Provost’s Learning Innovations Grant for Faculty
Request for Full Proposal
2007-2008

Please hand-deliver your completed grant proposal (4 pages, plus attachments),
the original plus 12 copies, to:
Susan DeWoody, 1530 Wallace (5)
by 4:30 p.m.
No hand written proposals will be accepted.
Notification of awards will be made by Friday, April 13, 2007.

Project Title:

Core Databases for Supply Chain Management

Applicant(s):

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<th>Name</th>
<th>Telephone</th>
<th>Dept.</th>
<th>College</th>
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<tr>
<td>Dr. Sudhakar</td>
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<td>Industrial &amp; Systems</td>
<td>KG College of Engineering</td>
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<td>Reddy</td>
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Core Databases for Supply Chain Management

1. Summary

A database course is being offered in the Industrial and Systems Engineering (ISE) department which currently uses ad-hoc examples to teach the basics in Databases for Information Systems [1]. It is liked by the enrollees for its rich content and usefulness in their employment immediately after graduation. However, it is perceived incorrectly by many non-enrollees as a programming course and the enrollment has been modest. In general, engineering students shy away from programming oriented courses due to their demanding nature and the perception that they don’t want to become programmers.

The proposed project will provide the necessary resources (beyond the normal course enhancement efforts) to develop a set of core databases commonly used in industry for supply chain collaboration among its partners and present the course more as a course in Supply Chain Management. Information Systems based on Relational Databases will continue to be the basis for all discussions. Such databases do not exist in public domain due to confidential nature of the business transactions and the broad scope of information that needs to be captured for any given type of business. An application oriented course will be more meaningful for engineering students that are interested in computer information systems. The development of these databases involves simulating various supply chain scenarios and generation of substantial data to support these scenarios, and implementation of databases in a SQL server. Collaboration with other engineering departments and faculty will provide the scenarios needed to attract students from various disciplines as well as generate case studies that are multi-disciplinary in nature. Specifically, Dr. Pratapa Reddy, Professor in Computer Engineering will be co-PI and will provide the necessary data content for the databases being generated. The PI (Dr. Sudhakar Paidy) will be responsible to design the overall system architecture, implement the databases, and teach the course. Graduate student help is needed in capturing the data and entering them into the database.

2a. Targeted Learners

This proposal targets students (under-graduate and graduate) in Industrial & Systems Engineering as well as students in other Engineering & non-engineering majors. The database course for which this project is being proposed has had students from Software Engineering and Mechanical Engineering in addition to students from Industrial & Systems Engineering programs (under-graduate and graduate). The proposed project has the potential to generate interest from students from Electrical as well as Computer Engineering as the proposed content is equally attractive to them. The colleges of Saunders (Business) and Golisano (Information Technology, Software Engineering, and Computer Science) offer courses in databases and may find the ISE offering appropriate for their students.

2b. Number of Affected students

The Industrial and Systems Engineering department currently has about 150 under-graduates and approximately 30 graduate students with an average class enrollment of about 35. This database
course is currently offered as an elective course with an average enrollment of 12. All engineering students have the option of enrolling into this course with a pre-requisite of a programming course which almost all engineering students take at present. The colleges of Saunders (Business) and Golisano (Computer & Information Sciences) offer courses in databases and may find the ISE offering appropriate for their students. Thus, there exists a large pool of students (~500) that may be affected by this project. The impetus behind the proposed project is to increase the enrollment to about 20. Larger class sizes (more than 20) will be handled by offering multiple sections and/or by increasing the frequency of course offering.

3. Current/New course

The proposed project enhances an existing course and increases the appeal to students in ISE as well as other disciplines.

4. Anticipated Impact on Teaching and/or Learning

The role of databases and information systems in engineering projects is increasing steadily as more and more enterprise applications rely on central repositories of data available within the organizations. Engineers depend on data stored in these and also provide data into such organization wide (as well as inter-organizational) repositories. Many engineering students shy away from programming based courses primarily due to their demanding nature and a steep learning curve for the application domain in which they will develop and/or use applications. The proposed project uses databases as applicable to typical electronic manufacturers and their suppliers. A supply chain management systems is a concept common to all business entities and thus the exposure to such applications will enhance the interest and learning in students. Due to business confidentiality of data, such databases do not exist in the public domain for adaptation.

5. Impact on Student Success

With the help of the proposed approach, the students can get started in an application area (supply chain) very quickly and focus more on the concepts that are new to them. It is our belief that when students are interested in the subject matter, they will be highly motivated and participate actively in the class projects. The perception of the database course will be transformed from a programming course to an application oriented course. The course content will become more cohesive as one major application area (supply chain management of an electronic manufacturer) instead of a collection of ad-hoc examples will be used in teaching the database concepts. The course prepares students with a skill that is immediately marketable for their employment after graduation.

6. Measurement and Dissemination

The course affected by the proposed project, Databases and Information Systems, will be taught at least once a year as an elective course in Industrial and Systems Engineering department. It will also be offered as an independent study course when the student interest and faculty availability coincide. Most, if not all, projects within the course will be inter-related and related to supply chain scenarios. Several projects will be generated by students using the data from
these databases. Additional content and complexity will be added in the next few years with the help of student generated case-studies. A report/manual documenting the data and supply chain processes will be generated and will be made available to students as supplemental material for the course. Potential exists for publications to emerge from student case-studies and subsequent research opportunities for undergraduate students. The PI will work on presenting the experiences at a conference/faculty forum and/or publish an article.

