

Indiana State University

2006 - 2007 Academic Annual Report

Department of Math & Computer Science

Vision Statement

[View/Modify Vision](#)

Below is your vision statement from previous years. Please take this opportunity to review it and if necessary update it.

The Department of Mathematics and Computer Science adopted a mission statement at the beginning of 2005. This also highlights the department's vision. The mission statement reads: The mission of the Department of Mathematics and Computer Science is to provide quality education in mathematics, computer science, mathematics education, information technology, and related fields and to expand knowledge in these fields. The Department strives to hone the thinking skills of the students. This effort is sustained and informed by the faculty's pursuit of enquiry-based research and scholarly activities. The faculty also have the mission of preparing quality teachers for the schools and providing students with the foundational knowledge, skills, and relevant experiences to succeed in their chosen professions. What our Students Should Know: Mathematics: Our students should be able to use a problem-solving approach to investigate and understand mathematical content; Formulate and solve problems from both mathematical and everyday situations; Communicate mathematical ideas in writing, using everyday and mathematical language; Make and evaluate mathematical conjectures and arguments and validate their own mathematical thinking; Show an understanding of the interrelationships with mathematics; Connect mathematics to other disciplines and real-world situations; Understand and apply numerical computation and estimation techniques and extend them to algebraic expressions; Understand the role of axiomatic systems in different branches of mathematics; Have a firm conceptual grasp of limit, continuity, differentiation and integration, and a thorough background in the techniques and applications of calculus and advanced analysis; Understand and apply the major concepts of linear algebra, algebra, analysis, probability, and statistics. Computer Science: Students should be able to possess a foundation of technical skills needed to begin a career in the area of Computer Science. They should understand intricate hardware, software, and organizational environments in which Computer Scientists work. They should be able to use critical thinking skills and invoke a variety of general problem-solving strategies and techniques. They should be able to apply systems theory concepts and methods to the solution of problems. They should be able to communicate effectively with their co-workers and administrators. They should be able to develop application systems by employing appropriate methodologies, techniques, tools, and languages. They should also understand the current trends in technology and learn to adapt to a changing computing environment. They should possess the conceptual skills, resources, and learning approaches needed for continuous professional development and growth. Mathematics Education: After completing a bachelors degree in mathematics education a student should be able to use a problem-solving approach to investigate and understand mathematical content; Formulate and solve problems from both mathematical and everyday situations; Communicate mathematical ideas in writing, using everyday and mathematical language; Make and evaluate mathematical conjectures and arguments and validate their own mathematical thinking; Show an understanding of the interrelationships within mathematics; Connect mathematics to other disciplines and real-world situations; Understand and apply concepts of number, number theory and number systems; Understand and apply numerical computation and estimation techniques and extend them to algebraic expressions; Understand and apply the process of measurement; Use geometric concepts and relationships to describe and model mathematical

ideas and real-world constructs; and Use both descriptive and differential statistics to analyze data.

Year in Review

Accomplishments

As you have heard, increasing public awareness of Indiana State University's accomplishments is crucial to building student enrollment, influencing policy makers, and developing a place of pre-eminence in the Midwest. What do you consider to be your department's accomplishments for the 2006-2007 year that will contribute to this effort? [Please list in priority order and limit to no more than 8.]

1. The faculty members published several original research articles in internationally reputed journals. The department faculty published 20 discipline based research articles. 2. One of our faculty members visited educational institutions in Korea and New Zealand on invitation for research and this resulted in research publications. 3. Several of our faculty members refereed scholarly papers for internationally reputed journals related to Mathematics, Computer Science, and Mathematics Education. This speaks to the reputation and international standing of our faculty. 4. One of our faculty members is currently writing a book with tentative title "Logical Reasoning and Mathematical Proofs". This will serve as the bridge course needs of the students between Calculus and abstract mathematics (corresponding to our Math 380). 5. Several of our faculty members gave invited presentations both in the Country and outside. This is a testimony for the international reputation of our faculty members. 6. A biweekly seminar series was organized in the department. Eleven talks were presented by the department faculty and by invited speakers. 7. The Department also signed several articulation and degree completion agreements for students coming from Ivy Tech community college and Vincennes University to our programs. 8. The department worked diligently on the proposed MS in CS program and we are hoping that it will go through the rest of the steps in ISU and will be submitted to the State for approval soon. We expect our enrollments in the MS program to increase with the approval and introduction of the MS in CS program.

Research and Scholarship

What is your assessment of accomplishments in the area of research and scholarship that is focused primarily on contributions to practice and discipline-based scholarship? Are you satisfied overall? In which areas do you feel your department does particularly well? In which areas do you feel your department needs to improve?

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Grants, Contracts & Off Campus Professional Service

What is your assessment of accomplishments in the area of grants, contracts, and off campus professional service? Are you satisfied overall? In which areas do you feel your department does particularly well? In which areas do you feel your department needs to improve?

