External Evaluation Report
for the
Department of Mathematics and Statistics
Texas A&M University-Corpus Christi
May 31, 2009

This letter summarizes my observations made during a visit to the Department of Mathematics and Statistics at Texas A&M University-Corpus Christi from May 26–28, 2009. The letter also contains my specific recommendations to the university and the department.

I received the department’s “Undergraduate Program Review” document for study prior to my visit. I spent Tuesday evening and all day Wednesday meeting with various Department, College and University members. On Thursday morning I reported my preliminary findings to Drs. Babbili and Nelson in the Provost’s Office, to the department, and to Dr. Smith-Engle in the College.

The departmental Undergraduate Program Review Committee, consisting of Drs. Denny, Guardiola, Tintera, Zimmer (chair), Cammarata (external member) and Ms. Compton (student member), thoroughly investigated the data provided by the university. The resulting report provides a detailed analysis of the state of affairs in the department. The committee’s recommendations are based on the evidence found, well thought-out, and will thus provide a valuable road map for the department in the near future.

The department has had an excellent beginning. Creating a separate Department of Mathematics and Statistics seems to have lifted faculty morale considerably. I was very impressed that all faculty members I met are deeply committed to the department’s main mission of providing a high quality mathematics education to its majors.

Most departmental faculty members are productively engaged in research and scholarship. It is notable that some faculty members, in Mathematics Education in particular, are consistently successful in attracting outside funding. Research and scholarship activities are limited by the high teaching load of the institution.
Therefore I recommend that faculty active in research and in support of graduate programs be supported by reducing their teaching loads\(^1\).

The undergraduate curriculum for the majors appropriately focuses on two target audiences. About half of the students are interested in a mathematical career in industry or government, or preparing for graduate studies at the institution or elsewhere, while the other half of the students is seeking state certification to teach mathematics at the high school level. The curriculum is well-rounded and uses departmental resources efficiently. The curriculum design also enables a smooth transition to the graduate program in mathematics.

Additionally the department has gained the reputation of providing quality service in support of the university’s core curriculum and the mathematics education of STEM majors. The recent expansion of course offerings in mathematics and statistics to satisfy core curriculum requirements in our state is commendable.

My specific recommendations to the university administration and the department are listed below.

**Recommendations:**

1. **Departmental home.** The Department of Mathematics and Statistics is currently housed in two separate locations on campus. Being a new department, it is essential that the department offices are housed in one building on campus instead. This will help the department in the process of building a departmental identity and facilitate collaboration between its members. The new location should also provide an informal meeting and study space for undergraduate mathematics majors.

2. **Faculty positions.** The department needs authorization to re-open its previous search for a faculty member in the area of Mathematics Education. Additional positions are needed in Statistics and Applied Mathematics. All three positions are necessary to ensure that the department can continue to pursue its mission of providing excellent programs of study at both the undergraduate and masters’ level. A position in Applied Mathematics can also strengthen the CMSS Ph.D. program. Hiring in these three areas is highly competitive; additionally the national supply of qualified Mathematics Educators still falls short of demand\(^2\). It is therefore essential

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\(^1\)The UT Systems’ Minimum Academic Workload regulations, for instance, provide a mechanism to award additional TLCs to faculty teaching graduate courses and supervising student theses. See: [http://www.utexas.edu/academic/oir/workload/2005workload.pdf](http://www.utexas.edu/academic/oir/workload/2005workload.pdf)

that the hiring process starts in a timely manner, and can be extended, if the need arises, beyond a one-year period.

With these resources, the department would be better equipped to aggressively recruit additional majors. While the current number of majors is slightly above the national average\(^3\) of 0.60\% of undergraduate enrollment—well below the national need, I am certain that with suitable recruitment efforts, the number of mathematics majors could be increased by at least 50\% in a five-year time span.

3.1. Curriculum: Lower division laboratories. Both the Calculus sequence and the introductory Statistics course are taught in a lecture+lab format. The laboratories provide an opportunity to engage students actively in their learning, and, if done right, will improve student satisfaction, success and retention. To reap these benefits, it is essential that there is a close linkage between the lecture and the accompanying labs. I encourage the department to investigate how these links can be made stronger. Not only does there have to be a regular channel of communication between course instructor and lab instructor, but the effort must also be coordinated between all instructors of a particular course.

