant events affecting the conduct or effectiveness of the program. Information obtained in program portfolio serves as a primary information in the preparation of periodic (normally five-six yearly) self-study reports and external reviews for program re-accreditation.

Program Reports: Reports prepared on the effectiveness of a program including data on indicators and interpretation of evidence on the achievement of learning outcomes, and changes planned in response to that evidence and changing circumstances. Program reports are normally prepared annually for consideration by those planning and teaching in a program, and by the department, college or institution. Copies of program reports should be included in program portfolios, and form an important part of the information considered in periodic self-studies and external reviews.

Quality Assurance: Processes of assessment, evaluation and follow up relating to quality of performance, which serve two distinct purposes. To: (a) Ensure that desired levels of quality are maintained and improved, and (b) Assure stakeholders that quality is being maintained at levels comparable to good practice in highly regarded institutions elsewhere in the world. Stakeholders in this context include students, the Government and the wider community, including parents, professional associations and industry.

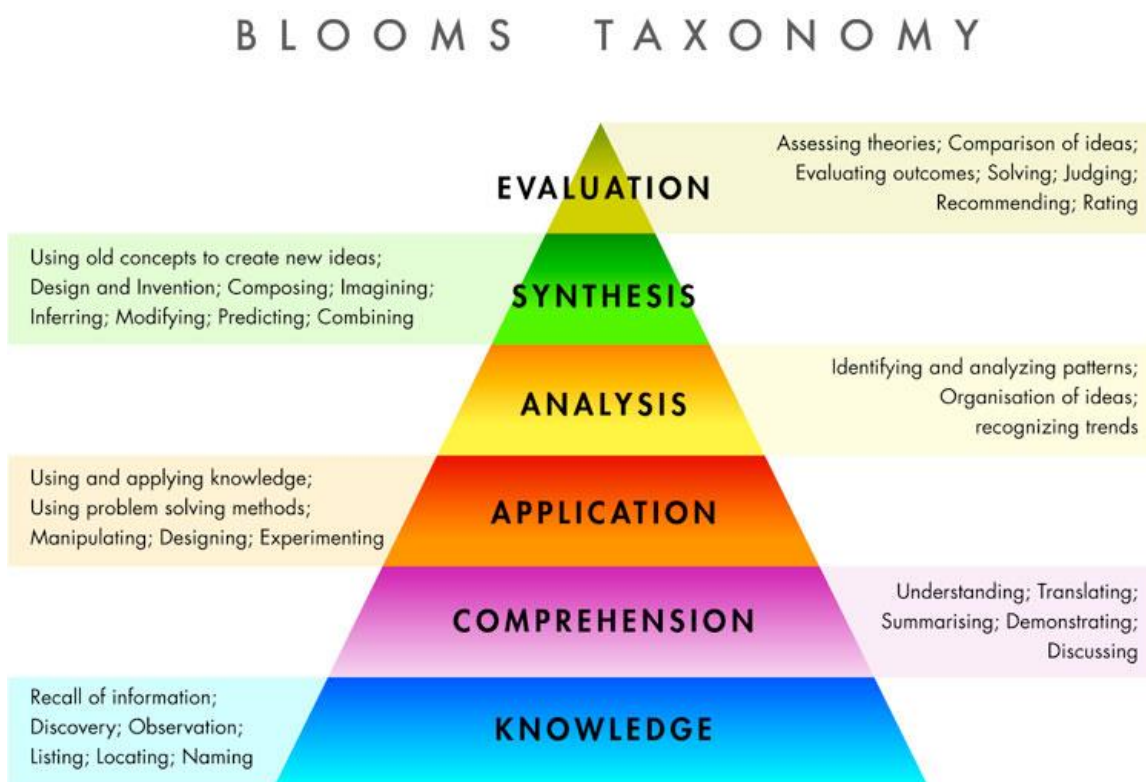
Substantial Equivalence: A judgment that a unit, subject or other component of a program is equal in quality and equivalent in scope to one offered elsewhere.

Student Attributes: Special characteristics of students developed as a result of the particular policies and teaching strategies of an institution. The development of particular student attributes is often an important part of the mission of an institution. For example, an institution may adopt procedures to ensure students are particularly self-reliant, more creative and entrepreneurial, or more effective than would normally be the case in group situations. The term is normally reserved for attitudes, skills, and habits of behavior or personality characteristics that are exhibited in students' behavior in outside situations rather than for purely academic learning outcomes which may refer to abilities rather than actual behavior.

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Bloom's Definition

The cognitive domain involves knowledge and the development of intellectual skills (Bloom, 1956). This includes the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills. There are six major categories, which are listed in order below, starting from the simplest behavior to the most complex. The categories can be thought of as degrees of difficulties. That is, the first ones must normally be mastered before the next ones can take place.



Analysis: Breaking down objects or ideas into simpler parts and seeing how the parts relate and are organized.

Verbs: Analyze, appraise, breakdown, calculate, categorize, compare, contrast, criticize, diagram, differentiate, discriminate, distinguish, examine, experiment, identify, illustrate, infer, model, outline, point out, question, relate, select, separate, subdivide, test.

Application: Applying knowledge to actual situations.

Verbs: Apply, change, choose, compute, demonstrate, discover, dramatize, employ, illustrate, interpret, manipulate, modify, operate, practice, predict, prepare, produce, relate schedule, show, sketch, solve, use, write.

Comprehension: Grasping the meaning of information.

Verbs: Classify, convert, defend, describe, discuss, distinguish, estimate, explain, express, extend, generalized, give example(s), identify, indicate, infer, locate, paraphrase, predict, recognize, rewrite, report, restate, review, select, summarize, and translate.

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Evaluation: Making judgments based on internal evidence or external criteria.

Verbs: Appraise, argue, assess, attach, choose, compare, conclude, contrast, defend, describe, discriminate, estimate, evaluate, explain, judge, justify, interpret, relate, predict, rate, select, summarize, support, value.

Knowledge: Remembering previously learned information.

Verbs: Arrange, define, describe, duplicate, identify, label, list, match, memorize, name, order, outline, recognize, relate, recall, repeat, reproduce, select, state.

Synthesis: Rearranging component ideas into a new whole.

Verbs: Arrange, assemble, categorize, collect, combine, comply, compose, construct, create, design, develop, devise, explain, formulate, generate, plan, prepare, propose, rearrange, reconstruct, relate, reorganize, revise, rewrite, set up, summarize, synthesize, tell, write.

