Core Course Objectives & CNS Responsibilities

The Texas Higher Education Coordinating Board recently revised the objectives that must be met by UT core courses. We are being asked to “recertify” each of the courses that are currently on the Mathematics and the Science UT Core lists. To do this, we must provide the following to UGS this spring:

For each core course,
(a) a sample course syllabus
(b) a completed “core course” form, explaining how the course meets the new core objectives

Here are the objectives that must be met by Mathematics and Science core courses:
(a) critical thinking
(b) communication
(c) empirical and quantitative skills
(d) teamwork (Science only!)

You will see each of these objectives (translated into a sentence) on the second page of the core course form. The task at hand is to write an explanation of how the objectives are being met within each particular class. Ideally, whatever is written on the form is somehow validated in the syllabus itself. For example, if you indicate that there is “teamwork” going on during class, then somewhere on the syllabus it should probably describe what class time looks like and it should reference things that look like teamwork.

So what kinds of activities satisfy the core objectives? Here are some examples to help you identify what can be referenced as support for each required objective

Critical Thinking Skills

- Students are asked to solve problems that require an understanding of underlying concepts rather than requiring only techniques explicitly taught in class.
- Students adapt knowledge on the subject to new situations which have not been seen before.
- Students determine whether a given statement is true or false, and prove it or provide a counterexample.
- On homework and exams, solve problems that require data analysis, evaluation of the reliability of the findings, and drawing an appropriate conclusion.
- Students diagram arguments, use concept maps, graphically organize processes
- Students write essay exams or short analytic assignments that require evaluation, synthesis, etc.
- Students evaluate the conditions under which a hypothesis will be rejected and propose strategies for reducing the likelihood of this happening.
- Given a raw dataset, students propose a method for examining and/or summarizing those data to answer a question of interest.
- Take knowledge from different categories from the class and marry the concepts together.
- Students evaluate media reports for causality, validity, accuracy
- Demonstrate the transfer of core knowledge to new situations and problems, relying on models to make predictions and formulate explanations for observed behaviors.

Communication

- Make research papers “proposals”
- Oral presentations of any length
- Narrative explanations of equations and processes
- Visual presentations of data such as posters, Web sites or slide presentations
• Students describe the nature of relationships that are represented graphically and express the relationship formally through a mathematical equation.
• Students interpret the outcomes produced by statistical software packages.
• Students generate mathematical proofs to justify the validity of mathematical statements.
• Students create logically ordered, clearly written solutions to problems.
• Students are required to present their knowledge and results of the labs in the form of a report and sometimes as a presentation or poster.
• Students create graphs and charts to clearly display data.
• In-class essay exams, take-home assignments, or informal writing that occurs within required weekly discussion sections
• Discussion sections as a participatory environment in which students hone their oral communication skills
• In large group setting, students come to the board to graphically display and explain their findings, perhaps with concept mapping.
• Students explain clearly what is being assumed and what is being demonstrated in solutions.
• Even in the large auditorium during “lecture” sessions, regularly engage students in discussion. The weekly discussion sections help to build their confidence to express their ideas in a much larger forum.

Empirical and Quantitative Skills

• Students calculate and then interpret the results of problem solving
• Students analyze the change in one variable with dependence on another to explain physical and chemical changes.
• Students generate and interpret graphs
• Problem-based or project-based assignments requiring data analysis and interpretation
• Students generate linear, exponential or logistic models and interpret them
• Students utilize statistical software to analyze large datasets after cleaning and sorting the data
• Students collect and analyze their own data to answer a question of interest.

Teamwork

• After individually solving i-clicker questions (at one of Bloom’s level of taxonomy), students then evaluate the solution together as a group.
• Students work in pairs to complete laboratory exercises that require collaborative decision-making.
• During discussion sections students are regularly divided into three groups which function as teams, working on individual assignments, and which then come back to the entire group to present the results they have developed during their teamwork.
• Peer review of writing or other assignments
• In a large group setting, instructor facilitates a discussion about the appropriate steps for problem-solving that is guided by student decisions and group feedback.
• Students work in small groups to debate their individual “correct” answers given in class as a form of peer teaching (Harvard Prof Eric Mazur - Peer Instruction)