

FORT WAYNE SENATE AGENDA  
MONDAY  
NOVEMBER 14, 2016  
12:00 P.M., KT G46

1. Call to order
2. Approval of the minutes of October 17, 2016
3. Acceptance of the agenda – K. Pollock
4. Reports of the Speakers of the Faculties
  - a. Purdue University – M. Masters
  - b. Indiana University – A. Downs
5. Report of the Presiding Officer – J. Malanson
6. Committee reports requiring action
  - a. Executive Committee (Senate Document SD 16-7) – K. Pollock
  - b. Educational Policy Committee (Senate Document SD 16-8) – D. Kaiser
  - c. Executive Committee (Senate Document SD 16-9) – K. Pollock
  - d. (Senate Document SD 16-10) – S. Carr
  - e. Educational Policy Committee (Senate Document SD 16-11) – D. Kaiser
  - f. Faculty Affairs Committee (Senate Document SD 16-12) – L. Vartanian
  - g. University Resources Policy Committee (Senate Document SD 16-13) – M. Jordan
  - h. Executive Committee (Senate Document SD 16-14) – K. Pollock
7. New business
8. Committee reports “for information only”
  - a. Curriculum Review Subcommittee (Senate Reference No. 16-10)
  - b. Executive Committee (Senate Reference No. 16-11) – K. Pollock
  - c. Executive Committee (Senate Reference No. 16-5) – K. Pollock
9. The general good and welfare of the University
10. Adjournment\*

\*The meeting will adjourn or recess by 1:15 p.m.

Approving  
A. Downs  
J. Malanson  
M. Masters  
K. Pollock, Chair  
A. Schwab  
B. Valliere

Non Voting  
M. Coussement

Absent  
B. Redman

**ATTACHMENTS ON BACK**

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Attachments:

- “Approval of replacement members of the Professional Development Subcommittee and Revenue Subcommittee” (SD 16-7)
- “Changes to policy to reflect student’s ability to ask for review not appeal” (SD 16-8)
- “Academic Program Closures” (SD 16-9)
- “Reinstatement of Academic Degree Programs” (SD 16-10)
- “Review of Action Plan 41” (SD 16-11)
- “FAC Report on ‘Action Plan 41’” (SD 16-12)
- “URPC Report on Action Plan 41” (SD 16-13)
- “Subcommittee Reports on Action Plan 41” (SD 16-14)
- “Proposals for Bachelor of Science in Actuarial Science and Bachelor of Science in Applied Statistics (SR No. 16-10)
- “Items under Consideration in Senate Committees and Subcommittees” (SR No. 16-11)
- “Report on Designated Items” (SR No. 16-5)

MEMORANDUM

TO: Fort Wayne Senate

FROM: K. Pollock, Chair  
Executive Committee

DATE: October 3, 2016

SUBJ: Approval of replacement member of the Professional Development  
Subcommittee and Revenue Subcommittee

DISPOSITION: To the Presiding Officer for implementation

WHEREAS, The Bylaws of the Senate provide (5.1.2.) that "... Senate Committees ... shall have the power to fill Committee vacancies for the remainder of an academic year, subject to Senate approval at its next regular meeting"; and

WHEREAS, The Bylaws of the Senate provide (5.1.5.1.) that "... Senate subcommittees ... shall have the power to fill subcommittee vacancies for the remainder of an academic year, subject to Senate approval at its next regular meeting"; and

WHEREAS, There is one vacancy on the Professional Development Subcommittee; and

WHEREAS, The Professional Development Subcommittee has appointed Sue Skekloff as the replacement member for the remainder of the 2016-17 academic year; and

WHEREAS, There is one vacancy on the Revenue Subcommittee; and

WHEREAS, The Revenue Subcommittee has appointed Janet Papiernik as the replacement member for the remainder of the 2016-2017 academic year;

BE IT RESOLVED, That the Senate approve these appointments.

MEMORANDUM

TO: Fort Wayne Senate

FROM: Daren Kaiser, Chair  
Educational Policy Committee

DATE: September 21, 2015

SUBJECT: Changes to policy to reflect student's ability to ask for review not appeal

WHEREAS, The current academic regulation regarding academic probation and dismissal provides that "... A student who wishes to appeal an academic probation standing should contact the academic department of their major for guidance in the appeal process"; and

WHEREAS, This leaves the procedure regarding the appeal process inconsistent across different academic units; and

WHEREAS, This often results in misunderstanding by students as they believe a probation or dismissal decision based on low GPA (rather than the grade itself) could be appealed; and

WHEREAS, This adds unnecessary burden to academic units for explanation and processing;

BE IT RESOLVED, that the change of academic regulation regarding academic probation and dismissal be adopted as attached.

**In favor**

Suining Ding  
Daren Kaiser  
Gang Wang  
Linda Wright-Bower

**Absent**

Jane Leatherman

**Non-voting**

Marcia Dixson  
Patrick McLaughlin

Probation, Dismissal and Readmission

**9.4:** Academic probation, dismissal, and readmission. The following probation, dismissal, and readmission criteria are minimums for IPFW; academic units may set higher standards which shall become effective upon publication in the Bulletin or its supplement. A student dismissed from a program for failure to meet the higher standards imposed by an academic unit must be accepted in another program before registering for a subsequent academic session.

**9.4.1: Academic Probation.** A student shall be placed on academic probation if his/her fall or spring semester or cumulative GPA at the end of any fall or spring semester is less than a 2.0. A student on academic probation shall be removed from that standing at the end of the first subsequent fall or spring semester in which he/she achieves semester and cumulative GPAs equal to or greater than 2.0.

IF: Semester GPA or Cumulative GPA is  $< 2.0$  = ACADEMIC PROBATION

IF: On academic probation and Cumulative GPA is  $< 2.0$  but Semester GPA is  $\geq 2.0$  = CONTINUED PROBATION

IF: On academic probation and Semester GPA is  $< 2.0$  but Cumulative GPA is  $\geq 2.0$  = CONTINUED PROBATION

Any grade change due to a reporting error will result in a recalculation of the GPA and determination of probation standing. Academic standing will not be assessed in summer sessions.

A student who wishes to ~~appeal~~ **further clarification about** an academic probation standing **may request a review by the registrar for accuracy of the GPA calculations on the academic record.** ~~should contact the academic department of their major for guidance in the appeal process.~~

**9.4.2: Academic Dismissal.** A student on academic probation shall be dismissed at the close of any fall or spring semester in which his/her semester and cumulative GPA is less than a 2.0.

IF: On academic probation and both the Semester GPA and Cumulative GPA are  $< 2.0$  = ACADEMIC DISMISSAL

Any grade change due to a reporting error will result in a recalculation of the index and determination of the dismissal status.

A student who wishes to ~~appeal~~ **further clarification about** an academic dismissal standing **may request a review by the registrar for accuracy of the GPA calculations on the academic record.** ~~should contact the academic department of their major for guidance in the appeal process.~~

**9.4.3: Readmission.** A student who has been dismissed from IPFW or from another campus of Indiana University or Purdue University may not enroll at IPFW until one fall or spring semester has passed. All readmissions are into probationary status and are subject to stipulations in effect as a condition of readmission. Readmissions shall be reported to the Registrar, and an appropriate entry shall be made on the student's academic record. A student who is academically dismissed for a second time is not eligible to enroll for at least one year.

A student dismissed by this policy must apply to the appropriate office or readmission committee. A fee is assessed for processing the readmission application. Readmission is not guaranteed.

MEMORANDUM

TO: Fort Wayne Senate  
FROM: Kathy Pollock, Chair  
Executive Committee  
DATE: October 31, 2016  
SUBJ: Academic Program Closures

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WHEREAS, The Purdue University Board of Trustees, in an Executive Session, mandated the closure of academic programs at IPFW; and

WHEREAS, This decision was made outside of any normal or established shared governance process;

BE IT RESOLVED, That the Fort Wayne Senate objects to this breach of shared governance at IPFW and in the Purdue University system.

