Council of Chief Academic Officers

Wednesday, February 12, 2014
9:15 a.m. – 10:00 a.m.
or upon adjournment of SCOCAO
Kathy Rupp Conference Room
1000 SW Jackson Street, Suite 520
Kansas Board of Regents
Topeka, Kansas
and reconvene at noon

A D D E N D U M

TO

A G E N D A

Page

2. New Program Requests

e. PSU - Request Approval for a Bachelor of Science in Polymer Chemistry (40.0507) (FIRST READING) [Attachment] **2**

Attachment

Request Approval for a Bachelor of Science in Polymer Chemistry (CIP 40.0507) [FIRST READING] - PSU

Universities may apply for approval of new academic programs following the guidelines in the Kansas Board of Regents Policy Manual. Pittsburg State University has submitted an application for approval of a Bachelor of Science in Polymer Chemistry. The proposing academic unit has responded to all of the requirements of the program approval process. No institutions have programs utilizing this Classification of Instructional Program (CIP) code.

Background

Criteria	**Program Summary**
1. Program Identification	Bachelor of Science in Polymer Chemistry CIP: 40.0507
2. Academic Unit	Department of Chemistry/College of Arts and Sciences
3. Program Description	This proposed program provides undergraduate students access to cutting-edge knowledge, research, and laboratory-based experience in the field of polymer chemistry. Students completing this program will be prepared for careers in high-tech polymers-based industies as well as laboratories in academic institutions, government, and private research settings. Further, this program prepares students for advanced academic study pursuing a master's degree and/or doctorate in polymer science. The program was developed as a result of Pittsburg State University (PSU) initiative in Polymer Chemistry, which was supported by Governor Sam Brownback and the Kansas Legislature. An important aspect of this initiative is creating and awarding a Bachelor of Science in Polymer Chemistry to students. This proposal received initial funding from the Legislature and Governor in FY13 and FY14, with the promise of a recurring $1 million annually added to the University's base funding to support the polymer initiative.
4. Demand/Need for the Program	PSU is in a unique position to create and implement the Polymer Chemistry initiative due to the presence of the Kansas Polymer Research Center (KPRC) on our campus. Given the promising future of polymer science, the relevance of this field for the Kansas economy, the lack of other polymer science programs in the region, and the obvious unique link between PSU and KPRC, it makes sense for PSU to offer a degree in polymer chemistry. KPRC has an established history taking the agricultural products of Kansas and turning them into polymers usable in industry. PSU has an established record providing high quality education in the areas of chemistry and plastics engineering. Joining and enhancing these units creates a valuable arrangement for our students, the region, and economic development in Kansas. The polymers and plastics industries are among the largest

	employers of high tech, high value jobs for science majors. The U.S. Bureau of Labor Statistics predicts a 10% increase in employment opportunities for material scientists through 2020 with a median annual salary of $69,790. Further, the Kansas Department of Labor employment projections claim jobs for people in plastics and rubber manufacturing to increase 12.6% and chemists to increase 4.5% by 2020. The median annual salary for these positions is $57,080. The typical entry level degree requirements for jobs in these areas is the bachelor's degree. In fact, the American Chemical Society Division of Polymer Chemistry projects 50% of all chemists work with polymers at some point in their career. In the absence of a formal polymer chemistry program, the burden for training workers falls to polymer companies and new employees must learn on the job. Students with this training through coursework, laboratories, research experiences, internships, and other hands-on education, not only save company time and money, but also have an advantage in the job market. This proposed program provides industry the opportunity to grow and develop at a faster pace. Training students for these contemporary lucrative careers significantly is enhanced by offering a degree program in polymer chemistry joining the assets, laboratories, and scientists of KPRC with the resources and faculty available in the PSU Department of Chemistry and Plastics Engineering Technology program.
5. Comparative/Locational Advantage	There is no other degree program offered at a university in this region focusing specifically on polymer chemistry. Further, the presence of KPRC on the Pittsburg State University campus provides exceptional resources when coupled with the academic assets in our Department of Chemistry and program in Plastics Engineering Technology. This combination creates a very unique and ripe environment for an undergraduate degree program in polymer chemistry. If approved, this program will put PSU in a very small group of higher education institutions providing students with an academic background in this cutting edge, high tech, and contemporary discipline. Other institutions in the United States offering this type of program include the University of Massachusetts, Southern Mississippi University, and the University of Akron.
6. Curriculum	The Bachelor of Science in Polymer Chemistry is a 124 credit hour degree program consisting of 47 hours of general education courses, an additional 26 hour science and math core, 22 – 24 hours of polymer chemistry core courses, six hours of polymer electives, and a minor selected in consultation with the academic advisor, such as Plastics Engineering Technology or another related area. All polymer science majors will be required to complete significant mentored research projects.
7. Faculty Profile	Dr. Petar Dvornic (terminal degree) was hired as Chemistry Department Chair and will coordinate the program. In addition, Dr.

