Teaching Improvement Fund 2003 (Faculty of Science)

Title: *Enhancing the employability of Science graduates: increasing the awareness of staff and students to the needs of the employers*

**Research Skills: Definitions**

**Higher order skills**

*Critical thinking* is accepting nothing at face value, and engaging in an examination of truth and validity in all argument and discourse and evaluating the relative importance of ideas. Critical thinking is evaluating and weighing different sides of an argument; applying reason and logic to determine the merits of arguments; and drawing and evaluating conclusions from logical arguments and data analysis.

*Problem solving* is the ability to identify, define and analyse problems, create solutions, evaluate opinions, innovate and improve current practices. Solution(s) need to be evaluated in the context of the identified problem, i.e. is the solution appropriate.

*Analysis* is gathering, evaluating and deploying relevant information.

**Background skills**

*Critique:*
- the ability to identify issues, apply critical reasoning, and make informed judgements, on a piece of work.

*Imagination and Creativity* is:
- initiating creative responses to problems and framing such responses as opportunities;
- producing work that embodies value, novelty, transformation, and condensation;
- producing work that is original and is valued by others in the discipline (value);
- producing work that is novel and useful (novelty);
- producing work that yields a new perspective – work that forces us to see reality in a new way (transformation);
- producing work that has an intensity and concentration of meaning (condensation); and
- developed after extensive training in the field, when the student has acquired the confidence to be autonomous (independent and questioning), flexible and open to new experiences and interpretations, original and novel thought.

*Logic and reasoning* is:
- an understanding of the structure of deductive and inductive logical arguments;
- assessing the logical basis for scientific claims and conclusions; and
- drawing conclusions from scientific arguments or analyses.

*Data collection and analysis* is:
- data gathering – surveys, focus groups, interviews, experiments;
- design of data collection tool – survey design and experiment design;
- interpreting data;
• identifying an appropriate method (mathematical or otherwise) for analysis of data;
• techniques of statistical analysis including using statistics in research and the statistical analysis of surveys;
• awareness of the limitations of analysis techniques; and
• forming appropriate conclusions from results of analysis.

**Conceptual thinking** is:
• analyzing a big issue in its component parts and making judgements about the value and relevance of ideas and information;
• identifying concepts relevant to a problem, synthesizing concepts and available data to construct a solution.

**Reflection** is:
• thinking about what you have done, what you might have done differently, how you feel about it, and how you might change it to improve your learning;
• providing constructive comment about each others work; and
• making changes to improve the learning process.