**Approved**

A. Downs  
J. Malanson  
M. Masters  
K. Pollock, Chair  
A. Schwab  
B. Valliere

**Opposed**

**Abstention**

**Absent**

B. Redman

**Non-Voting**

M. Coussement

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**MEMORANDUM**

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**TO:** FORT WAYNE SENATE  
**FROM:** STEVEN A. CARR  
**SUBJECT:** REINSTATEMENT OF ACADEMIC DEGREE PROGRAMS  
**DATE:** OCTOBER 17, 2016  
**CC:** EXECUTIVE COMMITTEE

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WHEREAS, the Constitution of the Senate endows Voting Faculty with powers to recommend policies concerning the conduct, welfare, privileges, tenure, appointment, retention, and promotion of faculty (VI.A.1.e.); and

WHEREAS, the Constitution of the Senate endows Voting Faculty with powers to recommend changes in academic organization (VI.A.2.a.); and

WHEREAS, the Constitution of the Senate endows Voting Faculty with powers to make recommendations concerning the determination and management of the budget (VI.A.2.b); and

WHEREAS, the Constitution of the Senate endows Voting Faculty with powers to make recommendations concerning increases and decreases in staff (VI.A.2.d); and

WHEREAS, the Constitution of the Senate endows Voting Faculty with powers to review and approve the titles of the academic degrees conferred at IPFW (VI.A.4.a.); and

WHEREAS, the Constitution of the Senate endows Voting Faculty with powers to review and approve the general requirements for the curricula leading toward academic degrees and certificates (VI.A.4.b); and

WHEREAS, the Constitution of the Senate grants Voting Faculty with powers to present its views concerning any matter pertaining to the conduct and welfare of IPFW to the Presidents and Boards of Trustees of Indiana University and Purdue University (VI.A.5); and

WHEREAS, SD 15-26 outlines a process where, in the exercise of these powers, decisions concerning reorganization, merger, reduction and/or elimination of programs shall occur as a result of a review process in which the faculty has assumed a prominent role, and

WHEREAS, the chief administrative officer has not declared financial exigency,

BE IT RESOLVED, that the Senate urge reinstatement, effective immediately, of all undergraduate and graduate degree programs or majors suspended or eliminated beginning in 1 July 2016 and forward where faculty did not initiate a recommendation, or did not assume a prominent role in decisions leading to these suspensions and eliminations; and

BE IT FURTHER RESOLVED, that any further action on the part of an academic administrator or the Presidents and Boards of Trustees of Indiana University and Purdue University to suspend, merge,



reduce, or eliminate a degree program must accompany publicly disclosed detailed financial statements for the past five years, and must come with a thirty-day remonstrance period to allow adequate analysis and review of these actions; and

BE IT FURTHER RESOLVED, any subsequent action initiated by an academic administrator or the Presidents and Boards of Trustees of Indiana University and Purdue University to suspend, merge, reduce, or eliminate a degree program must occur in accordance with the policies and procedures outlined in SD 15-26, especially under section IV “Procedures for Program Reorganization, Merger, Reduction, and/or Elimination” and where the chief administrative officer has not declared financial exigency, and

BE IT FURTHER RESOLVED, the Senate immediately notify the Presidents and Boards of Trustees of Indiana University and Purdue University of the exercise of the faculty’s will to reinstate academic degree programs and majors, and to have the administration, Presidents, and Boards of Trustees observe all policies and procedures outlined in 15-26 when initiating an action to suspend, merge, reduce, or eliminate a degree program.

MEMORANDUM

TO: Fort Wayne Senate

FROM: Daren Kaiser, Chair  
Educational Policy Committee

DATE: October, 26 2016

SUBJECT: Review of Action Plan 41

WHEREAS, the Educational Policy Committee was charged by the Executive Committee to evaluate sections 1.4 bullet point 1, 2.5 bullet points 1-4, 3.2 bullet points 1-4, and 3.6 bullet points 1 and 2 of Action Plan 41.

WHEREAS, the following document represents our evaluation of, and opinion about, Action Plan 41.

BE IT RESOLVED, that the Educational Policy Committee does not endorse any of the items of Action Plan 41 that we were charged to evaluate.

<u>Approving</u>	<u>Not approving</u>	<u>Absent</u>	<u>Non-voting</u>
Prasad Bingi		Jane Leatherman (sabbatical)	Marcia Dixson
Dong Chen		Linda Wright-Bower (sabbatical)	Patrick McLaughlin
Daren Kaiser			
Gang Wang			

## Preamble

It has become clear as the semester moves forward that the faculty response to AP 41 is irrelevant to the administration. It was fairly obvious that this was the case when the “plan” was not released until the beginning of the semester, and then the “response” from the faculty was required within a few weeks. The “plan” itself is a series of vacuous statements and action items most of which are so vague it would be impossible to respond to them. The only way one could respond to the action items was to ask the administration what they mean by these items.

Dr. Drummond was kind enough to attempt to clarify the items EPC was asked to evaluate, and, in particular, he provided an extensive plan of action to address item 2.5 bullet point 2 (restructuring of programs/elimination of degree offerings will result in optimization). Our committee reviewed his recommendations in good faith and, although we were somewhat concerned that the restructuring might affect some departments adversely, we felt, given the political and financial climate, that his plan was fair and based on solid evidence. Our only concern was to ensure that the departments most affected would be provided with ample time to voice their concerns.

Now, before any response from the faculty has occurred, Dr. Drummond’s initial plan has been abandoned and far more extensive cuts (all of which affect the college of Arts & Sciences) have been initiated for completion by January 1st. The supposed rationale for eliminating academic units is to save money. We are not convinced that these cuts will save a significant amount of money. More importantly, these cuts seem to run contrary to the mission of our University and diminish our ability to educate the citizens of northeast Indiana. The University is being forced to make these cuts without any feedback from the faculty, staff, and students. It is ludicrous to make these kinds of changes in a matter of months, just to save a couple hundred thousand dollars. It is obvious this is not about cost saving. The changes will damage IPFW and make it less than the scholarly institution it is now.

Below you will find our thoughts about the original action plan items we were charged to review. Our thoughts were predicated on what we were told by the Vice Chancellor of Academic Affairs. It has become clear that his understanding of Action Plan 41 is little better than that of the rest of the faculty. This committee does not wish to endorse any of these vacuous statements for fear that such an endorsement could be used later to further diminish this University. We consider this report to be feedback of very general ideas, **not** endorsement of a plan.

### **Our responses to our assigned action items are:**

**1.4 Bullet point 1:** *Incorporate predictive analytics process across departments in order to inform active management decisions.* Using predictive analytics is a feasible and appropriate idea providing that “active management decisions” are made at the department level and by the department.

**2.5 Bullet point 1:** *Create linkage between myBlueprint demand with course offering plans.* Creating linkage between myBLUEprint and course offerings is a logical idea to increase course scheduling cost efficiency and effectiveness for students. We want to be sure that flexibility for exceptions are maintained. We also see the need for a plan to be sure students, not advisors, are knowledgeable about and responsible for updating their four-year plans.

**2.5 Bullet point 2:** *Restructuring of programs/elimination of degree offerings will result in optimization*  
~~Discussion of Dr. Drummond’s Review and Recommendations for Academic Programs and Departments (09/19/2016). The process upon which the recommendations were made was applied fairly across all departments. The rationale for each recommendation is clear and the recommendations seem feasible.~~

~~The committee would urge Dr. Drummond to pay attention to the feedback and arguments from each department (as we are confident he will) and, in particular, to consider unintended consequences to other programs given the interconnected nature of our degree offerings. Our feedback to these recommendations is no longer relevant.~~

**2.5 Bullet point 3:** *Separate academic F (earned F) from F or not showing up.* Completed by EPC on September 7

**2.5 Bullet point 4:** *Analyze workload at individual faculty course level to manage instructional capacity.* FAC is reviewing this item

**3.2 Bullet point 1:** *Develop pathways major (completed)*

**3.2 Bullet point 2:** *Recharge the Advisory Council to be more impactful.* Recommend changes in proposed advising council reorganization: 1) Change the last sentence explaining the mission of the Executive Advising Committee in the following way “The Executive Advising Committee is to ensure information flow between and across units and facilitate changes in policy and practice originating from Advising Council”. Have seven (rather than 5) faculty advisors from at least three colleges to balance the primary role advisors. Make the SIS representative non-voting. Have six primary role advisors from at least three colleges (rather than one from each, this allows for potential restructuring of units in the future). Move the information about Executive Advising Committee to below the information about Academic Advising Council to indicate that information/policies should not originate with Executive group.