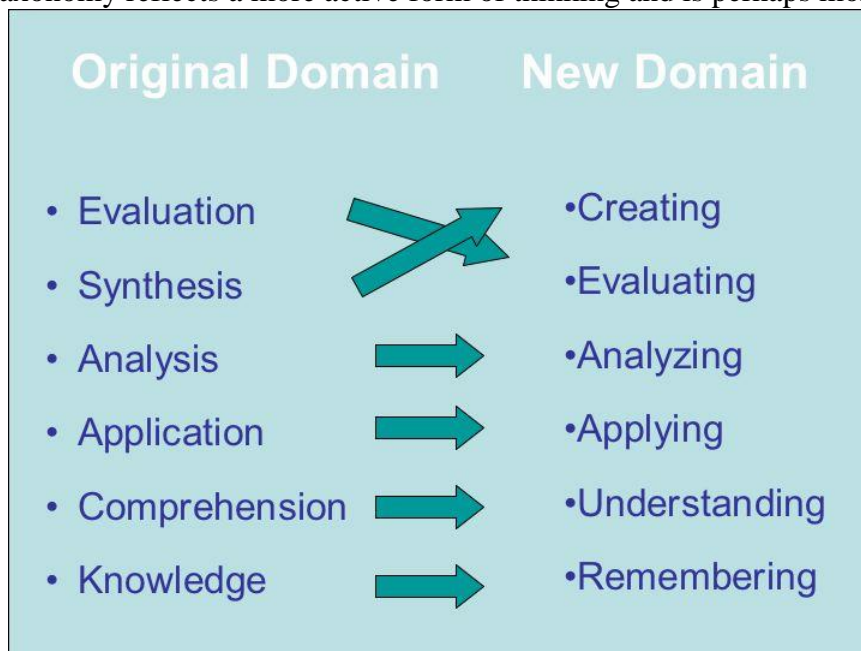
Valuation: Sensitivity/willingness to receive (awareness w/o assessment, willingness to suspend judgment); actively respond (comply, commit, internal satisfaction); Value (acceptance of worth, preference); Organize (when values conflict)

Verbs: Accept, challenge, defend, respect, question, support, enjoy.

Bloom's Revised Taxonomy

Lorin Anderson, a former student of Bloom, revisited the cognitive domain in the learning taxonomy in the mid-nineties and made some changes, with perhaps the two most prominent ones being, 1) changing the names in the six categories from noun to verb forms, and 2) slightly rearranging them (Anderson, Krathwohl, Airasian, Cruikshank, Mayer, Pintrich, Raths, Wittrock, 2000; Pohl, 2000).

This new taxonomy reflects a more active form of thinking and is perhaps more accurate:



- See more at:

<http://www.nwlink.com/~donclark/hrd/bloom.html#sthash.GKIQOfOH.dpuf>

Table of the Revised Cognitive Domain

Category	Example and Key Words (verbs)
<p>Remembering: Recall previous learned information.</p>	<p>Examples: Recite a policy. Quote prices from memory to a customer. Knows the safety rules.</p> <p>Key Words: defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states.</p>
<p>Understanding: Comprehending the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.</p>	<p>Examples: Rewrites the principles of test writing. Explain in one's own words the steps for performing a complex task. Translates an equation into a computer spreadsheet.</p> <p>Key Words: comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates.</p>
<p>Applying: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the work place.</p>	<p>Examples: Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a written test.</p> <p>Key Words: applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses.</p>
<p>Analyzing: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.</p>	<p>Examples: Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks</p>

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	<p>for training.</p> <p>Key Words: analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates.</p>
<p>Evaluating: Make judgments about the value of ideas or materials.</p>	<p>Examples: Select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget.</p> <p>Key Words: appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports.</p>
<p>Creating: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.</p>	<p>Examples: Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several sources to solve a problem. Revises and process to improve the outcome.</p> <p>Key Words: categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes.</p>

Activities at Various Cognitive Levels of Learning (LoL)

Bloom's taxonomy of learning objectives is used to define how well a skill or competency is learned or mastered. A fuller description of Bloom's taxonomy is given in the following pages but a brief summary of the activities associated with each level is given below.

1. At **Knowledge** Level of Learning, a student can define terms

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2. At **Comprehension** Level of Learning, a student can work assigned problems and can give examples of what they did
3. At **Application** Level of Learning, a student recognizes what methods to use and then uses the methods to solve the faced problems
4. At **Analysis** Level of Learning, a student can explain why the solution process works
5. At **Synthesis** Level of Learning, a student can combine the part of a process in new and useful ways
6. At **Evaluation** Level of Learning, a student can create a variety of ways to solve the problem and then, based on established criteria, select the solution method best suited for the problem.

KNOWLEDGE (INFORMATION)

1. How do **I know** I have reached this level?

I can recall information about the *subject, topic, competency, or competency area*; I can *recall* the appropriate material at the appropriate time. I have been *exposed* to and have *received* the information about the subject; thus, I can respond to questions, perform relevant tasks, etc.

2. What do **I do** at this level?

I read material, listen to lectures, watch videos, take notes; I pass ‘True/False’, ‘Yes/No’, ‘multiple choice’, or ‘fill in the blank’ tests which demonstrate my *general knowledge* of the *subject*. I learn the vocabulary or terminology as well as the conventions or rules associated with the *subject*.

3. How will the **teacher know** I am at this level?

The teacher will provide *verbal* or *written* tests on the *subject* that can be answered by simply *recalling* the material I have learned about this subject.

4. What does the **teacher do** at this level?

The teacher directs, tells, shows, identifies, and examines the subject or competency area *at this level*.

5. What are typical ways **I** can demonstrate my knowledge?

- a. Answer ‘True/False’, ‘Yes/No’, ‘fill in the blank’, or ‘multiple choice’ questions correctly.

