**EQUIPMENT NEEDS ASSESSMENT APPLICATION**

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| Name of Person Submitting Request: | **Michael Lysak** |
| Program or Service Area: | **Physics/Astronomy/Engineering** |
| Division: | **Science** |
| Date of Last Program Efficacy: | **Spring 2008** |
| What rating was given? | **Continuation** |
| Equipment Requested | 1 Vernier Physics LabQuest 2 Deluxe Packages @ $ 1064<br>1 Vernier Logger Pro 3 Software @ $189<br>1 *Physics with Vernier* Lab Book @ $48<br>---<br>1 *Advanced Physics with Vernier-Mechanics* Lab Book @ $48<br>1 *Advanced Physics with Vernier-Beyond Mechanics* Lab Book @ $48; 1 *Physics with Video Analysis* Lab Book @$ 48<br>1 Force Sensor, Motion Detector, Rotary Motion Sensor @ $357 (total); Advanced Physics accessories @ $938; Advanced Physics-Beyond Mechanics accessories @ $1159; Advanced Physics-Beyond Mechanics Sensors @ $1708 (detailed lists for accessories and sensors in Vernier catalog *Probeware Solutions for College Physics 2012*) |
| Amount Requested: | **$6300** |
| Strategic Initiatives Addressed: | Institutional Effectiveness and Resource Management; Student Success; Technology |

Replacement ☐ Growth ☐X

1. Provide a rationale for your request.

The present Physics/Astronomy labs are using equipment that is quite a number of years old, and, with increased use, more of this equipment is falling into disrepair. None of our present labs use modern technology with respect to computerized data acquisition and analysis; although there is much inherent value in the students' using analog measurement methods with devices such as stopwatches, meter sticks, thermometers, calipers, micrometers, and balances, at least some of the labs should have automated data acquisition capabilities in order to introduce the students to more modern lab measurement methods. The lab probe/data logging/analysis packages would be an asset for the labs, as the students could analyze their data in the lab itself, rather than going to a computer lab on campus or to their own personal computers. Furthermore, with these lab packages, the department would have the option of developing/performing labs using automated data acquisition; this, combined with the hands-on/manual data acquisition labs that we presently use, would greatly improve our laboratory program.

2. Indicate how the content of the latest Program Efficacy Report and current EMP data support this request. How is the request tied to program planning? *(Reference the page number(s) where the information can be found on Program Efficacy.)*

One of the goals of the Physics/Astronomy Department as stated in the EMP is to "Update the Physics/Astronomy Labs and their related equipment needs". Further, on pg. 12 of the Physics/Astronomy Program Efficacy Report of Spring 2008, "The department is piloting the exploration of the use of Fourier Systems Data Logging Kits in the Physics and Astronomy Labs next Fall". The Vernier Physics LabQuest 2 Deluxe Packages are superior to the Fourier Systems; the Vernier Package has the Vernier LabQuest interface (a stand-alone or computer module for date collection and analysis), and various sensors/probes/attachments to measure quantities as time intervals, motion (displacement, velocity, acceleration), forces, sound, light, temperature, magnetic fields, electric currents and voltages. The *Physics with Vernier* Lab Book has information on the various experiments which can be performed with the LabQuest interface and sensors, a site license to be able to duplicate labs for student use, sample data and graphs for these experiments, as well as a complete equipment and supplies list. The department will explore the adaptation of these measurement probes for use in our present labs, update several of the analog data acquisition processes used in other present labs, and create new, more interesting labs as well, possibly using and/or adapting the Vernier labs. The use of this data acquisition/analysis system with its associated probes will enhance our Physics/Astronomy lab program and enhance student learning through an enriched, hands-on application of Physics principles as experienced in the lab environment. Further, if given the opportunity, the Physics/Astronomy department will also explore the adaptation of the Advanced Physics labs, sensors, and accessories, both in mechanics and beyond mechanics (that is, in electricity, magnetism, optics, thermodynamics, and modern physics), through the associated Vernier equipment. Once the department has thoroughly explored these lab improvements, it will be in a better position to choose the appropriate equipment to be able to update our Physics and Astronomy labs, both at the introductory and advanced course levels.

3. Indicate if there is additional information you wish the committee to consider *(for example: regulatory information, compliance, updated efficiency, student success data, or planning, etc.).*

The last Program Review ranked the Physics/Astronomy department as #4 for Equipment Needs. The Science Division had ranked this Equipment request as third of all the Science division equipment requests in Fall of 2013.

4. Evaluation of initial cost, as well as related costs (including any ongoing maintenance or updates) and identification of any alternative or ongoing funding sources. (for example Department Budget or Perkins)

Total cost for the basic LabQuest2 Deluxe Packages, with software and lab book: $1301
Total cost for Advanced Physics lab books, sensors, and accessories: $4306
To include estimated tax, and shipping/handling costs: $ 1460 basic, $4800 advanced
Total cost for both: $6300

5. What are the consequences of not funding this equipment?

Without the new equipment, the Physics/Astronomy program will suffer as many of our labs will continue to be outdated, more present labs will fall into disrepair, and students will not have the opportunity to experience modern lab measuring and data acquisition techniques.