**3.2 Bullet point 3:** *Expand the role of primary advising in years 1 and 2.* We agree that more primary role advisors could be very useful as long as they are embedded within a department/school/college so as to be knowledgeable about limited number of major requirements.

**3.2 Bullet point 4:** *Regularize flow via myBlueprint from 1st year to degree.* This item is too vague for us to evaluate - what does “regularize flow” mean??

**3.6 Bullet point 1:** *Develop additional online/hybrid programs, flipped instruction in professional and technical programs.* Develop additional online/hybrid programs: Faculty within departments/colleges/schools should consider developing these if they are appropriate for the students and content. Academic Affairs should provide support for these efforts if faculty determine they should move forward.

Flipped instruction: We feel this impinges on academic freedom and should be the realm of individual faculty to make decisions about what pedagogical method is most appropriate for their content etc.

**3.6 Bullet point 2:** *Target adult learners for online/hybrid programs.* The plan currently pursued by Curt Hosier seems reasonable

MEMORANDUM

TO: Fort Wayne Senate

FROM: Lesa Rae Vartanian, Chair  
Faculty Affairs Committee

DATE: October 28, 2016

SUBJ: FAC Report on "Action Plan 41"

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WHEREAS, on September 13, 2016, the Executive Committee of the Fort Wayne Senate charged the Senate Faculty Affairs Committee (FAC) with reviewing and reporting upon the action items contained in "Action Plan 41" associated with USAP Recommendations 2.4, 2.5.4, and 4.3; and

WHEREAS, FAC was explicitly directed to evaluate the feasibility of the action items proposed, and to develop an understanding of the administration's timelines and plans for the next steps associated with them by meeting with the administrator(s) listed on the plan as responsible for the assigned action items; and

WHEREAS, the members of FAC met with the top administrator listed as responsible for the assigned action items, Vice Chancellor of Academic Affairs and Enrollment Management Dr. Carl N. Drummond, on October 5, 2016 to begin to accomplish this charge; and

WHEREAS, FAC met subsequently to create a written report (attached) to document due diligence; and

WHEREAS, the report makes clear that we reject the action items associated with USAP Recommendations 2.4, 2.5.4, and 4.3 for the reasons noted in the report; and

WHEREAS, we do not believe we have all of the information necessary to offer any meaningful, reasonable alternatives to those action items;

BE IT RESOLVED that the Fort Wayne Senate recognize the attached report "Action Plan 41 FAC Narrative Response" as a clear indication FAC has met its charge and completed its task.

<b>Approved</b>	<b>Opposed</b>	<b>Abstention</b>	<b>Absent</b>	<b>Non- Voting</b>
B. Dattilo				M. Dixon
D. Kaiser				
Z. Nazarov				
B. Valliere				
L. R. Vartanian				

## **“Action Plan 41” FAC Narrative Response**

October 28, 2016

In order to carry out the charge given to us by the Executive Committee, FAC felt that understanding the three USAP recommendations assigned to us, the action plan items associated with them, and—of special importance to us—*the links between the recommendations and the action items* was essential. “Action Plan 41” makes no attempt whatsoever to address what seems to us to be elementary—that is, how do the action items accomplish the goals embedded in the recommendations? Achieving that understanding requires first a clear understanding of the administration’s interpretation of the recommendations. Accordingly, prior to our meeting with VCAA Drummond, we submitted a number of questions to Dr. Drummond about the action items and the recommendations they are supposed to address (see Attachment A).

VCAA Drummond made it clear at the beginning of our meeting that he wasn't certain he could answer most of our questions, as they were about the recommendations (as opposed to the action items), and he was not the author of those recommendations. He indicated he would provide us with his understanding of them and their corresponding action plan items to the best of his ability, but in no way did he assert that his understanding was to be regarded as infallible. Dr. Drummond attempted to answer all of our questions, including follow-up questions that arose during the meeting. We appreciated his time and patience, and his attempts to be as clear and concrete as possible.

As a result of that discussion, we submit the following:

VCAA Drummond reported that the action items associated with Recommendations 2.4 (*“Explore and implement options for more efficient use of faculty and chair resources, where appropriate”*) and 2.5.4, (*“Optimize enrollment of course sections: Analyze workload at individual faculty and course level to manage instructional capacity”*) both of which pertain to the desire to increase cost efficiencies and relate directly to the work, workload, and work conditions of faculty, are slated to be accomplished during the current academic year. He discussed two specific ways by which the action items associated with those recommendations were being pursued.

One is that the university is considering the purchase and implementation of a software package that promises to assist administrators at various levels with tasks such as faculty and course scheduling. The software can collect data regarding scheduling patterns versus enrollment patterns, and analyze those data more quickly and with more precision than can be done by hand and head alone. It will be able to predict which courses (and how many sections) will be needed. That information would be used to make decisions about the best assignment of faculty and about method of delivery (e.g., online, hybrid, face-to-face).

Although providing administrators at various levels with powerful tools to assist them with their administrative tasks—particularly department chairs, with the task of course/faculty scheduling—seems a reasonable and desirable action, we are concerned that the upper-level administration at IPFW seems to believe that the use of a new tool in an established process will yield the kinds of significant and meaningful savings necessary to address the supposed financial problems IPFW faces. Regardless of the tool used to perform a task, there needs to be an a priori conceptualization of the goals and outcomes desired, and we find that to be lacking. We do not see, nor was an explanation offered, as to how exceptions to a “rule” will be handled by even the most powerful of software packages. We imagine

exceptions would be managed by *people* (as opposed to software), and so the fundamental question of what “*more efficient use of faculty and chair resources, where appropriate*” means persists. Indeed, as reflected by the use of the clause “*where appropriate,*” exceptions must already be anticipated. While VCAA Drummond was able to give a couple of anecdotal and hypothetical examples as to the circumstances where such a tool would be useful and/or helpful, no other forms of evidence documenting the extent to which difficulties in course and faculty scheduling currently exist and/or significantly contribute to reduced efficiency were offered. Therefore, we find the link between this action item and the recommendation weak. The cost of the software was not disclosed. When posed against the costs under consideration in the bigger picture of IPFW’s operations and future economic well-being, the cost of the software is probably small, but we think what seems like a lack of thought about the details of how such a tool would be used is troubling.

The action item associated with Recommendation 2.4—“*Implement optional modes of appointment for chairs and faculty*” was discussed with us in terms of faculty teaching load. Dr. Drummond shared with us that ways by which to motivate faculty (e.g., with financial incentive) to choose to move from a 3/3 load to a 4/4 load are under consideration, and the timeline for this action item is within the coming year.

Generally speaking, we think options and incentives are desirable things to have—preferable to mandates and disincentives. However, we have multiple, serious concerns. Our biggest is conceptual. We fear the university, in wanting to pay faculty to increase enrollment revenue by teaching another class, is reducing the role of faculty to that of “*earners,*” and that is a view to which most of us object strenuously. We also have pragmatic and logistical questions and concerns. For example, how would such an incentivized program be administered? Would taking advantage of an incentive and giving up one’s research release be a limited-time opportunity, or one that could be chosen and enacted at any time (as well as discontinued, so as to return to a 3/3 load)? What would the implications for future salary increments and promotions be? Would this be an “*option*” available to only tenured faculty?

We suspect that, in the event that such an “*incentive program*” does not produce the financial savings or “*increased efficiencies*” sought, what was originally “*optional*” could become mandatory. Endorsing this action item now could serve as some sort of conceptual precedent for creating the 4/4 default load that exists at Purdue Northwest. If we become Purdue Northeast as a result of LSA, we suspect there might be a desire to have greater consistency in policies, etc. between the two non-West Lafayette campuses. As noted above, no specific information regarding projected savings was presented. If the administration has somehow assessed the extent to which current faculty would be interested in moving to 4/4 and has figured out the costs of providing incentives versus the savings or other benefits gained, that information was not shared with us. If the administration has not begun to collect and analyze such information, we certainly would question the feasibility of this action item. Reducing reliance on “*contingent labor*” (i.e., Continuing Lecturers and Limited-Term Lecturers) was noted as an outcome sought. We believe that there are numerous instances on our campus where “*contingent labor*” is necessary and desirable from a curricular perspective—so an overarching goal of reduction in this vein is not something we can endorse.