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- b. Define technical terms associated with the subject by stating their attributes, properties, or relations.
 - c. Recall the major facts about the subject.
 - d. Name the classes, sets, divisions, or arrangements that are fundamental to the subject.
 - e. List the criteria used to evaluate facts, data, principles, or ideas associated with the subject.
 - f. List the relevant principles and generalizations associated with the subject.
 - g. List the characteristic methods of approaching and presenting ideas associated with the subject (e.g., list the conventions or rules associated with the subject).
 - h. Describe the general problem solving method (i.e., the techniques and procedures) or the method(s) of inquiry commonly used in the subject area.
6. What are typical *work products*?
- a. Answers to Knowledge level quizzes ('True/False', 'Yes/No', 'fill in the blank', or 'multiple choice').
 - b. Lists of definitions or relevant principles and generalizations associated with the subject.
 - c. Modifications of example problems presented in the textbook; for example, modest changes in numerical values or units; i.e., solutions to problems which were solved using 'pattern recognition'.
7. What are descriptive '**process**' verbs?

define	label	listen	list	memorize	name
read	recall	record	relate	repeat	view

COMPREHENSION (UNDERSTANDING)

1. How do **I know** I have reached this level?

I comprehend or understand the *subject, topic, competency, or competency area*; I use ideas associated with the subject without relating them to other ideas or subjects. I may not yet completely understand the subject. When others are discussing this subject, I can follow and understand the discussion. This level requires **Knowledge**.

2. What do **I do** at this level?

I successfully solve textbook problems using appropriate techniques and procedures based on (1) where the problem is located in the book or (2) the problem statement. I translate ideas into my own words (translation from one level of abstraction to another). I translate graphical or symbolic information (e.g., tables, diagrams, graphs, mathematical formulas, etc.) into verbal forms, and vice

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versa. I interpret or summarize communications (oral/written/graphical). I can use the problem solution to determine effects, trends, implications, corollaries, etc.

3. How will the **teacher know** I am at this level?

The teacher will ask questions that can be answered by restating or reorganizing material in a literal manner; i.e., by clearly stating facts or the principle meaning of the material in your own words. The teacher will also give tests based on the textbook problems that were (1) assigned as homework **or** (2) used as examples in the textbook or in class.

4. What does the **teacher do** at this level?

The teacher demonstrates, solves problems, listens, questions, compares, contrasts, and examines the information and your knowledge of the subject.

5. What are typical ways **I** can demonstrate, on my own, my comprehension and understanding?

- Read textbook problems, understand what is required, and successfully solve the problems.
- Clearly document the process used to solve the problem.
- Clearly describe the solution to the problem.
- Draw conclusions based on the solution to the problem.
- Compare/contrast two different textbook problems (i.e., what elements are the same? what elements are different?).
- Restate an idea, theory, or principle in your own words.

6. What are typical **work products**?

- Answers to Comprehension level quizzes and exams ('multiple choice' or textbook problems).
- Solutions to textbook problems which include (a) a summary of the learning objectives associated with the problem, (b) the problem statement in the form of a clearly labeled sketch, specifications, and what is required, (c) a description of the general solution method (techniques and procedures) used to solve the problem, and (d) a discussion of the solution.

7. What are descriptive '**process**' verbs?

describe	discuss	explain	express	identify	locate
recognize	report	restate	review	solve	tell

APPLICATION (INDEPENDENT PROBLEM SOLVING)

1. How do I know I have reached this level?

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I can recognize the need to use an idea, concept, principle, theory, or general solution methods (techniques and procedures) **without being told and without any specific or immediate context or cues**. For example, I do not need to locate a similar example in a textbook, nor do I need to know that an assignment is for a particular course in order to recognize the need to use a particular idea, etc. I know and comprehend these ideas, concepts, principles, theories, or general solution methods (techniques and procedures) and I can apply them to new situations. I also have the ability to recognize when a certain task or project is beyond my current competency. This level requires **Knowledge and Comprehension**.

2. What do I do at this level?

I apply ideas, concepts, principles, theories, or general solution methods (techniques and procedures) that I learned at the Knowledge and Comprehension level to new situations. I solve problems in which the solution method is not immediately evident or obvious. I solve these problems independently and make use of other techniques and procedures as well. This requires not only knowing and comprehending these ideas, concepts, principles, theories, and general solution methods (techniques and procedures) but deep thinking about their usefulness and how they can be used to solve new problems that I identify or define.

3. How will the teacher know I am at this level?

The teacher will review my work products and confirm that I am solving problems independently, in new situations, and without prompting by the teacher. The teacher will be able to pose general questions such as "*How much protection from the sun is enough?*" and I will know how to answer the question by defining and solving a problem.

4. What does the **teacher do** at this level?

The teacher assigns problems that do not explicitly (or as best possible implicitly) imply the use of an expected solution methodology. The teacher may develop problems and assignments in conjunction with teachers in another related subject areas. The teacher will probe for use of course material outside of the course.

5. What are the typical ways **I** can demonstrate, on my own, my Application of Knowledge and Comprehension?

- a. Solve problems which require that I recognize and apply the appropriate ideas, concepts, principles, theories, general solution methods (techniques and procedures), etc. without being told and without any specific or immediate context or cues.

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- b. Apply the laws of mathematics, chemistry, and physics, as well as engineering, business or design concepts, etc. to practical problems or situations.
 - c. Solve problems associated with design/build projects.
6. What are typical *work products*?

Application level work products are very similar to Comprehension level work products; however, documentation will be included which demonstrates that you recognized the need to use ideas, concepts, principles, theories, general solution methods (techniques and procedures), etc. in a new situation.

7. What are descriptive ‘**process**’ verbs?

apply	demonstrate	employ	illustrate	interpret
operate	practice	recognize	solve	use

ANALYSIS (LOGICAL ORDER, COMPONENTS)

1. How do I know I have reached this level?

I can explain why. I can methodically examine ideas, concepts, principles, theories, general solution methods (techniques and procedures), reports, etc. and separate these into their component parts or basic elements. I can use the results of this examination to clarify the organization of the whole or to gain a global view. This level requires Knowledge and Comprehension Levels of Learning; Application is not required.

2. What do I do at this level?

I demonstrate that I can analyze results by breaking ideas, concepts, principles, theories, general solution methods (techniques and procedures), reports, etc. into their component parts. I explain the logical interconnections of the parts. I can also develop detailed cause and effect sequences.

3. How will the teacher know I am at this level?

When asked, I am able to explain why I did what I did. I include a discussion with my work that explains why my solution method worked.

4. What does the teacher do at this level?

The teacher probes, guides, observe, and acts as a resource or facilitator.

