EQUIPMENT NEEDS ASSESSMENT APPLICATION
Fall 2015

Name of Person Submitting Request:	**John Stanskas**
Program or Service Area:	**Chemistry**
Division:	**Science**
Date of Last Program Efficacy:	**2011**
What rating was given?	**Continuation**
Equipment Requested	**FTIR Spectroscopes**
Amount Requested:	**$54,000**
Strategic Initiatives Addressed: (See Appendix A: http://tinyurl.com/l5oqoxm)	Access, Success, Safety

Replacement ☐X Growth ☐

1. Provide a rationale for your request.

This request is for two Nicolet iS5 FTIR (Fourier Transform Infra-Red) Spectroscopes and ancillary software. Currently we have one instrument available for all chemistry courses and demand has increased as sections increase and more labs call for spectral analysis. This instrument is standard in all research and industrial chemistry labs and familiarity with it is essential for our students.

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 main focuses of the last efficacy report and current EMP is to increase the number of degrees conferred in Chemistry. Organic Chemistry is required to complete the degree and as we have increased the offerings, in response to demand, for this class, the equipment utilized by this sequence of classes needs to be upgraded.

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

A Fourier-Transform Infrared Spectrometer (FT-IR) is a critical instrument in the Organic Chemistry curriculum, because it permits students to characterize compounds that result from reactions that they perform in the 212/213 laboratory. IR spectroscopy is a routine tool in the upper-division curriculum, and students are expected to have first-hand experience in acquiring and interpreting IR spectra for the compounds that they obtain in the lab. To maintain our C-ID designation, appropriate instrumentation experiences must be offered as part of instruction and use of the FT-IR is one of the expected instruments. Students should be proficient in the use of this instrument before they move on to upper-division organic labs, synthesis courses, or undergraduate research involving any area of organic chemistry.

Enrollment Trends. When this building was designed, the typical offering of Organic Chemistry was one section that was on-sequence; in other words, CHEM 212 in the Fall and CHEM 213 in the Spring, for a total of 2 sections per year. In Fall 2011, when we began using the new building, we had 3 sections in the Fall and 2 sections in the Spring, for a total of 5 for the year. This already represented a 150% increase in Organic lab sections, compared to what

had been offered for many years. If we further compare 2011–2012 (5 sections) to 2015–2016 (10 sections), we have doubled the number of sections offered, or have experienced another 100% increase in 4 academic years. Every student needs access to the FTIR instrument in the Organic Chemistry sequence.

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, Perkins, Grants, etc.*).

The initial cost is approximately $27,000 per instrument including taxes and shipping. There is no ongoing cost except for regularly scheduled maintenance and replacement parts over time with wear and tear. This cost will be assessed at that time and science division maintenance funds will cover the cost.

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

Currently in our lab we have two instruments—one is very old and only works well with liquid samples. The other instrument is suitable for both liquid and solid samples. Beginning about mid-way through CHEM 212, instructors expect students to collect IR spectra for nearly every experiment. If the product is a solid, this creates a huge bottle-neck for 20 students trying to each use the instrument. At this level, students must be able to characterize and collect data for their own reactions—working with a lab partner is not a pedagogically sound option, because only by evaluating their own sample will each student be able to assess their experimental results (and deduce information about what did/didn't work with their experiment). Adding two more FT-IR instruments capable of readily analyzing solid samples would alleviate the bottle-neck, and even permit students to run a sample more than once, which is often necessary. Currently we are limited to each student running one sample, one time, in order for all students to have access to the instrument.