There was little discussion about what an “*optional mode of appointment for chairs*” would look like. VCAA Drummond indicated that an examination of the ratio of chair and other leadership positions to department size may be examined, with an eye to eliminating perceived administrative redundancies

and increasing efficiency. As part of this discussion the VCAA indicated that “fairness” in the amount of release time chairs receive (e.g., .25 vs. .50) for their duties may be under consideration to assess the “right” distribution of administrative FTE per department. How the “right” distribution is to be defined was not revealed; one concern we have is that the notion that there is one “right” way to allocate FTE for all departments, given their diversity in size, resources, etc., suggests a lack of appreciation for that diversity. For these reasons, we cannot say we believe these action items are feasible.

Finally, with respect to USAP recommendation 4.3 *“Incentivize and invest in bold research initiatives,”* VCAA Drummond addressed the action item about identifying *“focused/signature research areas for growth and investment.”* We asked the question what does it mean to be “bold” in this context? The VCAA explained to us that area business leaders are interested in graduates that have expertise in three areas—actuarial science, material science, and bio-engineering. We have certainly heard previously about the needs of the region in terms of what businesses want to see in their future pool of employees. And we have heard about IPFW’s desire to develop a clear and distinct “brand” for itself. We have multiple concerns about this recommendation and the action item discussed with us. We have heard that we “can no longer afford what we have become.” Colleges and universities nationwide, but especially in the Midwestern region of the U.S., face similar economic challenges. Thus, we recognize that creative solutions to economic challenges are needed. But this recommendation and its action item make it sound like we should try to afford to become something else—that what we “have become” is the problem, and is not what we should be or want to be any longer. Making cuts because we can’t pay our bills is one thing—making cuts because there is a desire to spend money in new and different ways is another. The “something else” it seems we should try to become sounds to us more like a technical institute, as opposed to a strong, diverse metropolitan university, and we do not support that. There are other areas of programming and operation at IPFW that should be examined openly and critically for cost savings and increased efficiencies (e.g., our participation in Division I athletics). If other, non-academic areas have been thoroughly examined and analyzed by the administration, we wonder how and why they have not been discussed with the rest of the university.

We do recognize and agree that a university should pay attention to the needs of the region in which it exists and operates. We don’t think our primary role is just to respond, and not simply by attempting to graduate large numbers of students who fit a particular career or employment profile. A university such as ours ought to be playing a major role in *shaping* the needs of the region. That can be accomplished only with strong leadership and a clear long-term vision for the institution. It is undesirable to define the “needs of the region” only in terms of career roles, for those “needs” are sure to change over time. In fact, this region has seen that sort of change before. That said, of the possibilities shared with us, investing in an actuarial science program seems to us like it would be the least expensive and easiest to do in the shortest amount of time. Our impression from Dr. Drummond is that this action item is currently slated for “down the road.”

The second and curiously-worded action item related to Recommendation 4.3 about “targeting grant-active faculty in these areas for future hires” (is this a plan for poaching faculty from other institutions?) was not discussed.

Not two weeks after our meeting with Vice Chancellor Drummond, we learned that he was expressly directed by the Purdue Board of Trustees to cut a number of programs immediately. His remarks at the October 17<sup>th</sup>, 2016 meeting of the Fort Wayne Senate were sobering. He indicated that he had come to



understand in ways he had previously failed to recognize that our internal USAP process and the external LSA agenda are indeed closely linked—a connection that Chancellor Carwein has denied existed throughout both processes. We have little faith in the validity and transparency of the USAP process, the results of which are seemingly being used in ways that indicate a lack of respect for the principles and spirit of shared governance. After the October 17<sup>th</sup> Senate meeting, we wondered if there was even any point in moving forward with this task assigned to us. Would VCAA Drummond answer our questions in the same way as he had, given his recent experience with the Trustees?

In conclusion, we have attempted in good faith, which we believe was reciprocated by VCAA Drummond in his conversation with us on October 5<sup>th</sup>, 2016, to meet the charge given to us by the Executive Committee. In sum, we find USAP Recommendations 2.4, 2.5.4, and 4.3 to be poorly articulated. The language used is certainly not sophisticated, but rather, the terms used are not defined or contextualized so as to make clear the intentions or the goals. That being the case, the action items in “Action Plan 41” associated with those recommendations are equally vague—their connections to the recommendations are not spelled out or justified in any conceptual or empirical way. Accordingly, we are not willing to judge any of them as “feasible.”

As far as timelines and next steps go, only very general information regarding both was shared. Because we have serious concerns and questions about the action items and the recommendations from which they stem, we cannot say that the timelines and next steps, insofar as they were revealed to us, make sense or reflect our ideas about responsible leadership of the institution.

Finally, with respect to the invitation to submit proposals of our own: Meaningful alternatives can only be generated when one has full knowledge of all of the relevant information. We certainly do not believe we have that, and given that, the request for input and alternatives seems less than genuine.

## Attachment A

### Questions for VCAA RE: Portions of “Action Plan 41” Assigned to FAC

For meeting with C. Drummond on Weds. 10/5/16 Noon, NF 374

#### **Recommendation 2.4: “Explore and implement options for more efficient use of faculty and chair resources, where appropriate.”**

- 1) In this context, what does “efficient” mean, and “more efficient” compared to what specific baseline or starting point? What is the target goal, or is there a belief or expectation that efficiency can be increased infinitely?
- 2) How and when will “exploration” begin, and what exactly will exploration in this context look like? What will guide this exploration? Has it already begun, and are there specific ideas, goals, or concepts guiding it now?
- 3) What will indicate or define the point at which exploration becomes implementation? Do options for implementation already exist and if so, have they been explored or discussed?
- 4) What is an “optional mode of appointment for chairs and faculty?”
- 5) Why does the action item represent only half of the recommendation—where is the “exploration?”

#### **Recommendation 2.5 (BP#4): “Optimize enrollment of course sections: Analyze workload at individual faculty and course level to manage instructional capacity.”**

- 1) What is “instructional capacity” – give an example of it being managed.
- 2) How will the analysis take place—what method(s) will be used?
- 3) Who will vet/review the results of the analysis?
- 4) How long will the analysis take?
- 5) What happens after the analysis has been completed?

#### **Recommendation 4.3: “Incentivize and invest in bold research initiatives.”**

- 1) Define “bold” as it is used here.
- 2) With respect to “identify focused/signature research areas” – what do “focused” and “signature” mean? Was the term “signature program” ever defined? Given that the action item is to “identify,” how are there examples already in the parentheses? Has this action item already been completed?
- 3) Second action item is unclear/confusing. Does it mean we’d seek to target our own “grant active” faculty? For future hires? How will “targeting” be done? What % of current faculty are “grant-active” as conceptualized here?
- 4) Do these action items signal a shift in IPFW’s mission? Why would there not be a plan to incentivize and invest in bold pedagogical initiatives?

MEMORANDUM

TO: Fort Wayne Senate  
FROM: Mark Jordan, Chair  
University Resources Policy Committee  
DATE: October 28, 2016  
SUBJECT: Report on Action Plan 41 items

WHEREAS, The administration released Action Plan 41 in September and asked for Senate feedback on proposed action items; and

WHEREAS, The Senate Executive Committee assigned action items from USAP recommendations 1.6, 2.1.a., 2.10, 2.11, 2.12, 3.4, 3.10, 3.11, and 3.12 to the University Resources Policy Committee (URPC); and

WHEREAS, URPC met with, and/or received input from, VCFA Wesse, evaluated the feasibility of the timeline and plans, and made recommendations on each of the aforementioned USAP recommendations,

BE IT RESOLVED, That URPC asks the Fort Wayne Senate to approve the attached report on Action Plan 41 recommendations.