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5. What are typical questions I can ask myself that will demonstrate my Analysis Level of Learning?
 - a. What are the causal relationships between the parts and how the whole functions?
 - b. Can I explain, from the parts, why the whole does or does not work?
 - c. Are the conclusions supported by sound reasoning?
 - d. Does the evidence provided support the hypothesis or the conclusion?
 - e. Are the conclusions supported by facts, opinions, or an analysis of the results?
 - f. What are the unstated assumptions, if any?
6. What are typical work products?
 - a. Answers to Analysis level exams (problems, multiple choice, and essays).
 - b. Analysis level work products are very similar to Comprehension level work products; however, documentation will include a more extensive discussion of the work. The content, amount, and depth of the presentation is what distinguishes Analysis level work products from Comprehension level work products; e.g., see items a. through f. above.
7. What are descriptive 'process' verbs?

analyze	appraise	break apart	break down	calculate
compare	contrast	debate	diagram	differentiate
examine	experiment	explain	inspect	inventory
question	relate	solve		

SYNTHESIS (CREATE)

1. How do I know I have reached this level?

I have the ability to assemble parts and elements into a unified organization or whole that requires original or creative thinking. I recognize new problems and develop new tools to solve them. I create my own plans, models, hypotheses, etc. for constructing solutions to problems. This Level of Learning requires Knowledge, Comprehension, Application and Analysis Levels of Learning.

2. What do I do at this level?

I generate ideas and use them to create a physical object, a process, a design method, a written or oral communication, or even a set of abstract relations (e.g., mathematical models). I produce written or oral reports that have the desired effect (e.g., information acquisition, acceptance of a point of view, continued support, etc.) on the reader or listener. I generate project plans. I propose designs. I formulate hypotheses based on the analysis of relevant or pertinent factors. I am able to generalize from a set of axioms or principles.

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3. How will the teacher know I am at this level?

I demonstrate that I can combine ideas into a statement, a plan, a product, etc. that was previously unknown to me; e.g., I develop a program that includes the best parts of each of these ideas.

4. What does the teacher do as this level?

The teacher reflects, extends, analyzes, and evaluates.

5. What are the typical questions I can ask myself that will demonstrate my Synthesis Level of Learning?

- a. Can I create a project plan?
- b. Can I develop a model?
- c. Can I propose a design?

6. What are typical work products?

- a. Answers to Synthesis level exams (problems, multiple choice, and essays).
- b. Synthesis level work products are very similar to Comprehension level work products; however, documentation will include a more extensive discussion of the work. The content, amount, and depth of the presentation is what distinguishes Synthesis level work products from Comprehension level work products; e.g., see items a. through c. above.

7. What are descriptive 'process' verbs?

Arrange	assemble	collect	compose	construct
create	design	formulate	manage	organize
plan	prepare	propose	set up	write

EVALUATION (APPRECIATION)

1. How do I know I have reached this level?

I have the ability to judge and appreciate the value of ideas, concepts, principles, theories, or general solution methods (techniques and procedures) using appropriate criteria. This level requires Knowledge, Comprehension, Application, Analysis, and Synthesis Levels of Learning.

2. What do I do at this level?

I make value judgments based on certain criteria such as usefulness and effectiveness. Based on information gained through application, analysis, and synthesis, I can rationally select a process, a method, a model, a design, etc. from among a set of possible processes, methods, models, designs, etc. I evaluate competing plans of action before actually starting the work. I evaluate work

Guidelines for Continuous Program Improvements

products based on internal standards of consistency, logical accuracy, and the absence of internal flaws; e.g., I can certify that the feasibility of a design has been demonstrated in a report. I evaluate work products based on external standards of efficiency, cost, or utility to meet particular goals or objectives; e.g., I can certify that the quality of the design has been demonstrated in a report.

3. How will the teacher know I am at this level?

I demonstrate that I can select, judge, or appreciate a process, a method, a model, a design, etc. using appropriate criteria or standards.

4. What does the teacher do at this level?

The teacher clarifies, accepts, harmonizes, aligns, and guides.

5. What are typical statements and questions I can answer to that will demonstrate or show my appreciation/evaluation?

- a. I can evaluate an idea in terms of ...
- b. For what reasons do I favor...?
- c. Which policy do I think would result in the greatest good for the greatest number?
- d. Which of these models or modeling approaches is best for my current needs?
- e. How does this report demonstrate that the design is feasible?
- f. How does this report demonstrate the quality of the design?

6. What are typical work products?

- a. Answers to Evaluation level exams (problems, multiple choice, and essays).
- b. Evaluation level work products are very similar to Comprehension level work products; however, documentation will include a more extensive discussion of the work. The content, amount, and depth of the presentation is what distinguishes Evaluation level work products from Comprehension level work products; e.g., see items a through f above.

7. What are descriptive 'process' verbs?

appraise	assess	choose	compare	estimate (quality)
evaluate	judge	predict (quality)	rate value	select

Practices to Achieve Desired Outcomes

The primary means by which students achieve the desired outcomes is through the curriculum, in which specific technical skills are learned in classes and laboratories, and then applied through other courses and projects.

- Several Tables will be constructed to show all MPP courses required for the degree in MPP program and their contributions toward achieving the Program Outcomes. While some outcomes achieved in a course are assessed in the course (through graded assignments, for example), others simply provide students in the course with an exposure.
- The contribution of the required non-MPP courses to achieving the Program Outcomes will also be demonstrated.
- It should be noted that students are continuously provided the opportunity throughout their academic career to demonstrate achievement of the Program Outcomes. Repetitive achievement of specific outcomes throughout a student's academic career demonstrates that students are reaching a higher level of achievement for the outcome.

Assessment Methods

Assessment methods are methods of gathering evidence to demonstrate that those outcomes important to the missions and objectives are being measured, i.e., outcomes indicators. The following items outline the methods used to collect evidence of desired outcomes as suggested by NCAAA as well as those selected by this department.

Some program outcomes can be measured using “devices” administered by the department, while others depend on external assessment. In addition, some program outcomes can be assessed using direct measures while others will probably have to be inferred by observing student behavior or by indirect measures such as student self-reporting.

The assessment methods listed below were selected by this department. A description of each method's process is outlined on the following pages.

- i. Senior projects
- ii. Portfolios or specific course assignments
- iii. Alumni surveys
- iv. Employer/recruiter surveys
- v. Placement data
- vi. Student exit interviews
- vii. Course evaluations
- viii. Participation in professional society
- ix. Summer training

Instructor's guide to Course Assessment Report and Plan for Improvement

Course Assessment Plan:

Each individual instructor must prepare a course assessment plan at the beginning of the semester in which the course is being offered. The plan must clearly define how the instructor will assess whether this particular offering has achieved the outcomes on the syllabus.