One of the current goals of the laboratories accompanying the Calculus sequence is to make students familiar with a versatile computational software package (Matlab). The department should continue this effort. Since these courses are basically taken by all STEM majors, this provides an opportunity to utilize the software not only in advanced mathematics courses, but also in other STEM courses across campus. Coordination with other departments will be useful.

3.2. Curriculum: Capstone course. The departmental curriculum contains a capstone course taken by all mathematics majors. This course provides a suitable vehicle for mathematics majors to apply the knowledge they have gained during their undergraduate studies in a meaningful way. At the same time it is an ideal opportunity for the department to assess the learning goals it has set for its graduating seniors. During the course, students apply mathematical modeling to a “real world” problem, engage in research on how to use the model for analysis and prediction, write a research report, and present their findings to the class.

Students are overwhelmed by the demands of this course and the department is not completely satisfied with the observed outcomes. What is needed is appropriate scaffolding earlier in the undergraduate program to give the students a chance to build the skills expected of them in the capstone course. The department should

start a discussion whether parts of this scaffolding should be integrated into several existing courses in the program, or whether a new course is needed at the sophomore or junior level to address these issues.

3.3. Curriculum: Coordination of service courses. A considerable portion of the lower-division service courses in mathematics are taught by adjuncts, drawn from a limited pool of local applicants. While this provides substantial cost savings to the university, this also comes with a price. Part-time faculty members are usually much less committed to the mission of the department, and lack a long-term view. Excessive use of adjuncts makes the coordination of multi-section courses much more difficult, consequently leads to undesirable variations in student learning gains among sections of the same course, and makes it harder for students to transition from one course in the course sequence to the next. Because of its sequential course structure this affects mathematics departments probably more than any other department on campus.

The university and the department should think about strategies to reduce these negative effects. One obvious solution is to reduce the reliance on part-time faculty and to hire tenure-track faculty or full-time instructors instead. Implementing common tests and/or final exams, maybe combined with course modularization, can also help in achieving comparable results across many sections of the same course.

4. Course placement. Every college student in Texas has to successfully complete at least one college-level mathematics course. It is commendable that the department has recently expanded the choice of courses that can be used to satisfy this requirement. Data gathered show that a substantial number of freshmen students are not placed in the appropriate initial mathematics course. General audience mathematics courses can be barriers to student success; it is therefore imperative that students are initially placed in a course where they have a high likelihood of success. Similarly, “underplacing” sends the wrong signal to incoming students.

Currently placement is based on a variety of factors including SAT or ACT quantitative test scores. If further analysis reveals that these data alone cannot reliably predict student success, it is advisable to implement a mathematics placement exam. A pilot project could be launched to see whether an online placement exam will improve placement.

At the University of Texas at El Paso summer orientation includes a six-hour “math review”. Students subsequently retest; about 40% of all students place into a mathematics course at a higher level than indicated by their initial math placement results. See: Benjamin C. Flores, Jana Renner Martínez, Helmut Knaust, Ann Darnell, Lilly Romo and Connie Kubo Della-Piana. The
5. **Advising.** Currently incoming freshmen in the mathematics major are required to see a professional advisor. While advising after the initial contact is encouraged, it is not mandatory, unless students are put on academic probation. Additionally, faculty advisors are available to mentor students if desired. Given the university’s high priority on increasing retention, I strongly recommend more invasive advising procedures. Mandatory advisement of all students every semester will surely improve retention and shorten time to graduation.

While advising by professional advisors is probably the most effective solution for students during their first two years of study, faculty mentoring should be employed as graduation draws closer. Advising is time-consuming, but it is also rewarding for the faculty advisor. To improve the flow of information and to increase faculty awareness, I also recommend that the professional advisor for mathematics majors reports on her activities to a faculty meeting on an annual basis.

Due to a resignation, the professional advisor is currently responsible for more than 800 students. This amounts to more than twice the advisee workload recommended by NACADA. The college needs to hire additional advising staff as soon as possible.

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