Approving

A. Argast  
J. Hersberger  
M. Jordan  
S. LaVere  
H. Luo  
Z. Nazarov  
S. Peterson  
N. Reimer  
G. Schmidt

Absent

C. Drummond  
A. Ushenko  
D. Wesse

Non Voting

Abstention

K. Pollock

## **Evaluation of Action Items to the University Strategic Alignment Process (USAP)**

University Resources Policy Committee (URPC)

### **Overview**

The Executive Committee of the IPFW Senate requested Senate Committees to:

1. Communicate with the responsible administrators identified in Action Plan 41 to develop an understanding of the administration's timelines and plans for next steps. This information should be included in your report to the Senate.
2. Evaluate the feasibility of the action items associated with each USAP Recommendation proposed by the administration.
3. Make recommendations on how to proceed with each USAP Recommendation. These recommendations can be an endorsement of the administration's proposed action items, timelines, and plans; a proposal to scrap any or all of the proposed action items; a proposal for an entirely new approach to the USAP recommendation; or whatever else the committee feels appropriate to recommend.

Nine USAP Recommendations were assigned to URPC and each is included in this report. There are often several action items associated with each recommendation in Plan 41 but the committee was assigned some but not all action items in some cases. An appendix that compiles the timelines and plans provided by the administration is attached at the end of the report.

While Action Plan 41 is a list of recommendations, it is important to consider each recommendation in the context of the broader goals and outcomes of the USAP report and Plan 2020. In particular, there has been much focus on the recommended reduction of academic programs to address declining revenues on campus. During our work, even deeper cuts to academic programs were announced as necessary. It was also announced that there is a direct link between USAP and Legislative Services Agency (LSA) recommendations and that linkage was solely focused on academic programs (USAP 2.1-2.3). Given that academic programs directly relate to the core mission of the University, we suggest that any such reductions should be taken only after savings on resources that serve in a supporting role of the mission have been maximized. We also encourage the Indiana and Purdue Boards of Trustees to utilize this broader view of USAP analyses to get a fuller picture of the state of the campus. We find that savings might be found in Action Plan 41 items relating to: the evaluation of administrative positions (USAP 2.1.a), Athletics (USAP 2.11), and student housing (USAP 2.12).

### **Specific Evaluations**

#### **USAP 1.6 – Provide the necessary resources to excel**

**Plan 41 Action item:** Assess unit needs, develop appropriate model to provide necessary resources

**Administration timeline and plan:** An iterative process for the development of the annual budget is described that broadly includes three steps: 1) initial preparation based on state

appropriation, enrollment trends, guidance from Purdue-WL (e.g. benefits, management costs, and inflation costs of supplies and services), 2) budget guidance and preparation at the unit level that is reviewed by the administration and the University Budget Committee, and 3) budget finalization by the IPFW Budget Office.

**Evaluation of feasibility:** The plan presented is feasible for annual budgets but it does not consider longer term revenue and cost projections. It also does not address the development of an ‘embedded service model’ at the college level that is envisioned in the USAP report. Under this model, colleges are allocated support to allow greater control over areas such as marketing, IT, communications, advising and retention, data analytics, and advancement.

**Recommendation:** An effort should be made to go beyond an annual process and project budgets over a longer term. This longer term budget should be shared with the faculty.

The costs and benefits of the ‘embedded service model’ should be investigated by the administration and explained to the faculty. Given the rise in administrative positions over the past decade (Figure 1, below), analysis of the ‘embedded service model’ should demonstrate the educational value of increasing administrative positions at the college level.

#### **USAP 2.1.a – Create viability standards for non-academic programs, events, etc.**

**Plan 41 Action item:** Establish viability standards for non-academic units/programs to inform decisions and resulting action

**Administration timeline and plan:** URPC was provided with a description of an initiative to create a general framework for positions that is based on three categories: career streams, career levels, and job families. Human Resources started this work in February 2016 and suggests that it will begin to be implemented in November 2016.

**Evaluation of feasibility:** The plan presented appears to be feasible but no viability standards have been described.

**Recommendation:** Viability standards should be developed and applied to find savings in administrative costs to guide the application of USAP 2.2 and 2.8. A similar recommendation was made by URPC four years ago in response to a budget shortfall (SR 11-29), yet no progress in this area seems to have been made. Administrative positions in the University have increased by more than 100% since 1995 [SR 11-29, Figure 1 (data updated to 2015)].

To our knowledge, viability standards have not been developed as part of USAP as they have for academic programs. USAP 2.2 calls for the application of these standards to assess programs for closure, restructuring, and investment and USAP 2.8 calls for the reduction of administrative positions. These efforts should be completed prior to, or at least in concert with, action on academic programs resulting from USAP 2.1 and 2.2.

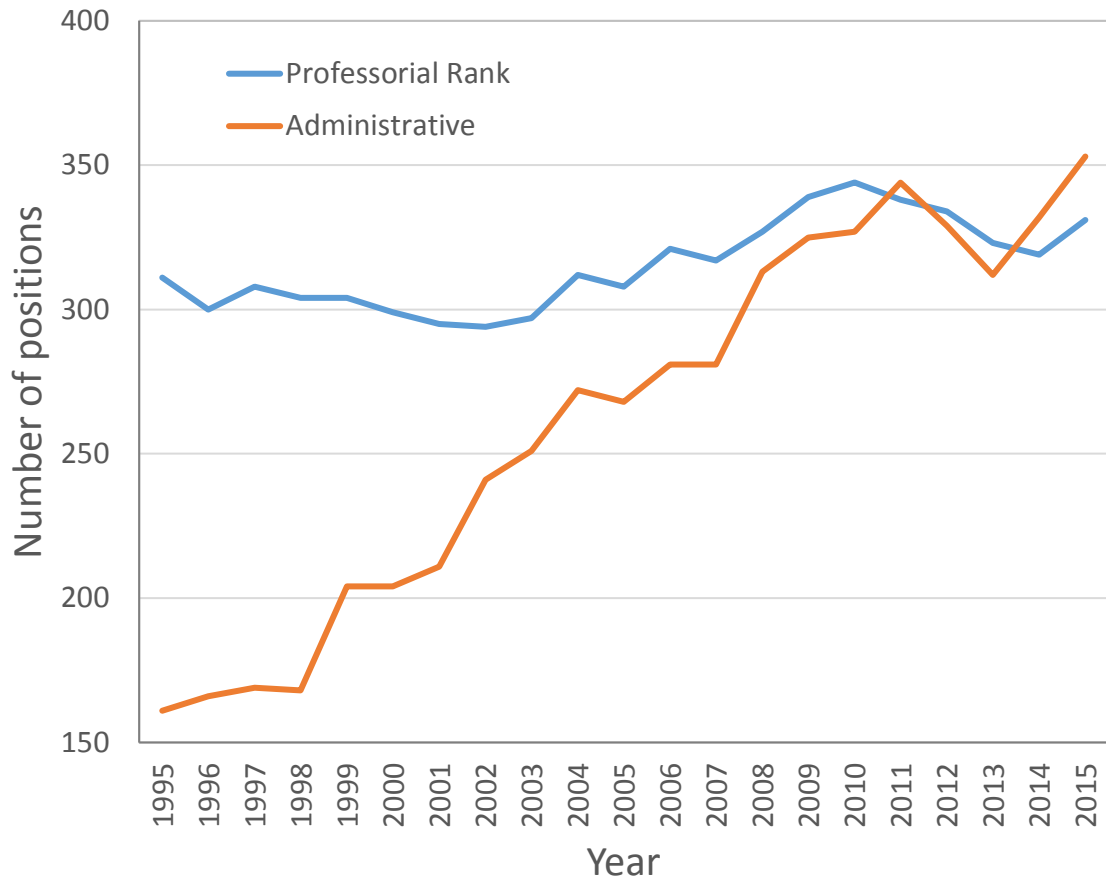


Figure 1. IPFW Administrative to Faculty FTE, 1995-2015

**USAP 2.10 – Create and deploy campus sustainability measures**

**Plan 41 Action item:** Appoint Blue Ribbon Panel to include faculty/staff/students/alumni/community to develop plan to make campus more environmentally friendly

**Administration timeline and plan:** Rather than developing a Blue Ribbon Panel to increase the environmental sustainability of the campus, there is now a plan to put together a committee to identify and promote behaviors that individuals can make to reduce resource use (switching off lights, wearing appropriate clothing in buildings set at warmer and cooler seasonal temperatures, etc.). Structural investments in recent years have reduced energy use, limited water loss through the cooling system, reduced pollutant run-off, and increased re-use and recycling of materials. It is suggested that these improvements will continue as older systems are upgraded and environmental regulations are met but a greater impact on reducing resource use could be found by changing human behavior.