The assessment procedures must clearly define how each of the syllabus outcomes will be directly monitored. Direct monitoring of the achievement of outcomes is preferred. Direct methods involve graded work, such as homework, exams, lab exercises, lab reports, and projects. Student surveys are indirect assessment tools and carry less weight in proving that outcomes have been achieved. However, surveys are useful in gauging how the course was organized from the standpoint of our students, and can lead to suggestions for future improvements or refocus.

The instructor is free to define whatever assessment and improvement procedures he deems appropriate, but they must rely mostly on direct measures, and they must cover all of the course outcomes. Once written, however, the instructor has obligated himself to follow that plan in preparing the final course assessment.

Course Assessment Report and Plan for Improvement

Each individual instructor must prepare a course assessment and a plan for improvement at the end of the semester. This is a report that uses the outcome monitoring methods defined in the assessment plan to determine how well the course outcomes have been achieved. If deficiencies have been noted, then it also includes a plan for improving the course in the future in order to remedy these deficiencies.

The assessment and the plan for improvement are to be written by the instructor. It is necessary to develop some sort of semi-quantitative rating of how well each outcome has been achieved. It is also necessary to document which direct and indirect evidence has been used by the instructor in order to assess each outcome. It is not appropriate to include "raw data" in this section. Examples of inappropriate raw data include grade statistics for homework assignments, for exams, or for the students' cumulative course averages. Such data do not constitute an assessment even if a mapping has been made between particular graded work and course outcomes. It is the instructor's duty to interpret such raw data and to come to an overall assessment of how well each outcome has been achieved.

The instructor may want to include an additional improvement plan that is not in response to a failure to achieve outcomes. Such improvements will normally be motivated by the instructor's own vision of how the course can be made more relevant or more up-to-date.

Portfolio or Specific Course Assignments

Course portfolios are to be compiled for each course taught in the ME program in the '1431-1432 H' ('2011- 20012') academic year. Each portfolio contains representative (**good, satisfactory, poor or the equivalent superior, acceptable, unacceptable**) samples of homework, quizzes, tests, laboratory assignments and reports, as applicable for each course. In addition, some project hardware (prototypes) may also be available. Choose to use permission slips or white out student names.

While the portfolios are not used for assessment purposes, they will be available for inspection by the NCAAA evaluator. In certain instances, specific assignments (e.g. design projects, senior projects and reports) are used for assessment purposes.

Coordinator's Responsibilities: The professor for each course is responsible for collecting and compiling the sample coursework.

Please prepare Course Binder according to the following.

NCAAA Course Binders General Information

1. NCAAA Syllabus

[2-3 page document in NCAAA format].

2. Outcomes

[Include level of coverage (L/M/H) and location of relevant material in course binder - Course Classification Form (with Examples).]

3. Course Information

[Instructor syllabus, grading policy, and any other similar material]

4. Class Handouts

Handouts not related directly to student assignments/work, i.e., information provided to supplement the text, but not an assignment that would be covered under a later heading. Could also include instructors lecture notes if they weren't too voluminous - or, these could go under heading number 10 if the instructor so desired.

5. Homework

HW assignments, etc; and examples of student work.

6. Written Reports and Other Student Assignments

Report assignments, etc; and examples of student work.

7. Lab Assignments

Lab assignments, etc; and examples of student work.

8. Exams

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Include quizzes, tests, mid-terms, final exams, etc., and examples of student work.

9. Student Roster

Grade roster (list) with names blanked out unless permission slips are used.

10. Other

An annex-like location for anything the instructor wants to include other than what goes under the previous headings?

VISION, MISSION, OBJECTIVES, AND OUTCOMES for MPP Prog.

Vision, Mission, Goals and Outcomes

i. Vision

Building an outstanding teaching environment that empowers the graduates in professional computing and contributes in development of an informatics knowledge society.

ii. Mission

Providing higher outstanding education to acquire graduates sufficient skills and knowledge to communicate and work effectively in teamwork through scientific environment to compete in labor market .

iii. Program Learning Goals and Objectives

1. *Learning Goal:* Prepare graduates, who are entering immediately into professions upon graduation, to be capable of performing duties on an entry-level computing-related position.

Objectives: Students will:

- a. acquire the computer science knowledge required for graduate studies;
- b. understand the architecture, organization and programming of modern computing systems; and
- c. understand the mathematical foundations of computer science, algorithm efficiency and computational complexity.

2. *Learning Goal:* Enable graduates to pursue graduate studies to successfully complete an advanced degree.

Objectives: Students will:

- a. acquire the skills to design, evaluate, and/or implement research or scholarly projects;
- b. learn how to carry out research effectively; and
- c. enable to conduct advanced and creative research themselves

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3. *Learning Goal:* Enhance graduates to work as individuals with minimum guidance and as leaders or members of a team.

Objectives: Students will:

- a. Communicate effectively with a range of audiences; and
- b. Function effectively on multidisciplinary teams to accomplish a common goal.

4. *Learning Goal:* Encourage graduates to follow appropriate practices within a professional, legal, and ethical framework.

Objectives: Students will:

- a. be able to evaluate potential ethical dilemmas and apply decision-making techniques to resolve them; and
- b. Understand the professional, ethical, legal, security and social issues and responsibilities;

5. *Learning Goal:* Prepare graduates to recognize the need for and be capable of pursuing life-long learning.

Objectives: Students will:

- a. be aware of the rapid rate of change of technology and methodologies in computer science;
- b. be familiar with ways to gain knowledge and understanding of new developments in computer science and technology; and
- c. be aware of alternatives for continuing education in computer science.

NCAAA Outcomes

i. Knowledge

Graduate have ability to recall, understand, and present information, including:

- Knowledge of facts.
- Knowledge of concepts, principles and theories.
- Knowledge of procedures .