7. Rationale
7a. Regular College Business

This course, which was first offered as an independent study about ten years ago for one or two students, grew into an elective course three years ago. The normal faculty load and annual course enhancements could not afford the resources needed to elevate the course to the proposed higher level. As it is an existing course, the usual course development opportunities do not exist. Most of the other grants/resources appear to be geared towards new and young faculty and new course developments. This grant will provide the critical resource needed to seed a multi-year effort that will impact the course significantly for some years to come. It also changes the approach in which the course material is presented for better learning and retention.

7b. Relevance to Required Competencies

The proposed project will develop some core databases using the experience of the PI (Paidy) and the co-PI (Reddy). PI has an extensive consulting experience (over twenty years) in the area of databases with local industry and co-PI has an extensive consulting background (over twenty years) in the design of electronic systems for which supply chain scenarios will be designed. Being in academia for more than 25 years each, both have extensive experience in teaching the related subject areas respectively.

7c. Relevance to Other Faculty

Other faculty interested in teaching database related courses can mimic the design developed here. The design and data generated will be available in the form of reports and publications. Faculty from engineering disciplines as well as software engineering and computer science will have interest in this course.

7d. Faculty Credentials

Dr. Paidy (PI) is a Professor in Industrial & Systems Engineering department since 1979 and Dr. Reddy (co-PI) is a Professor in Computer Engineering department since 1981. Dr. Reddy was also a Professor jointly in Electrical Engineering department in the past. Dr. Paidy has been teaching this and other computer related courses (Computing for Engineers, Advanced Systems Integration/Real-time Computing, and Data Structures) to ISE and other students for the last 28 years. He also has extensive consulting background in developing database based ERP (Enterprise Resource Planning) systems for small businesses. Dr. Reddy has taught interface electronics courses and electronic systems design courses in both electrical and computer engineering departments for over 35 years (26 at RIT). He also has extensive consulting
experience (over 20 years) in designing and building electronics hardware projects. His expertise is instrumental in identifying the data content which is mostly electronics based. In the proposed project, various product designs and resulting supply chain scenarios will be used in establishing the database design and the content. Both faculty members are associated with the college-wide multi-disciplinary projects.

7e. Innovation

The objective is to structure the database course as an application oriented course rather than programming oriented course as it is perceived by many now. This not only has the impact on enrollment but also on the learning of database concepts which are critical in modern business applications which engineering students must support. Most business applications are data centric and depend on relation database design that this course focuses on. Industrial engineering discipline emphasizes human, systems and process design aspects of engineering and it is a natural place for an application (supply chain) oriented course. This course also complements other ISE courses in supply chain management based on Operations Research. The material is relevant to all engineering as well as non-engineering majors that are interested in information systems.

8. Timeline

June-October, 2007
- Identify product families for the supply chain scenarios
- Conceptual design of databases

September–November 2007
- Implementation of Database Design
- Generate/gather Data for the adapted design
- Generate Queries for scenarios chosen

October 2007-April 2008
- Documentation, Presentation and publication

References

[1] Course outline for Databases and Information Systems, Department of Industrial & Systems Engineering, Rochester Institute of Technology

Attachments

1. Budget Detail
2. Letter of support from the ISE Department Head
Attachment 1

Budget Explanation

Faculty Salaries
- Two faculty for summer at ½ ‘release’ @4500 $4500
- One faculty for fall at 1 ‘release’ @4500 $4500
- Benefits for summer @8.3% $ 374

Student Stipend
- Graduate student for summer quarter (~200 hours) $3200
- Graduate student for fall quarter (~200 hours) $3200 (ISE)

Instructional supplies/Copy/Poster expense $500
Software (Microsoft Visio or equivalent) $200

Total 13274(PLIG) + 3200(ISE)

The ISE department will fund the stipend for the graduate student during Fall 2007 quarter while the proposed project will fund the graduate student help during the summer and/or other quarters. The project requires a minimum of six month (most likely nine month) period for the research, design, and implementation cycle. Some graduate student help (~80 hours) will be from the electronics area and Dr. Reddy will advise that student. Their contribution will be spread over multiple quarters.

Attachment 2

A letter of support from the ISE department head is enclosed. The computer engineering department head has approved the time allocation of its faculty and student help. The budget form has the signatures of both department heads.
MEMO

To: PLIG Review Panel
From: Jacqueline R. Mozrall, ISE Department Head & Associate Professor
Date: March 14, 2007
Re: Support Letter for Dr. S. Paidy

I support Dr. S. Paidy’s proposal, “Core Databases for Supply Chain Management”. The course 0303-765 Database – Information Systems is offered annually, and has seen very low enrollment over the last few years. I do believe that a more applied context for the course could help to increase enrollment. This work would potentially attract more engineering students from various disciplines and equip them with supply chain-specific experiences and tools that would allow them to function more effectively in today’s global environment. In support of this effort, the department would be willing to fund a graduate student during the fall term.