**Evaluation of feasibility:** The plan has potential for success but there is no timeline nor an analysis of the relative effectiveness of different sustainability measures.

**Recommendation:** Identify goals for environmental sustainability. Develop an analysis of the relative costs and benefits of sustainability measures to maximize return on investment. Promote the actions that have occurred, and are planned, to increase awareness of sustainability efforts within and beyond campus.

### **USAP 2.11 – Determine the campus community’s acceptable level of investment in Athletics**

**Plan 41 Action item:** Maintain current investment of 4.4% of general fund budget (2.6% of all funds budget)

**Administration timeline and plan:** The administration has stated its continued commitment to NCAA Division I status and the Summit League for the foreseeable future. Athletics has undertaken some budget cuts, and the administration plans to have the Athletics budget set as a fixed percentage. This means that Athletics funding will rise or decline with overall student fee revenue and general funds. The administration has pledged greater transparency in the Athletics budgeting process, including making budget data available to the campus community. The administration is also supporting Athletics in its fundraising efforts to increase the proportion of financial support originating outside of IPFW.

**Feasibility:** Given the current financial status of the university and projections for continued falling enrollment and revenues, maintaining the current investment of 4.4% of the general fund budget in Athletics is not feasible. The administration notes that IPFW’s monetary investment is considerably lower than most schools in the Summit League and non-football schools in Division I, but these comparisons are largely irrelevant to USAP 2.11 since they do not take into account the financial situations at each of these schools or (more importantly) IPFW’s current financial situation. The academic success of IPFW’s student-athletes, which is frequently mentioned in the USAP report and the administration’s future plans for Athletics, is laudable. However, there are 218 student-athletes, compared to IPFW’s overall 2015 undergraduate and graduate enrollment of 12,719 students. Investing nearly \$8 million in less than 2 percent of the overall student population is not sustainable, regardless of the tangible and intangible benefits Division I athletics brings to IPFW.

**Recommendations:** While the USAP report recommendation 2.11 notes that IPFW must “determine the campus community’s acceptable level of investment in Athletics,” Action Plan 41 states that the current level of investment should be maintained. In other words, the above stated action item in Action Plan 41 does not align with USAP recommendation 2.11. In addition, an extensive survey of student attitudes towards Athletics (SR #14-29, summarized in that report’s Table 31) suggests that while there is support of NCAA Division I among non-athletes in concept, this status did not influence their own recruitment, retention, or engagement with Athletics at IPFW. This latter observation should be kept in mind as the University considers the contribution that Athletics makes in serving non-athletes to advance the educational mission of the University

Therefore, the University Resources Policy Committee recommends finding an alternative to IPFW's status in NCAA Division I. In order to determine the campus community's acceptable level of investment in Athletics, all potential alternative statuses must be considered. These include moving to NCAA Division II, Division III, or to the National Association of Intercollegiate Athletics (NAIA), or discontinuing intercollegiate athletics at IPFW.

This continued scrutiny of Athletics is in line with the 2015-2016 USAP report, which called for the university to "continue to closely study this issue." Given the considerable size of the Athletics budget, which is approximately \$8 million across all funds and approximately \$5 million from the general fund, a reexamination of the level of investment from all angles is warranted and necessary. IPFW's financial situation has changed for the worse since the 2015 Alden & Associates report that recommended remaining in NCAA Division I and in the Summit League, and thus new studies and/or surveys must be quickly undertaken to determine what levels of investment in Athletics are feasible. Financial costs of leaving NCAA Division I identified by the Alden report, especially exit fees and lost revenue, must be carefully considered, but must not prevent the university from undertaking a thorough examination of the future of Athletics at IPFW. It is important to note that exit fees are an unfortunate, but necessary, one-time cost expected to result in long-term savings found in leaving NCAA Division I. Any evaluation should not be undertaken until January 2017 so that the ways IPFW is affected by the release of the LSA report may be taken into account.

In conclusion, as part of the mandate of USAP 2.11, the administration should demonstrate an attractive cost to benefit ratio for maintaining an intercollegiate Athletics program at IPFW.

## **USAP 2.12 – Adopt policies to maximize revenue in student housing**

### **Plan 41 Action items:**

- RFQ to do market analysis of alternative uses
- Generate additional rental revenue during the summer

**Administration timeline and plan:** The administration has identified multiple alternative uses of vacant spaces that include:

- 1) Establishment of a Senior Living Center (target population: senior residents who can take classes and complete degrees at the IPFW)
- 2) Establishment of an Honors Housing program (target population: students representing the similar majors or programs)
- 3) Other incentives to increase the occupancy rate within the current student community
  - a. Family housing
  - b. Current students - Many students may take into account only the rent expense which is slightly higher than in other living arrangements in their decision-making without accounting for bundled services that they may receive at student housing (free internet, cable, proximity to the campus, etc.)
  - c. Students living in other neighboring states that are eligible for some tuition breaks (embed into the tuition cost the living expenses at IPFW student housing)



- 4) Leasing or selling vacant buildings for other alternative uses
  - a. Fort Wayne Community Housing (target population: individuals who are eligible for subsidized housing options)
  - b. Indiana University's dental or radiology programs may rent/buy buildings and convert them in classrooms & labs

The administration has also identified two uses of vacant spaces during the summer when the occupancy rate declines to 25% of the total capacity of IPFW student housing:

- 1) Summer conferences
- 2) Athletic camps

These two alternatives can be implemented in collaboration with other IPFW units (Special Events, Campus Safety & Campus Food Services) and the City of Fort Wayne's Visitor's Bureau

**Feasibility:** With respect to the first item, only plans 2) and 3) may have potential for success. The second plan seems to require only minimum investment (low cost alternative), so it can be implemented at any time. The third plan requires more analysis to come up with the right set of incentives to increase the use of student housing among the current student population. The leasing or selling vacant buildings may have a reverse impact on the demand for student housing among the IPFW students. These can be considered more as short-run solutions with ambiguous long-run effects. Likewise, without any analysis it is hard to see that Senior Living Center can be regarded as a sustainable solution. Are there enough seniors who are willing to pursue post-secondary education, therefore, to live on campus?

With respect to summer, it is difficult to evaluate whether the suggested alternative uses would be considered as successful without any preliminary cost-benefit analysis.

**Recommendation:** The current occupancy rate is 75% which is only 10% points shy of the break-even rate (85%). The current situation with underutilization of student housing cannot be classified as critical. Therefore, the actions should be directed toward increasing the use of student housing services among current students (IPFW or Ivy Tech) instead of converting the units for other purposes (leasing or selling the units). There are uncertainties with respect to future demographics of IPFW students; however, demand for student housing may increase over time increasing the occupancy rate without drastic actions. If the occupancy rate declines to some critical level, then the alternative uses should be considered.

### **USAP 3.4 – Invest in the Enrollment Services Center (“Mastodon Hub”)**

#### **Plan 41 Action items:**

- Legal limitations prevent use of self-service kiosks
- Implement cross training of staff to deliver services of Mastodon Hub

**Administration timeline and plan:** Investments for the “Mastodon Hub” have been made in staff (Financial Aid, Registrar, and Student Information Systems), software, S&E, and

marketing. This effort has been funded from savings generated by the elimination of Tennis and was supported by the University Budget Committee. Minimal information was provided concerning kiosks and staff training.

**Evaluation of feasibility:** It is difficult to assess the feasibility of the plan without information on the number of students that will be served and the expected effectiveness of the service relative to investment.

**Recommendation:** Carefully monitor the impact of this new student services initiative. The investment in administrative overhead for the initiative should be justified to the faculty.

