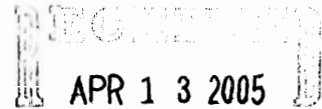


**Doctorate Degree in Mathematics
Assessment of Student Learning Plan
Kansas State University**



BY:.....

A. College, Department, and Date

College: Arts and Sciences
Department: Mathematics
Date: Nov. 1, 2004

B. Contact Person(s) for the Assessment Plans

Louis Pigno, Department Head
Pietro Poggi-Corradini, Director of Graduate Studies

C. Degree Program

Ph.D. in Mathematics

D. Assessment of Student Learning Three-Year Plan

1. Student Learning Outcome(s)

In the next three years we will focus our assessments on the following student learning outcomes:

- K-2: Students will know the standard theorems and techniques of real and complex analysis, including Lebesgue theory and analytic function theory.
- K-3: Students will know the standard theorems and techniques of higher algebra, including structure theorems.

Special rationale for selecting these learning outcomes

Our Ph.D. SLOs are divided into two categories: "Knowledge" (K-1 through K-4) and "Reasoning" (R-1 through R-5). We have identified three major areas (Analysis, Algebra, and Geometry/Topology), of which we require all our Ph.D. students to demonstrate knowledge. Moreover, our students are required to achieve the required knowledge level within three years of their entry in our program. Our Qualifying Exam system requires each student to be tested in at least one of the two areas covered by K-2 and K-3. By using (and further developing) the proposed assessment system, we hope to be able to measure the students' success in their first three years, which is critical in their future development as mathematicians.

Relationship to K-State Student Learning Outcomes

Program SLOs	University-wide SLOs (Graduate Programs)			Program SLO is conceptually different from university SLOs
	Knowledge	Skills	Attitudes and Professional Conduct	
K-2	X			
K-3	X			

2. How will the learning outcomes be assessed? What groups will be included in the assessment?

Both K-2 and K-3 will be assessed by direct methods (both formative and summative) - based on course work and exam results - following an incremental system described below.

- *Initial Phase.* Students take the Counseling Exam, which has three components, two of which correspond to the areas we want to focus on. Based on this exam, the students are advised to enroll in the Analysis and Algebra (700 or 800 level) courses that best fit their entry level. In case of failure of one component of the Counseling Exam, the student is required to re-take that exam. [Formative]
- *Intermediary Phase.* This second phase applies only to those students who are enrolled in the 700 level (introductory graduate) courses. At that level, mostly through homeworks, quizzes, and course exams, the students are expected to demonstrate readiness for the 800 level (core graduate) courses. [Formative]
- *Pre-candidacy Phase.* This assessment phase applies to those students who are enrolled in the 800 level courses. These courses are designed to prepare the student for the Qualifying Exam. Homeworks, quizzes, classroom presentations, and course exams are the main instruments for assessing the student's readiness for the Qualifying Exam. Based on the assessment results, the course instructor and/or the student's academic make recommendations to the student. [Formative]
- *Final Phase.* The students are expected to take the Qualifying Exam in the area(s) where they feel best prepared, with the expectation to pass in two areas, within three years from entering the graduate program. This is the last step before they can start working on a dissertation. [Summative]

The attached tables describes the detailed structure of (the preliminary version of) this system, as well as the groups involved in the assessment process.

3. When will these outcomes be assessed? When and in what format will the results of the assessment be discussed?

The Graduate Program Advisory Committee (GPAC) will have the primary responsibility for managing the assessment program. Since the (full) assessment system is designed to cover the first three years of the student's graduate studies (at the end of which the student has to take the Qualifying Exams, and fulfill graduate coursework), priority will be given to new graduate students (who start in Fall 2005). Those students already in our program will be partially assessed, the data accumulated from them being used as baseline data.