	Ram Gupta (terminal degree), Dr. Santimukul Santra (terminal degree), and Dr. Jeanne Norton (terminal degree) were hired in the past year to staff the new PSU Polymer Initiative and each will be primary and core faculty in the proposed Bachelor of Science in Polymer Chemistry. Dr. Charles Neef (terminal degree) and Dr. William Shirley (terminal degree) from the Chemistry Department will offer occasional courses as support faculty. Various other faculty from the College of Arts and Sciences at PSU will provide foundational coursework, such as Math and Physics prerequisites along with general education courses. Four of these faculty lines are new and cost $395,000 (salary and benefits). Funding for the new lines comes from the $1 million annual allocation from the Kansas Legislature for the PSU Polymer Initiative. All core faculty have terminal degrees, completed post-doctoral experiences, and significant academic accomplishments (external funding, industry experience, publications, professional presentations, technical reports, etc.). In addition, the PSU Polymer Initiative budget provides three graduate assistants at an annual cost of $41,000, who will assist faculty with courses and oversee student laboratory experiences.
8. Student Profile	Students entering this academic program and career field should prepare themselves with a strong record high school coursework in science. Students will be admitted to the polymer chemistry major who meet the Pittsburg State University admission criteria. These students will have career interests in companies working with polymers for production and/or have a desire to pursue graduate education either at Pittsburg State or one of the few Ph.D. programs in the United States offering a doctorate in polymer science.
9. Academic Support	All academic support at Pittsburg State University and in the College of Arts and Sciences will be available for students and faculty in the polymer chemistry major program. Available support includes institutional programs for freshmen, initiatives offered through the Student Success Center (including the Writing Center), resources available via Axe Library, access to support for faculty and student travel, and internal grant funding opportunities. In addition, Pittsburg State University and the College of Arts and Sciences provide outstanding support for both hardware and software technology needs. Students also will have access to the equipment and expertise of scientists at the Kansas Polymer Research Center (KPRC) as well as equipment and lab space in both the Department of Chemistry and the Plastics Engineering Technology program in the College of Technology at Pittsburg State.
10. Facilities & Equipment	This proposed Bachelor of Science in Polymer Chemistry has significant laboratory and equipment needs. These needs are met through existing facilities and equipment available through KPRC, the Chemistry Department, and the Plastics Engineering Program, as well

