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:
The Investigation of an Innovative “Toolbox” for Experiential Learning in ET

Applicant(s):

<table>
<thead>
<tr>
<th>Name</th>
<th>Telephone</th>
<th>Dept.</th>
<th>College</th>
</tr>
</thead>
<tbody>
<tr>
<td>William Leonard</td>
<td>475-5813</td>
<td>MMET/PS</td>
<td>CAST</td>
</tr>
<tr>
<td>Steven Ciccarelli</td>
<td>475-4736</td>
<td>ECTET</td>
<td>CAST</td>
</tr>
<tr>
<td>Beth Carle</td>
<td>475-6752</td>
<td>MMET/PS</td>
<td>CAST</td>
</tr>
</tbody>
</table>
Request for Full Proposal Requirements

Pages 1- 4

1. Title and summary of proposed project.

The Investigation of an Innovative “Toolbox” for Experiential Learning in ET

This project is about capturing the inquisitiveness and creativity of the student by way of experiential learning via an 'erector-set' style of Toolbox. The Toolbox initially contains basic metrology and sensor technology in which to capture information. It is expected to grow in robustness throughout additional kits or modules as the students progress through their coursework.

Learning innovation is coming from bringing sensor technology along with their own creative design of experiments into a "Mr. Wizard" style of learning. The student will then compare results with the applied theory from the coursework. Students will not only be expected to create the experiment but also will investigate the variability of errors and sensitivity of equipment. It is expected that students, where possible, actually fabricate their own thermocouple and pressure/strain sensors where possible. It is also expected that seniors will provide the majority of the development and kit expansion in their later courses.

The equipment and supplies are purchases of sensing equipment such as data acquisition, wireless communications, sensors that need to be evaluated and tested to prove the concept and what it would cost in the long run. It is proposed that the equipment be housed in the materials testing lab of MMET/PS and is shared between MMETPS and ECET.

In addition to the sensor technology that would be owned at the departmental level it is expected that the MMET students would purchase a “Toolbox” to use in their classes. The initial Toolbox would consist of Machinery Handbook, caliper/micrometer set, thermocouple wire, etc. The Machinery Handbook would be used as the text in 0610-211 Intro. to Materials Technology, as well as an important reference for other classes including 0617-220 Manufacturing Processes I.

MMET departmental funding to support this project includes loan of a laptop or tablet PC for the summer development effort. As per George Sutherland, it is likely that should this investigation prove valuable that the department will fund further equipment purchases in order to implement at a classroom level.

Deliverables:

- Prototype Toolbox
- Instructional modules for selected courses to be used as pilots
- Logistics of implementation to an entire freshman class
- Report documenting work done and assessment results
- Plan for future funding
- Paper for potential publication by students hired for development efforts
2. Targeted learners or population (include cluster, departments, year level, number of learners impacted).

The initial plan is to target freshmen in both the MMET and ECTET programs. This involves approximately 170 students (60 ECTET, 110 MMET and E/MET and Undeclared ET). It is intended that additional modules will be developed for more advanced students after the initial Proof of Concept. Eventually all MMET students and ECTET students will be involved.

3. Is this for a current course or new course?

Toolbox will be incorporated into existing Mechanical and Manufacturing ET courses. Freshmen courses are to be involved first (60% of MMET courses taken in the freshman year). Approximately 110 incoming freshmen (Mech. ET, Manuf. ET, Electro-Mechanical ET, and some of the Undeclared ET):

- 0610-211 Introduction to Materials Technology
- 0610-304 Materials Testing Lab
- 0610-220 Design Dimensioning & Tolerancing
- 0617-220 Manufacturing Processes I

After initial Proof of Concept, the toolbox will continue to expand with more modules being developed. Anticipated Sophomore courses to be impacted in the second year are:

- 0610-302 Statics
- 0610-303 Strength of Materials
- 0610-315 Principle of Mechanical Design

The development of the sensor technology will impact the electronics sequence in ECTET. This sequence is taken by all students in Electrical, Computer, and Telecom ET students (with the exception of Computer students don’t take Electronics 4). Approximately 60 students per year.

- 0609-203 Electronics I
- 0609-361 Electronics II
- 0609-362 Electronics III
- 0609-363 Electronics IV

One outcome of the Proof of Concept is to determine exactly which courses will be incorporated in both the MMET and ECTET programs. The target is to reach at least 50% of the courses in Mechanical ET.

4. Anticipated impact on teaching and/or learning.

The impact on teaching is unknown due to the unique nature of inquisitive investigation by the student and faculty in using the Toolbox. This report is to investigate the actual impact.
5. How will your project impact student success (i.e., retention)?

It is anticipated that there will be an increase in retention due to the experimental nature of the Toolbox. This has been displayed in previous departmental efforts such as ‘Battle-eggbots’ and autonomous line-following robots.

6. How you will measure the impact, how you will report your findings, and what you will share about your project in a faculty forum.

- Impact – Through retention, student feedback, faculty involvement.
- Findings report – Through faculty meetings and special workshop forums.
- Share your project – Dissemination through regional and national organizations such as the American Society of Engineering Educators and New York State Engineering Technology Association.

7. Present a rationale for your project, as it ties to the intent of the grant, including:

   a. why it is not part of regular college business –

   It has not been done before as far as we know.

   b. its relevance to required cluster, college, and/or department competencies –

   It will enhance TAC-ABET accreditation requirements. It also fits into incoming-President Dresler’s goal of providing an innovative learning experience to all students, and faculty alike. This experience would begin in the first year and continue throughout the students’ experience at RIT.

   c. describe how your project is relevant to other faculty and what you think it would take to transfer your success to other faculty

   Project will be relevant to all faculty teaching first-year courses, initially, expanding eventually to all faculty as we move from proof of concept to full implementation. Transfer of success given as they become benefactors of the Toolbox.

   d. relevant credentials, experience of involved faculty/staff

   Faculty involved have substantial industrial and laboratory experience in using all of the anticipated components in the Toolbox. Faculty also have substantial experience in guiding students involved in institute endeavors, such as will be required to guide the students this summer. It’s important to note that students will be hired for much of the project’s development.

   e. describe how this innovation is in your discipline or program

   Not sure what is being asked here. However, this innovation through experiential learning and student-generated design of experiments, which closely ties in with the Industrial Advisory Board recommendations and ABET accreditation requirements.
8. Provide a timetable of the development of the project.

- Summer 2007 – Roll-out of plan and investigation of proposed equipment
- Fall 2007 – Pilot implementation to selected courses.
- Spring 2007 – Ramp-up to include additional courses. Also, investigation of new funding through external grants.

Page 5

1. Using attached form, complete a detailed budget for the project. Signatures of appropriate budget officers need to be included. Department Head signature is required for single department projects. **College Dean signature is REQUIRED for interdepartmental (Adaptation and Implementation Program) projects.**

   NOTE: See attached

Page 6

1. If co-funders are involved, attach statement(s) of support.

2. Letters of support from appropriate administrators are to be included.

   NOTE: See attached letter from George Sutherland.