One of our faculty members was a co PI for two NSF grant application for Bioinformatics. Another faculty member applied for an NSF grant for research in combinatorics. Another faculty member obtained a grant from OIT for research in "Detectin Structural Difference between Coding and Non-Coding Regions in Genomes". It is expected that the results of this research will lead to an NSF grant application in Genome researech. The Department is involved in 9 grant activities, some of them external. The Department faculty is actively involved in providing some of the modules for Project PRE. The Mathematics Education faculty run a full fledged Center for Mathematics Education Resource Library serving the teachers in the region. One of our faculty members worked with the State coordnator for MATHCOUNTS in helping with the annual state chapter competition. The same faculty member also conducted the Regional High School Science Bowl and Regional Middle School Science Bowl at Indiana State University. One of our faculty memebtrs is the Coach for Indiana Americal Regional Mathematics League (ARML) team. ARML is the highest Mathematics Competition that High School students can participate. We also host the website for the Indiana ARML. We have three board of Directors for Indiana Council of Teachers of Mathematics (ICTM). The journal for ICTM is also published from our department. Several of our faculty wrote reviews of professional discipline based research articles.

Teaching

We would like to highlight innovative approaches to teaching. Has your department developed any pedagogies or practices you'd like to share with us? Please describe briefly.

Several Mathematics and Computer Science web based courses were offered in 2006-2007. In spite of the budget constraints, we were able to accommodate most of the students' course needs, by strategic plannning with the courses. Several graduate students successfully completed their Masters program. All these students had to complete a project as part of their course requirements.

Course Scheduling/Enrollment Management

How is the department making sure that students are able to get the classes they need to graduate in a timely manner?

The greatest challenge has been the budget constraint. Our Adjunct budget was cut severly. In spite of this, by increasing the class sizes and cancelling the low enrolled classes and accommodating those students into other sections, we were able to serve the needs of all students. We also offered several sections of remedial mathematics courses. One of the sections of Math 102 is a large section with more than 160 students. Teaching this section and making sure that the students succeed is always a challenge. The department also offered help with mathematics in the Mathematics Learning Center. This is manned by our graduate students and undergraduate juniors and seniors, and all possible help is provided for students of Math 010, 011, 102, 111, 115, and other mathematics courses. Several elective courses in Mathematics and Computer Sciences were offered during 2006-2007. Our enrollments in M.S. in Mathematics have gone up. Most of our students look for concentration in computer Science. Our Computer Science course offerings take the needs of the graduate students into consideration.

Outreach

What are the outreach opportunities for your discipline? (non-traditional modes of delivery and timing, etc)

Several of our courses are offered on the web.Math 102, Math 111, Math 301, CS 253, are some of

the courses offered on the web. For Math 131, Calculus I one of our Professors used the web based MyMathLab, a pedagogy tool for the benefit of the students. We hope to increase the number of web based offerings based on the needs and the feasibility. We also offered some courses in the evenings.

Assessment

Please share your stated student learning outcomes.

We did an assessment of our Mathematics and Computer Science undergraduate programs last year. We plan to do it again next year. We also plan to do an assessment for the IT program.

Strategic Initiatives

Community Engagement I

Please summarize your faculty's efforts in community engagement this year.

Some of our faculty are engaged in preparing area school students for mathematics competitions at state and national levels. Faculty also actively organize/participate in the organization of Mathcounts, Regional Middle School Science Bowl, Regional High School Science Bowl, and ARML contests. The Editor of the Ictm journal is one of our faculty members. Our Math Education faculty are engaged in helping the Vincennes Schools with after School help for teachers and students. We are quite satisfied with the community engagement activities offered by our faculty..

Experiential Learning

What is your vision for experiential learning in your department?

The Department is also engaged in Experiential learning activities of ISU and Community Engagement activities. Our Mathematics Education students do student teaching in area schools. This gives them experience and abilities to teach School students in a class room setting. Some of our Information Technology and Computer Science Students get hands-on experience with internships with industry. There are many such opportunities available to juniors and seniors.

Fundraising Activities

What steps have you taken to support fundraising activities in your department? How can your efforts be supported?

Our Math Ed faculty made a presentation to the ISU Foundation board members. We will be discussing plans for fundraising in the future. On our website we also have a link to "Giving to the Department". Though this did not result in any funds we hope that this will have some long term results in the future.

Quality

Quality

Please provide 1-2 suggestions to increase the ability of your department or the University to meet the criteria above.

Funding from the University for enrollment activities like, visiting the area schools to increase the visibility of the department and publicity for our degree offerings in Mathematics, Math Education, Computer Science and Information Technology would be useful in increasing the enrollments.

Feedback

This section is to allow you to share your ideas for enhancing enrollment, dealing with budget

and other challenges facing the university community.

Budget provisions for outreach activities to reachout to the school teachers and students would help us increase our enrollments.