	as completed renovations to the Chemistry Department suite in Heckert-Wells Hall to create additional office space for new faculty as well as an additional seminar room, and three labs in KPRC to accommodate research experiences, at a cost of $500,000. All building renovations and new equipment are funded by the state allocation supporting the polymer initiative at Pittsburg State University.
11. Program Review, Assessment, Accreditation	The Department of Chemistry at PSU is approved by the American Chemical Society (ACS). The Chemistry Department will use existing ACS guidelines to oversee the proposed academic program in polymer chemistry and seek ACS approval for the new program when implemented. The Bachelor of Science in Polymer Chemistry also will be reviewed according to the regular program review cycle and process at Pittsburg State University. Further, all degree programs at the University are required to submit an annual assessment report to the University Assessment Committee documenting progress towards meeting student learning outcomes.
12. Costs, Financing	Funding for this new academic program is included in the $1 million recurring annual allocation provided by the Kansas State Government. These funds provide four new faculty lines ($395,000 annually), start-up and equipment procurement ($550,000 one-time expense), facility renovations ($500,000), acquisition of materials, graduate assistants ($41,000 annually), support staff ($9,000 annually), and operations ($540,000 annually).

CURRICULUM OUTLINE
NEW DEGREE PROPOSALS
Kansas Board of Regents

I. Identify the new degree: Bachelor of Science in Polymer Chemistry

II. Provide courses required for each student in the major:

Course Name & Number	Credit Hours
<u>Core Science Courses (36 hours)</u>	
CHEM 215-216 General chemistry I/laboratory *	5
CHEM 235 Laboratory safety and compliance	1
CHEM 225-226 General chemistry II/laboratory	5
CHEM 325-326 Organic chemistry I/laboratory	5
CHEM 335-336 Organic chemistry II/laboratory	5
MATH 150 Calculus I **	5
PHYS 104-130 Engineering physics I/Elementary physics laboratory I	5
PHYS 105-132 Engineering physics II/Engineering physics laboratory II	5

* - CHEM 215-216 satisfies the Physical Sciences general education requirement.
** - MATH 150 satisfies the Mathematics general education requirement.

<u>Polymer Chemistry Core Courses (22 - 24 hours)</u>	
CHEM 360 Introduction to polymer science and technology	3
CHEM 611 Senior review and assessment	1
CHEM 625-626 Polymer synthesis and characterizations/laboratory	5
CHEM 680 Physical properties of polymers	3
CHEM 681 Polymer chemistry colloquium	1
CHEM 690 Selected research projects in polymer chemistry	1-3
PET 370-371 Thermoplastic resins/laboratory	4
PET 374-375 Thermoset resins/laboratory	4

<u>Elective Polymer Courses (select 6 hours)</u>	
CHEM 270 Sophomore research in polymer chemistry	1
CHEM 370 Junior research in polymer chemistry	1
CHEM 640 Polyurethanes and their applications	3
CHEM 650 Conducting polymers and their applications	3
CHEM 670 Senior research in polymer chemistry	1
CHEM 683 Biopolymers	3
CHEM 685 Selected topics in polymer chemistry	1-3
CHEM 687 Polymers in Nanotechnology	3
PET 373-372 Plastic processing I/laboratory	4

IMPLEMENTATION YEAR FY 2014-2015

Fiscal Summary for Proposed Academic Programs

Institution: PITTSBURG STATE UNIVERSITY

Proposed Program: Bachelor of Science in Polymer Chemistry

Part I. Anticipated Enrollment	Implementation Year		Year 2		Year 3	
	Full-Time	Part-Time	Full-Time	Part-Time	Full-Time	Part-Time
A. Full-time, Part-time Headcount:	**10**	**1**	**20**	**2**	**35**	**4**
B. Total SCH taken by all students in program	**205**		**410**		**695**	
Part II. Program Cost Projection						
A. In implementation year one, list all identifiable General Use costs to the academic unit(s) and how they will be funded. In subsequent years, please include only the additional amount budgeted.						
	Implementation Year		Year 2		Year 3	
Base Budget Salaries	**$403,134**		**$403,134**		**$403,134**	
OOE	**$596,866**		**$596,866**		**$596,866**	
Total	**$1,000,000**		**$1,000,000**		**$1,000,000**	

Indicate source and amount of funds if other than internal reallocation:

Funding for the Bachelor of Science in Polymer Chemistry is provided in the $1 million targeted annual allocation from the Kansas Legislature for the Polymer Initiative at Pittsburg State University.