**USAP 3.10** – Invest in the technology needed to enhance student learning, increase the quality of instruction, improve business processes and remain current with student expectations

**Plan 41 Action items:**

- Continue significant classroom upgrades across campus
- Comprehensive campus-wide needs assessment completed – investment continues as resources are available

**Administration timeline and plan:** Using funds from legislative appropriation directed at student learning, renovations to 47 classrooms occurred over Summer 2016. Classrooms received new projectors and controls, white boards, furniture and décor. The prioritization process begins with requests solicited from chairs for evaluation by the IPFW Space Committee (includes representatives from physical plant, ITS, faculty, deans, students, registrar, purchasing and the Assistant VC for Teaching and Learning). The committee set priorities based on room usage weighted toward 100 and 200 level classes (to increase potential for retention when most ‘stop-outs’ occur), renovation need, and cost. A survey of the effectiveness of the renovations for learning and general atmosphere was sent to faculty and students in Fall 2016. This overall process is occurring again in 2016 and 2017 in anticipation of approval for additional state funding.

**Evaluation of feasibility:** The plan appears to be feasible and has been executed with general success in 2016. An important concern that has not been addressed is the long term budget for technology upgrades. Projectors and other IT equipment have a relatively short lifespan but account for a substantial portion of the costs of renovation.

**Recommendation:** Continue to use the process outlined above and respond to problems identified in the recently completed survey. This will help to refine the process and make future renovations more effective.

The non-recurring state appropriations that have funded the current renovations are helpful but are not guaranteed in the future. It is recommended that the administration plan for the long-term replacement of classroom technology. Likely useful lifetimes for IT equipment should be established at the time of acquisition, and funds should be proportionally set aside each year in

an accumulating pot to pay for replacement at the end of the projected lifetime.

### **USAP 3.11 – Improve the physical appearance of campus grounds**

#### **Plan 41 Action items:**

- Engage students, faculty and staff in grounds beautification twice annually
- Engage external community in campus beautification

**Administration timeline and plan:** A description of the ongoing efforts of the Physical Plant was described but a plan to engage on and off campus volunteers for beautification was not provided.

**Evaluation of feasibility:** The feasibility of the action items is not possible to evaluate.

**Recommendation:** Given the other priorities on campus and the recent completion of disruptive infrastructure projects (chiller plant piping, parking lots) this area of investment should receive a low priority. If an effort to recruit volunteers is made, it should be directed at assisting Physical Plant with their work and not unintentionally creating additional long-term maintenance (for example, weed control resulting from extensive new flower beds).

### **USAP 3.12 – Laboratory and equipment budgets must be provided to academic units that teach laboratory and studio classes**

#### **Plan 41 Action items:**

- Create central pool
- Catalog current capital lab equipment and resource needs
- Increase solicitation of companies/industry for equipment replacement budgets
- Create and build equipment replacement budgets
- Lab fees instituted 2 years ago

**Administration timeline and plan:** No additional information provided.

#### **Evaluation of feasibility and recommendation:**

1. Create central pool

*Comment.* Capital equipment for laboratory and studio classes is expensive. By definition, the cost of acquiring capital equipment exceeds the funds routinely available from S&E budgets. An assessment should be made of current and future needs (see item 2). Funds should be accumulated in a central pool and distributed in meaningful amounts through a predictable rotation to academic units running laboratory and studio facilities. Wherever possible, the distribution of these funds should be leveraged with money from grants and departmental/college resources. Carry-over savings protected from year-end wrap-up,

derived from S&E and other sources, should be encouraged to help departments and colleges meet the need to provide funds for capital acquisitions.

## 2. Catalog current capital lab equipment and resource needs

*Comment.* Inventory lists of capital equipment already exist and are of mixed value in assessing usefully-available resources for labs and studios. A catalog of capital equipment in actual use, along with the current uses of this equipment (preferably organized into groups comprising functional units/labs/studios) should be prepared. A priority list of wanted items requested by departments and their Chairs should also be maintained.

## 3. Increase solicitation of companies/industry for equipment

*Comment.* Area businesses might have older equipment that can be used in academic programs. Rather than simple solicitation, meaningful relations should be developed between IPFW and local companies resulting in multiple benefits including acquisition of equipment. Care must be taken to avoid becoming burdened with older, out-of-date equipment in poor repair. Used equipment obtained through donations is not a replacement for developing and maintaining well-considered, modern, laboratory/studio spaces.

Of greater value would be work at the chair, dean, VC, and chancellor levels to develop mutual interests and areas of cooperation between IPFW and local industry; where new equipment can be purchased, university/industry collaborations can be developed to foster student learning, and collaborations can be used to create an on-going source of funding for maintenance and development of laboratory/studio spaces. Sean Ryan will be an invaluable resource for this purpose. Fostering these collaborations will require a change in the mindset of faculty and administrators. University/industrial collaborations will need to be viewed as valuable contributions to the core university mission, and of value to the establishment of faculty credentials at the time of tenure and promotion, annual reporting and increments. In return, participating faculty will need to understand the majority of income derived from these relationships must remain with the lab/studio and with the university as a means for maintenance and development of facilities. Any approach must bear in mind the *quid pro quo* mindset of industry that frequently demands a direct and profit-making pay-back for investment.

IPFW suffers from significant departmental isolation that impedes the use of laboratory facilities not located in a home department. Consideration should be given to the development of core facilities, open to all at modest or no cost, operated by dedicated staff/faculty, possibly paid at least partly with soft money derived from grants and contracts.

## 4. Create and build equipment replacement budgets

*Comment.* Item 3.12.4 should be expanded to include maintenance along with replacement. Acquisition of capital equipment must carry a commitment from the central administration to provide service contracts on core instrumentation, and guaranteed support for timely repair of ancillary equipment exceeding funds available through S&E. This is especially critical for work done in support of external grants and contracts.

Well-used facilities built around capital instrumentation will become old and out-of-date. Likely useful lifetimes for capital equipment should be established at the time of acquisition, and funds should be proportionally set-aside each year in an accumulating pot to pay for replacement at the end of the projected life-time.

An increased effort at fund-raising to develop support for facilities might be useful to help develop endowed funds for capital replacement.

#### 5. Lab fees instituted 2 years ago

Comment. The \$50/lab-credit fee generates substantial funds which must be used only for the purchase of consumables in direct support of the lab sections that generate the funds. These restrictions are a substantial hindrance to the value of these funds. These restrictions should be removed and replaced with a directive that the funds be used to support all aspects of class-room lab instruction, including the acquisition of capital equipment with shared instructional and research purposes. Funds should be shared among the departments that generate the fee, the colleges and the central administration with the condition that funds centralized at the college and central administration levels be reserved for equipment purchases and maintenance in lab and studio settings.

## Appendix: Compiled Administration Input for URPC Review of Action Plan 41

**Summary Table:** The table shows the input that URPC has received on each of the USAP recommendations and action items.