The levels of knowledge expected of Bachelor's Degree graduates

Successful graduates should demonstrate:

- A comprehensive, coherent and systematic body of knowledge in their field and the underlying principles and theories associated with it.*
- An awareness of relevant knowledge and theory in other related disciplines and professional fields.*
- Familiarity with the latest developments at the forefront of specializations within their field including current research resolution of significant professional issues.*
- An awareness of relevant conventions, regulations, and technical requirements and of how these .*

ii. Cognitive Skills

Cognitive skill learning outcomes include the ability to:

- Apply conceptual understanding of concepts, principles, theories.*
- Apply procedures involved in critical thinking and creative problem solving, both when required to do so, and when faced with unanticipated new situations.*
- Investigate issues and problems in a field of study using a range of sources and draw valid conclusions*

The levels of cognitive skills expected of Bachelor's Degree graduates

Successful graduates should be able to:

- Undertake investigations, comprehend and evaluate new information, concepts, and evidence from a range of sources, and apply conclusions to a wide range of issues and problems with limited guidance .*
- Investigate relatively complex problems and recommend creative and innovative solutions taking account of relevant theoretical knowledge and practical experience, and the consequences of decisions made .*
- Apply these skills and insights in professional and academic contexts relevant to the field of study undertaken .*

In professional programs, the graduates should not only be able to use routine procedures appropriately, but also identify situations requiring

innovative solutions and draw on relevant theoretical and respond to practical insights.

iii-Interpersonal Skills and Responsibility

Interpersonal skills and responsibility learning outcomes include both the ability and the predisposition to:

- Take responsibility for their own learning and continuing personal and professional development*
- Work effectively in groups and exercise leadership when appropriate*
- Act responsibly in personal and professional relationships*
- Act ethically and consistently with high moral standards in personal and public forums*

The levels of interpersonal skills and responsibility expected of Bachelor's Degree graduates

Successful graduates should possess the :

- Capacity to contribute to and facilitate constructive resolution of issues in group or team situations, whether in a leadership role or as a member of a group*
- Ability to exercise group leadership in undefined situations calling for innovative responses*
- Ability to take initiative in identifying issues requiring attention and in address them appropriately on an individual or team basis*
- Capacity and acceptance to take responsibility for their continued life-long learning*
- Ability to identify and use appropriate means of researching new information or techniques of analysis needed for completion of tasks*
- Ability to deal with ethical and professional issues involving values and moral judgments in ways that are sensitive to others and consistent with underlying basic values and relevant professional codes of practice .*

iv- Communication, Information Technology, and Numerical Skills

Communication, information technology, and numerical skills outcomes include the ability to:

- Communicate effectively in oral and written form
- Use information and communications technology, and
- Use modern mathematical and statistical techniques*

The levels of communication, information technology and numerical skills expected of Bachelor's Degree graduates

Successful graduates should demonstrate:

- Ability when investigating issues and problems to identify relevant statistical or mathematical techniques and apply them creatively in interpreting information and proposing solutions*
- Ability to communicate effectively both orally and in writing, selecting and using forms of presentation appropriate for differing issues and audiences*
- Use of the most appropriate information and communications technology in gathering, interpreting, and communicating information and ideas*

Cognitive

Category	Example and Key Words
<p>Knowledge: Recall data or information.</p>	<p>Examples: Recite a policy. Quote prices from memory to a customer. Knows the safety rules. Key Words: defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states.</p>
<p>Comprehension: Understand the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.</p>	<p>Examples: Rewrites the principles of test writing. Explain in one's own words the steps for performing a complex task. Translates an equation into a computer spreadsheet. Key Words: comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives Examples, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates.</p>
<p>Application: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the work place.</p>	<p>Examples: Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a written test. Key Words: applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses.</p>
<p>Analysis: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.</p>	<p>Examples: Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training. Key Words: analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates.</p>
<p>Synthesis: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.</p>	<p>Examples: Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several sources to solve a problem. Revises and process to improve the outcome. Key Words: categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes.</p>
<p>Evaluation: Make judgments about the value of ideas or materials.</p>	<p>Examples: Select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget. Key Words: appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports.</p>

iii. Affective: growth in feelings or emotional areas

This domain includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. The five major categories are listed from the simplest behavior to the most complex.

Affective Skills

Affective skills and responsibility, including the ability to:

- take responsibility for their own learning and continuing personal and professional development.
- work effectively in groups and exercise leadership when appropriate.
- act responsibly in personal and professional relationships.
- act ethically and consistently with high moral standards in personal and public forums.

Communication is a sub-domain of affective skills including the ability to:

- communicate effectively in oral and written form.
- use information and communications technology.

Affective

Category	Example and Key Words
<p>Receiving Phenomena: Awareness, willingness to hear, selected attention.</p>	<p>Examples: Listen to others with respect. Listen for and remember the name of newly introduced people. Key Words: asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits, erects, replies, uses.</p>
<p>Responding to Phenomena: Active participation on the part of the learners. Attends and reacts to a particular phenomenon. Learning outcomes may emphasize compliance in responding, willingness to respond, or satisfaction in responding (motivation).</p>	<p>Examples: Participates in class discussions. Gives a presentation. Questions new ideals, concepts, models, etc. in order to fully understand them. Know the safety rules and practices them. Key Words: answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes.</p>
<p>Valuing: The worth or value a person attaches to a particular object, phenomenon, or behavior. This ranges from simple acceptance to the more complex state of commitment. Valuing is based on the internalization of a set of specified values, while clues to these values are expressed in the learner's overt behavior and are often identifiable.</p>	<p>Examples: Demonstrates belief in the democratic process. Is sensitive towards individual and cultural differences (value diversity). Shows the ability to solve problems. Proposes a plan to social improvement and follows through with commitment. Informs management on matters that one feels strongly about. Key Words: completes, demonstrates, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works.</p>
<p>Organization: Organizes values into priorities by contrasting different values, resolving conflicts between them, and creating an unique value system. The emphasis is on comparing, relating, and synthesizing values.</p>	<p>Examples: Recognizes the need for balance between freedom and responsible behavior. Accepts responsibility for one's behavior. Explains the role of systematic planning in solving problems. Accepts professional ethical standards. Creates a life plan in harmony with abilities, interests, and beliefs. Prioritizes time effectively to meet the needs of the organization, family, and self. Key Words: adheres, alters, arranges, combines, compares, completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes.</p>
<p>Internalizing values (characterization): Has a value system that controls their behavior. The behavior is pervasive, consistent, predictable, and most importantly, characteristic of the learner. Instructional objectives are concerned with the student's general patterns of adjustment (personal, social, emotional).</p>	<p>Examples: Shows self-reliance when working independently. Cooperates in group activities (displays teamwork). Uses an objective approach in problem solving. Displays a professional commitment to ethical practice on a daily basis. Revises judgments and changes behavior in light of new evidence. Values people for what they are, not how they look. Key Words: acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, verifies.</p>

iv. Psychomotor

Psychomotor skills include manual dexterity and the capacity to manage physical behavior with precision and skill. They include skilled use of equipment and other physical activity (that may be managed consciously or unconsciously), voice production and non-verbal communications.

