

## COMMISSION FOR HIGHER EDUCATION

Friday, March 9, 2012

### DECISION ITEM A-2:

#### Master of Science in Modeling, Simulation, and Visualization To Be Offered by Purdue University Calumet at Hammond

#### Staff Recommendation

That the Commission for Higher Education approve the Master of Science (M.S.) in Modeling, Simulation, and Visualization to be offered by Purdue University Calumet at Hammond, in accordance with the background discussion in this agenda item and the *Abstract*, February 24, 2012.

#### Background

Two major federal grants to Purdue University Calumet have provided a strong foundation for the offering of this program. The first -- \$4.9 million from the U.S. Department of Energy (2008-2011) -- led to the establishment of the Northwest Indiana Computational Grid (NWICG), which, in addition to Purdue Calumet, includes the University of Notre Dame, Purdue University West Lafayette, and the Department of Energy's Argonne National Laboratory. The second -- almost \$4.8 million, also from the Department of Energy (2009-2011) -- created the Center for Computational Simulation and Visualization, which the Commission toured in connection with the Commission's June 2009 meeting. These two projects together provide state-of-the-art visualization facilities with access to high performance computing resources on campus and to NWICG partners.

The Calumet campus has utilized the Center for Computational Simulation and Visualization to undertake a variety of applied projects that are useful to industry and government agencies. The list of such projects is long and exceptionally varied, as exemplified by grants from the Air Force on speech recognition for \$167 thousand (2008-2010), the Office of Naval Research on educational materials aimed at middle school students for \$150 thousand (2008-2011), and the American Iron and Steel Institute on blast furnace fuel efficiency for \$679 thousand (2008-2011). The Center has also been used by numerous local businesses. Over the last two years, 24 projects totaling \$351 thousand have come from companies within a ten-mile radius of the campus. Attention to the practical and applied needs of a variety of clients, including local businesses, and the overhead generated by such projects, constitutes the Purdue Calumet business plan for maintaining the infrastructure of the Center.

Graduates of the proposed program are expected to fare favorably in the marketplace, although it is difficult to quantify such prospects because occupational titles do not reflect terms such as modeling, simulation, or visualization skills. For example, graduates of the program should be well qualified to fill Operations Research Analyst positions, an occupation that is expected to grow by 20 percent in the State of Indiana by 2018. The University has provided two sets of analyses generated from Department of Workforce Development data – one for the seven-county area in northwestern Indiana and one for the state – that document projected openings, for which graduates would be qualified, in a variety of occupations, including computer systems analysts and specialists, graphic designers, and engineers.

### **Supporting Documents**

- (1) *Abstract – Master of Science in Modeling, Simulation, and Visualization To Be Offered by Purdue University Calumet at Hammond, February 24, 2012.*
- (2) *New Academic Degree Program Proposal Summary – M.S. in Modeling, Simulation, and Visualization, February 24, 2012.*

## Abstract

Master of Science in Modeling, Simulation, and Visualization  
To Be Offered by  
Purdue University Calumet at Hammond

February 24, 2012

**Objectives:** To teach individuals to understand and effectively apply computing skills used in modeling, simulation and visualization; to apply required mathematical and statistical methods to the design of a model and simulation of a process; to understand and apply modeling, simulation and visualization processes and state of the art implementation tools to modeling, simulation and visualization projects across disciplines; to manage modeling, simulation and visualization projects across disciplines.

**Clientele to be Served:** Citizens of Northwest Indiana and the southern suburbs of Chicago who prefer to stay and work in this areas and would like to attend a graduate program that is conveniently located near their home or place of employment.

**Curriculum:** A total of 30 semester credit hours are required to complete the program, distributed as follows:

Core Courses (18 credit hours)

Unified Modeling Languages (3)

Simulation Techniques (3)

Visualization Techniques (3)

High Performance Computing (3)

Design and Analysis of Simulation Experiments (3)

Software Project Management (3)

Capstone Project Course (3 credit hours)

Directed Project in Modeling, Simulation, and Visualization (3)

Electives (9 credit hours)

**Employment Possibilities:** Industrial Engineering Technology, Industrial Technology, Industrial Engineering are the closest category for the skills of an engineer with modeling, simulation, and visualization training.

**NEW ACADEMIC DEGREE PROGRAM PROPOSAL SUMMARY**

February 24, 2012

**I. Prepared by Institution**

Institution/Location: Purdue University Calumet to be offered at Hammond

Program:

	Year 1 FY2012	Year 2 FY2013	Year 3 FY2014	Year 4 FY2015	Year 5 FY2016
Enrollment Projections (Headcount)					
Full-Time	<u>2</u>	<u>4</u>	<u>7</u>	<u>10</u>	<u>12</u>
Part-Time	<u>6</u>	<u>9</u>	<u>13</u>	<u>13</u>	<u>13</u>
Total	<u>8</u>	<u>13</u>	<u>20</u>	<u>23</u>	<u>25</u>
Enrollment Projections (FTE)					
Full-Time	<u>2</u>	<u>4</u>	<u>7</u>	<u>7</u>	<u>7</u>
Part-Time	<u>3</u>	<u>5</u>	<u>7</u>	<u>7</u>	<u>7</u>
Total	<u>5</u>	<u>9</u>	<u>14</u>	<u>14</u>	<u>14</u>
Degree Completions Projection	<u>0</u>	<u>3</u>	<u>3</u>	<u>12</u>	<u>15</u>
New State Funds Requested (Actual) *	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>
New State Funds Requested (Increases) *	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>

**II. Prepared by CHE**

New State Funds To Be Considered For Recommendation (Actual) *	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>
New State Funds To Be Considered For Recommendation (Increases) *	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>	<u>-0-</u>

CHE Code: 11-28

Campus Code: 1827

County: Lake

Degree Level: Master's

CIP Code: Federal – 110804; State – 110804

\* Excludes new state dollars that may be provided through enrollment change funding.