Three-year timeline

December 2004	Collect data from MATH 721, 730, 810, 821
January 2005	Collect data from Counseling Exams; Collect data from Qualifying Exams.
February 2005	GPAC discusses academic progress and makes recommendations to graduate students and their academic advisors.
March 2005	Faculty Meeting to discuss students with poor academic performance.
May 2005	Collect data from MATH 722, 731, 811, 822; GPAC evaluates the assessment process, and necessary revisions, including rubric/curriculum changes. Baseline data is analyzed.
August 2005	Collect data from Counseling Exams; Collect data from Qualifying Exams; One-time academic advising for new graduate students.
December 2005	Collect data from MATH 721, 730, 810, 821.
January 2006	Collect data from Counseling Exams; Collect data from Qualifying Exams;
February 2006	GPAC discusses academic progress and makes recommendations to graduate students and their academic advisors.
March 2006	Faculty Meeting to discuss students with poor academic performance;
May 2006	Collect data from MATH 722, 731, 811, 822; GPAC evaluates the assessment results for 1 st year graduate students, and identifies areas of concern regarding student learning.
August 2006	Collect data from Counseling Exams; Collect data from Qualifying Exams; One-time academic advising for new graduate students.
December 2006	Collect data from MATH 721, 730, 810, 821.
January 2007	Collect data from Counseling Exams; Collect data from Qualifying Exams;
February 2007	GPAC discusses academic progress and makes recommendations to graduate students and their academic advisors.
March 2007	Faculty Meeting to discuss students with poor academic performance.
May 2007	Collect data from MATH 722, 731, 811, 822; GPAC evaluates the assessment results for 2 nd year graduate students, and identifies areas of concern regarding student learning.
August 2007	Collect data from Counseling Exams; Collect data from Qualifying Exams; One-time academic advising for new graduate students.
Fall 2007	Collect data from MATH 721, 730, 810, 821; GPAC evaluates the assessment results for 3 rd year graduate students; GPAC and the Department Head analyze the assessment process, and prepare a new assessment plan.

4. What is the unit's process for using assessment results to improve student learning?

Historically, GPAC has reviewed all assessment data, and has made recommendations to graduate students and their advisors, as well as to the curriculum committee. In addition, any faculty member in the department may suggest ideas or concerns for the GPAC and/or the curriculum committee to consider. These committees then provide recommendations to the faculty that are accepted (or not) at scheduled faculty meetings. Several changes aimed at improving student learning (for example new Counseling and Qualifying Exam systems) have been implemented in the past decade from this model. With the new assessment plan we will have a more rigorous and formalized method of collecting and analyzing data, as well as monitoring student academic progress, but will keep the same process for improvement as it seems to be working well.

Assessment System for K-2 (Preliminary Version)

Phase (when)	Assessment method	Who carries on assessment	Who is assessed
Initial (entry)	<i>Written Test:</i> Analysis Counseling Exam	Analysis Counseling Exam Committee	All students who enter Graduate Program
Intermediary (1 st year)	<i>Course work:</i> MATH 721-722	Course instructor	All students enrolled in the course
Pre-candidacy (2 nd year)	<i>Course work:</i> MATH 821-822	Course instructor	All students enrolled in the course
Final (3 rd year)	<i>Written Test:</i> Analysis Qualifying Exam	GPAC & Analysis Qualifying Exam Committee; Ratified by faculty	All students who take the Analysis Qualifying Exam

Assessment System for K-3 (Preliminary Version)

Phase (when)	Assessment method	Who carries on assessment	Who is assessed
Initial (entry)	<i>Written Test:</i> Algebra Counseling Exam	Algebra Counseling Exam Committee	All students who enter Graduate Program
Intermediary (1 st year)	<i>Course work:</i> MATH 730-731	Course instructor	All students enrolled in the course
Pre-candidacy (2 nd year)	<i>Course work:</i> MATH 810-811	Course instructor	All students enrolled in the course
Final (3 rd year)	<i>Written Test:</i> Algebra Qualifying Exam	GPAC & Algebra Qualifying Exam Committee; Ratified by faculty	All students who take the Algebra Qualifying Exam