Descriptions of the level of psychomotor skills expected of a bachelor's degree graduate will vary widely for different fields of study according to the nature of the skills to be developed in different academic areas or professional fields

The levels of psychomotor skills expected of Bachelor's Degree graduates

Successful graduates should demonstrate levels of achievement appropriate to their field of study:

- An ability to use sensory cues to guide motor activity
- Skillful performance of motor activities
- Coordination of a series of activities to achieve internal consistency
- Achievement of high levels of motor skills performance naturally

Psychomotor

Category	Example and Key Words
<p>Perception: The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection, to translation.</p>	<p>Examples: Detects non-verbal communication cues. Estimate where a ball will land after it is thrown and then moving to the correct location to catch the ball. Adjusts heat of stove to correct temperature by smell and taste of food. Adjusts the height of the forks on a forklift by comparing where the forks are in relation to the pallet.</p> <p>Key Words: chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects.</p>
<p>Set: Readiness to act. It includes mental, physical, and emotional sets. These three sets are dispositions that predetermine a person's response to different situations (sometimes called mindsets).</p>	<p>Examples: Knows and acts upon a sequence of steps in a manufacturing process. Recognize one's abilities and limitations. Shows desire to learn a new process (motivation). NOTE: This subdivision of Psychomotor is closely related with the "Responding to phenomena" subdivision of the Affective domain.</p> <p>Key Words: begins, displays, explains, moves, proceeds, reacts, shows, states, volunteers.</p>
<p>Guided Response: The early stages in learning a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing.</p>	<p>Examples: Performs a mathematical equation as demonstrated. Follows instructions to build a model. Responds hand-signals of instructor while learning to operate a forklift.</p> <p>Key Words: copies, traces, follows, react, reproduce, responds</p>
<p>Mechanism: This is the intermediate stage in learning a complex skill. Learned responses have become habitual and the movements can be performed with some confidence and proficiency.</p>	<p>Examples: Use a personal computer. Repair a leaking faucet. Drive a car.</p> <p>Key Words: assembles, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.</p>
<p>Complex Overt Response: The skillful performance of motor acts that involve complex movement patterns. Proficiency is indicated by a quick, accurate, and highly coordinated performance, requiring a minimum of energy. This category includes performing without hesitation, and automatic performance. For example, players are often utter sounds of satisfaction or expletives as soon as they hit a tennis ball or throw a football, because they can tell by the feel of the act what the result will produce.</p>	<p>Examples: Maneuvers a car into a tight parallel parking spot. Operates a computer quickly and accurately. Displays competence while playing the piano.</p> <p>Key Words: assembles, builds, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.</p> <p>NOTE: The Key Words are the same as Mechanism, but will have adverbs or adjectives that indicate that the performance is quicker, better, more accurate, etc.</p>
<p>Adaptation: Skills are well developed and the individual can modify movement patterns to fit special requirements.</p>	<p>Examples: Responds effectively to unexpected experiences. Modifies instruction to meet the needs of the learners. Perform a task with a machine that it was not originally intended to do (machine is not damaged and there is no danger in performing the new task).</p> <p>Key Words: adapts, alters, changes, rearranges, reorganizes, revises, varies.</p>
<p>Origination: Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills.</p>	<p>Examples: Constructs a new theory. Develops a new and comprehensive training programming. Creates a new gymnastic routine.</p> <p>Key Words: arranges, builds, combines, composes, constructs, creates, designs, initiate, makes, originates.</p>

ASIIN General Criteria for the Accreditation of Bachelor's degree program in Physics

Educational Objectives - Competences

"High technology is computer science/informatics technology" – this sentence from a position assessment by the National Academy of Sciences of the USA shows that computer science/informatics plays an increasingly important role in practically all areas of the natural and engineering sciences, but also in economic, financial and social science areas and in medicine.

The educational objectives are outlined by the description of the learning outcomes, i.e. knowledge, skills and competences, required by the graduates for practicing their profession or for post-graduate studies. These outcomes vary in extent and intensity in accordance with the differing objectives of Bachelor's.

Requirements for Bachelor's Degree of Computer Science

Graduates have the ability to contribute on their own responsibility in cooperation with appropriate specialists to the adequate solution of problems in nearly all fields of application. They contribute to the solution of complex problems. They are able to build on the concepts, methods, procedures, techniques and tools of informatics.

On the basis of their Bachelor degree studies, graduates will have learned to react to the dynamically evolving challenges which result from technological development or from problems in the field of application. Computer scientists with a Bachelor's degree are able to widen and deepen their competences by further training in their job or through academic studies such as consecutive Master degree programs or by additional studies in other fields.

Learning Outcomes

Computer scientists with a Bachelor's degree have acquired a fundamental understanding of central concepts and methods of their discipline; they are

informed about important current developments of their field of study; they are able to integrate their knowledge and competences in a wider context.

A) Specialist Competences

The following learning outcomes (knowledge, skills or competences) are typical of a Bachelor's degree in computer science:

- a. Computer scientists with a Bachelor's degree have acquired a fundamental understanding of central concepts and methods of their discipline; they are informed about important current developments of their field of study; they are able to integrate their knowledge and competences in a wider context.
- b. They command the scientific foundations necessary for informatics, in particular the mathematical, logical, statistical, and physical tools.
- c. They understand central notions and conceptions of informatics, such as "algorithm" and "data processor", in an abstract form which is not dependent on actual technical realization.
- d. They are able to assess the possibilities and constraints of algorithmic operations.
- e. They are in a position to think in abstract models, and they have mastered constructive approaches.
- f. They are thoroughly familiar with the most important algorithms, data structures and problem-solving patterns, including central paradigms of programming. They possess a basic understanding of the composition and functioning of computers and key informatics systems such as operating systems, database systems, and communication systems.

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- g. They understand the basic principles of complex informatics systems consistent with state-of-the-art technique, and they have first-hand experience of handling them adequately.
- h. They have mastered the methods of modeling, construction, verifying and testing typically used in informatics; they are able to apply these methods to solving problems.
- i. Graduates are familiar with important applications of informatics. They are able to develop solutions for practical problems using informatics techniques and evaluate them, having due regard to technical, ergonomic, economic, juridical, and social constraints.

