End of Course Memo
CS 202 – Discrete Math
Aaron Bloomfield (Fall 2004)

Course Objectives:

1. Introduce a formal system (propositional and predicate logic) which mathematical reasoning is based on.
2. Develop an understanding of how to read and construct valid mathematical arguments (proofs) and understand mathematical statements theorems).
3. Introduce and work with various problem solving strategies and techniques (e.g. abstracting away unimportant details to state a problem in its basic form, transforming a problem into another simpler problem which we have already solved).
4. Introduce and work with important discrete data structures such as sets, relations, and discrete functions.
5. Develop important mathematical traits such as precision and the willingness and ability to investigate and solve one problem in multiple ways to verify that the solution is indeed correct.

Assessment of Learning by Course-Objective:

For the assessment of these objectives, I analyze the final exam, which was split into 5 parts to correspond to the various course objectives (there was a sixth part, but that was a mini-survey, so everybody got points for that part). The final was difficult, but fair. The overall average on the final exam was 79.2%.

Objective 1: Introduce a formal system (propositional and predicate logic) which mathematical reasoning is based on.
The final exam grades yielded an average of 89.4% on the questions for this objective. This was the second highest, which is not surprising – logic was the first concept studied, and both of the midterms had significant questions on this topic. Thus, due to the increased exposure to the material, it is expected that the students would do well on it.

Objective 2: Develop an understanding of how to read and construct valid mathematical arguments (proofs) and understand mathematical statements theorems).
The final exam grades yielded an average of 91.6% on the questions for this objective. This shows solid understanding of the material.

Objective 3: Introduce and work with various problem solving strategies and techniques (e.g. abstracting away unimportant details to state a problem in its basic form, transforming a problem into another simpler problem which we have already solved).

The final exam grades yielded an average of 63.1% on the questions for this objective. This result is slightly biased, as it only relied on one (rather difficult) question on the final. Still, this is lower than expected, and more focus should be focused on this material in the future.

Objective 4: Introduce and work with important discrete data structures such as sets, relations, and discrete functions.
The final exam grades yielded an average of 74.8% on the questions for this objective. This shows understanding of the material.

Objective 5: Develop important mathematical traits such as precision and the willingness and ability to investigate and solve one problem in multiple ways to verify that the solution is indeed correct.
The final exam grades yielded an average of 61.5% on the questions for this objective. This objective was poorly worded and rather vague – how does one demonstrate (and measure) a "willingness" to solve problems in multiple ways? This objective is not going to be used next semester. Thus, the 61.5% average on this part of the exam is rather meaningless.

Assessment of Changes Made in the Course:

This was my first semester teaching this course, so I did not make any changes to it. I generally followed the same course format as that of Paul Reynolds, who had taught this course successfully in previous semesters.

Other Issues:

1. Do you have concerns regarding the background of students coming into the course?

No. The students coming into the course are assumed to have no background in the material presented. This causes a lot of the initial material to be repeated for them. However, there is no obvious way to fix this – requiring a pre-requisite course (so the students all had the same background) would just move the problem to that course.

2. Are there other issues affecting student learning beyond what has been discussed elsewhere in this report? Include any other concerns you have about what students have or have not learned when they have completed the course.

The fact that the course was at 9 a.m. three days a week made it very difficult for the students to learn the material – many college students are simply not awake early enough in the morning to effectively learn. Studies have shown that early morning is the worst time for math classes. Moving the course later in the day would have a significant improvement in material retention.

3. If you know of changes being made or considered in the curriculum that might affect the course, briefly describe what these are and how the course might be affected.

None.

4. List any other comments you think the Committee that monitors our degree programs should know about this course this semester.

   None.

Mapping of Course Objectives to BSCS Outcomes:

CS Degree Outcomes: Students who graduate with a BSCS will…	**Course Obj. 1**	**Course Obj. 2**	**Course Obj. 3**	**Course Obj. 4**	**Course Obj. 5**
(1: Math & DLD) Have demonstrated comprehension in relevant areas of mathematics (including calculus, discrete math, and probability), and in the area of logic design.	D	D	D	D	D
(2: Fundamentals) Have demonstrated comprehension in fundamental topics of computing, including the intellectual core of computing, software design and development, algorithms, computer organization and architecture, and software systems.	F	F	F	F	F
(3: Analysis & Evaluation) Have applied knowledge of areas of computing to analyze and evaluate algorithms, designs, implementations, systems, or other computing artifacts or work-products. Application of this knowledge includes the ability to design, conduct and evaluate the results of experiments and testing activity.		F		F	F
(4: Build Solutions) Have applied knowledge of areas of computing to create solutions to challenging problems, including specifying, designing, implementing and validating solutions for new problems.	X	X	X	X	X
(5: Research Awareness) Be aware of current research activity in computing through activities including reading papers, hearing research presentations, and successfully planning and completing an individual research project in computing or its application.					X
(6: Broadening) Have demonstrated comprehension of subjects in the humanities, social sciences, and the natural sciences in order to broaden a student's education beyond engineering and computing.					
(7: Social and Professional) Comprehend important social, ethical, and professional considerations related to computing practice and research, and be able to apply this knowledge when analyzing new situations.					
(8: Post-graduation) Be prepared to enter graduate programs in computing or related fields, and be prepared to begin a professional career in computing.	X	X	X	X	
(9: Life-long Learning) Have demonstrated a self-directed ability to acquire new knowledge in computing, including the ability to learn about new ideas and advances, techniques, tools, and languages, and to use them effectively; and to be motivated to engage in life-long learning.	X	X	X	X	X
(10: Teamwork) Have demonstrated the ability to work effectively in a development team.					
(11: Communication) Have demonstrated the ability to communicate effectively (orally and in writing) about technical issues.	X	X	X	X	X
(12: Professional development practices) Comprehend important issues related to the development of computer-based systems in a professional context using a well-defined process to guide development.					