B) Social Competences

Graduates know the history of informatics:

1. They are aware of juridical aspects of informatics and its effects on society.
2. They are aware of ethical questions and security problems connected with the application of information processing systems.
3. They possess key skills such as e.g. techniques of learning and working, the capacity for team-work and communicating, the ability to undertake literature research and to apply new media.
4. They are able to independently complement and deepen the knowledge acquired during their studies and to adapt to developments in the field.
5. They have experience of solving application problems in teams covering all phases of system development, from analysis of requirements, specification and implementation to testing.
6. They are able to reflect critically on their own contributions and explain them both to experts and to persons not acquainted with informatics, using sound arguments.
7. They are prepared to take on responsibility in technical as well as management roles. In particular, periods of practical training as an integral part of the curriculum help to develop the professional skills of graduates.
8. Ideally, they will have broadened their horizons by taking advantage of offers of mobility integrated in their study programs; they will have made use of opportunities to extend their language skills; they will be aware of and understand international and global developments in information technology and their possible effects on business and society.

Relationship Between MPP Program Outcomes, ASIIN, and NCAAA:

Graduates will have:

Physics program outcomes		ASIIN	NCAAA
a.	An ability to:		knowledge
1.	<i>Acquire knowledge of computing and mathematics appropriate to the discipline including simulation and modeling.</i>	a	
2.	<i>Recognize the need for and an ability to engage in continuing professional development.</i>	b	
3.	<i>Understand of best practices and standards and their application.</i>	b, c, i	
b.	An ability to:		Cognitive
1.	<i>Analyze a problem to identify and define the computing requirements appropriate to its solution.</i>	h, i	
2.	<i>Design, implement, develop and evaluate complicated computer-based system, process component, or program to meet desired needs.</i>	i, 6, 8	
3.	<i>Use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, web systems and technologies.</i>	g, h	
4.	<i>Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.</i>	f	
	5. <i>Integrate IT-based solutions into the user environment effectively.</i>	f	
c.	An ability to:		Responsibility

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Physics program outcomes			ASIIN	NCAAA
1.	<i>Adhere professional, ethical, legal, security, and social issues and their responsibilities.</i>		f, h	
2.	<i>Analyze the local and global impact of computing on individuals, organization, and society.</i>		c, e	
3.	<i>Use current techniques, skills, and tools necessary for computing practice.</i>		7	
d.	An ability to:			Communication
1.	<i>Function effectively on teams to accomplish a common goal.</i>		b, e, h	
2.	<i>Communicate effectively with a range of audiences.</i>		b, d, e	
3.	<i>Apply advanced numerical methods.</i>		e, h	

Guidelines for Continuous Program Improvements

**MPP Course Objectives and Outcomes
Due September 3, 2005**

Course Number: _____ **Course Name:** _____

Prepared by: _____

Table 1 – Please fill in this table based on the following criteria:

1. Based on your course syllabus, provide 3 - 5 *major course objectives* in column 1 along with 2 - 3 *outcomes for each objective* in column 2.
2. In column 3, indicate how the objectives and outcomes in column 1 and 2 map into ME Program Learning Outcomes (PLO)
3. In column 4, indicate how the objectives and outcomes in columns 1 and 2 *map* into the NCAAA Outcomes
4. In column 5, indicate how the objectives and outcomes in columns 1 and 2 *map* into the Asiin criteria

Course Objectives:	Course Outcomes:	PLO	NCAAA	Asiin
1.	1.			
	2.			
	3.			
2.	1.			
	2.			
	3.			
3.	1.			
	2.			
	3.			
4.	1.			
	2.			
	3.			

Guidelines for Continuous Program Improvements

Table 2: Based on your course syllabus, indicate how your course is *assessed*. If an item is given but not assessed, simply leave the last 4 columns blank.

Assessment Method	Number/Type				Instructor Assessed	TA/Grader Assessed	Peer/Self Assessed
Homework							
Mid Terms/Final Exams							
Quizzes							
Individual Projects	1-2 wks	3-4 wks	1/2 sem	Full sem			
Team Projects	1-2 wks	3-4 wks	1/2 sem	Full sem			
Lab Assignments							
Computer Assignments							
Computer Tools Used	(e.g., C, FORTRAN, Matlab)						
Oral Presentations							
Written Reports							
Other							

Guidelines for Continuous Program Improvements

Course:

Developed by:

Course Competency	Mastery Level	Core Competency (Y/N)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Course:

Developed by:

Course Prerequisite Competency	Mastery Level
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

Department of MPP

Summary of NCAAA course information for BSc MPP degree

Course Description

Number of Credits

Prerequisites by Course

Prerequisites by Topic

Textbook(s)/ Required Material

Course Topics

Guidelines for Continuous Program Improvements

Course Objectives

Course Outcomes

Individually each student will be able to:

Class/Laboratory Schedule

Computer Applications

Laboratory Projects

Contribution to Meeting the Professional Component

Science/Design Contents

Guidelines for Continuous Program Improvements

Assessment Tools

Prepared by

Date of Preparation

Revised

Guidelines for Continuous Program Improvements

Course Assessment

Course: _____ Semester _____ Instructor _____

The Department Accreditation Committee (DQC) uses the following report in its efforts to continuously improve the Programs. The report should be completed and submitted before the end of Finals.

1. Are the prerequisites for this course adequate (if not what changes do you recommend)?
2. Are the students entering with the expected mastery of these prerequisites (if not what fraction fall short of expectations)?
3. Discuss the ease/difficulty that the students had in demonstrating mastery of the core course competencies
4. What, if any, recommendations do you have for improvement relative to: course outcomes, **core** competencies, and/or Program Objectives and Outcomes.
5. Do you have any other comments that might help the DQC improve the Program?

Student Sign Off Form for MPP Course

Course: _____ Semester ____ Instructor _____

MPP Department Grading Guidelines

MPP courses are assessed using the following condition:

A grade of C or better can only be given to a student who demonstrates mastery of **all** the course core competencies.

Acknowledgment of Reading

You were given a number of documents during your first class to read. Please read the following statements, sign, make a copy for your records (optional), and return this signed copy to your instructor within the first week of class. If you feel you cannot sign this document please discuss the reasons with your course instructor.

1. I received and read a copy of the MPP Program Objectives and Outcomes
2. I received and read a copy of the Course Objectives, Outcomes, and Competencies
3. I have noted the **Core** Competencies contained within the Course Competencies
4. I have read the grading guidelines above and know that I can only receive a grade of C or better if I demonstrate mastery of **all** the **Core** Competencies.

Signature