USAP rec	Action item	Admin Input
<b>1.6 Provide the necessary resources to excel</b>	<ul style="list-style-type: none"> <li>• Assess unit needs, develop appropriate model to provide necessary resources</li> </ul>	X
<b>2.1.a Create viability standards for non-academic programs, events, etc.</b>	<ul style="list-style-type: none"> <li>• Establish viability standards for non-academic units/programs to inform decisions and resulting action</li> </ul>	X
<b>2.10 Create and deploy campus sustainability measures</b>	<ul style="list-style-type: none"> <li>• Appoint Blue Ribbon Panel to include faculty/staff/students/alumni/community (e.g. GM Plant) to develop plan to make campus more environmentally-friendly</li> </ul>	X
<b>2.11 Determine the campus community's acceptable level of investment in Athletics</b>	<ul style="list-style-type: none"> <li>• Maintain current investment of 4.4% of general fund budget (2.6% of all funds budget)</li> </ul>	X
<b>2.12 Adopt policies to maximize revenue in student housing</b>	<ul style="list-style-type: none"> <li>• RFQ to do market analysis of alternative uses</li> <li>• Generate additional rental revenue during summer</li> </ul>	X
<b>3.4 Invest in the Enrollment Services Center ("Mastodon Hub")</b>	<ul style="list-style-type: none"> <li>• Legal limitations prevent use of self-service kiosks</li> <li>• Implement cross training of staff to deliver services of the Mastodon Hub</li> </ul>	X
<b>3.10 Invest in the technology needed to enhance student learning, increase the quality of instruction, improve business processes and remain current with student expectations</b>	<ul style="list-style-type: none"> <li>• Continue significant classroom upgrades across campus</li> <li>• Comprehensive campus- wide needs assessment completed – investment continues as resources are available</li> </ul>	X
<b>3.11 Improve the physical appearance of campus grounds</b>	<ul style="list-style-type: none"> <li>• Engage students, faculty and staff in grounds beautification twice annually</li> <li>• Engage external community in campus beautification</li> </ul>	X
<b>3.12 Laboratory and equipment budgets must be provided to academic units that teach laboratory and studio classes</b>	<ul style="list-style-type: none"> <li>• Create central pool</li> <li>• Catalog current capital lab equipment and resource needs</li> <li>• Increase solicitation of companies/industry for equipment (deans/chairs)</li> <li>• Create and build equipment replacement budgets</li> <li>• Lab fees instituted 2 years ago</li> </ul>	

**Response to 1.6 – Provide the necessary resources to excel (from Warren Soptelean, Director of Budget and Planning)**

The following narrative contains a summary of the budget process that is utilized in preparing the fiscal year operating budget. While the majority of the focus is on the General Fund, the budget process encompasses all of the funds related to IPFW.

1. In the initial preparation the following information is gathered, summarized and reviewed by the budget department.
  - a. State Operating Appropriations – Past and Projected Funding.
  - b. Enrollment Trends – Past and Projected Credit Hours. This data is further reviewed by the VCAA to further refine trends and projections specific to individual colleges and programs.
  - c. Guidelines are provided to IPFW by Purdue WL for the following areas.
    - i. Items provided by Purdue - benefits, management and system costs, etc.
    - ii. Guidelines for areas such as inflation costs related to supplies, contracted services, investments, etc.
  - d. Other input provided to the Budget Office by Purdue and IPFW leadership – Chancellor and Vice Chancellors.
2. Budget Preparation and Submission
  - a. Historical data and current year projections for S&W and S&E are provided to the units as a budgeting guide.
  - b. Both Academic and Non- Academic units review the data provided. This data is used along with supplemental information provided by the individual units that relate to the operation of their units to assemble their respective budget requests. These budget requests are then reviewed by the appropriate responsible individuals with knowledge of the units operations.
  - c. All unit budgets are forwarded to the respective administrative team member, (Chancellor or VC) for final review and approval.
  - d. The respective administration team member forwards their approved budgets to the Budget Office.
  - e. The University Budget Committee, with representation of URPC, via the URPC Budgetary Affairs Subcommittee (BAS), reviews the individual unit submitted budgets and makes appropriate recommendations regarding the units budget requests
  - f. These recommendation are presented to the Chancellor for review and incorporation into the budget.
3. Budget Review and Finalization
  - a. The Budget Office oversees the entering of the Fiscal Budget.
  - b. The budget is reviewed on an ongoing basis and is reconciled to the available current fiscal year’s funds to ensure that all expenses have a current year funding source. Exceptions to this are noted in the budget process and are subject to approval by the Chancellor.
  - c. The summarized budget is shared with the Administrative Team and Purdue for approval. If revisions are requested, then the appropriate revisions are made and the summarized budget is resubmitted and reviewed.

**Response to USAP 2.1a - Create viability standards for non-academic programs, events, etc. (from Tamara Brownlee via VC David Wesse)**

As a reminder, late February 2016, HR-OIE launched the job restructuring project with the outcome of a new job framework. The framework consists of establishing career streams, career levels and job families.

Career streams will identify career type within the organization, characterized by unique responsibilities such as Support, Skilled Trades, Professional, Management, and Executive. Career Levels will be placed in a detailed career leveling guide which will define the accountabilities for jobs at each level, based on the following dimensions: Organizational Impact, Innovation & Complexity, Communication & Influence, Leadership & Talent Management, Knowledge & Experience. Finally, job families will recognize major professional areas, often requiring a unique set of skills. Most career development occurs within a job family. Ultimately, we feel this project will address the USAP 2.8 identified concerns. The objectives are to:

- Create clear and attainable career paths and recognizable differences between jobs,
- Move away from position descriptions, which are highly individualized, to a broader job description that represents a number of individualized positions having a common set of duties, responsibilities, knowledge, skills and abilities
- Create a framework for jobs that reflects the University's structure and sets the foundation for talent management initiatives, such as succession planning
- Align jobs to the new framework
- Develop a "common language" for jobs across the University
- Develop the foundation for a future system-wide approach to compensation management

**Response to USAP 2.10 - Create and deploy campus sustainability measures (from Jay Harris, Director of Physical Plant).**

The following initiatives have been undertaken by the Physical Plant to help reduce costs and create a more sustainable University.

**Background and energy use.** IPFW, like every other organization or individual on this planet consumes energy. In our case back in 2010 we used 26 million Kilowatt-hours (kWh) of electricity and over 174,000 dekatherms (DT) of natural gas each year. Our campus has an annual energy budget that exceeds \$4 Million which is paid to public utility companies such as AEP for Electricity, NIPSCO for natural gas and Fort Wayne City for water and sewer. In FY 2015-16 we are seeing a slight reduction energy use in the range of 24 million kWh of Electricity and a slight increase in the use of natural gas to 179,000 DT of natural gas. However, since 2010 we have added the Student Services Complex approximately 175,000 SF which includes the bridge connection between Walb and the Library, the book store and coffee shop, the international ball rooms, International Education headquarters, the fieldhouse, fitness areas, and a significant amount office, conference space and public toilets. Parking Garage III has been completed to accommodate 1000 vehicles. The Gates Gymnasium has been air conditioned. The Modular Classroom Building (21,600 SF) has been added to the campus classroom inventory. The consumption of electrical



energy units has remained about the same, and the units of natural gas has increased by just over 45% as we convert from reliance on electrical energy for heating to the more efficient natural gas.

Over the past two years we have undertaken significant campus and building infrastructure projects with the expressed purpose of reducing energy consumption. Projects like the replacement of the four main HVAC (heating ventilating and air conditioning) units in Kettler and upgrading and replacement of most of the high voltage and electrical distribution system in Kettler were designed to save energy, manage environmental conditions better and make our systems safer and more reliable.

The Helmke Library renovation project which will provide an improved learning environment was driven in part by the need to replace worn out and inefficient infrastructure. The original electric heating system is being replaced with a more efficient and reliable gas fired hydronic system with direct digital controls and a better monitoring systems. The original building lighting will be replace with LED lights. The renovation of the library infrastructure is expected to reduce energy consumption in that building by as much as 60%.

Air conditioning on a campus is provided by the Chiller Plant at the north end of campus. This facility creates chilled water that is distributed by a system of underground pipes that extend from the Plant through the heart of campus under Mastodon Way to each building on campus. The main supply and return pipes, which were installed in the late 1960's, are 24" diameter and made of carbon steel. Over the years those pipe have corroded resulting in multiple small leaks which when combined resulted in a daily loss of over 40,000 gallons per day of water. This loss had to be made up by adding water to the "closed loop system" and required adding costly water treatment chemicals. In the winter and spring of 2016 a project was undertaken to line the inside of the mains with a fused polymer sleeve. New isolation valves and connections to individual buildings were installed to provide better control. A second project replaced pumps and added new controls to optimize the Chiller Plant operations. The end result is that the water loss is now down to less than 400 gallons per day. Last year during peak periods in the cooling season it required two and sometimes three chillers to be operated, whereas this season it has taken only one chiller to keep up with demand.

Historically University Buildings have been designed and constructed to be "100 year buildings". That means that the structures themselves, built of concrete, steel and masonry, are intended to be safe and functional for at least 100 years. However, mechanical, electrical and plumbing systems, need to be replaced within 35-50 years. Since IPFW is now over 50 years old many of the buildings on campus have mechanical and electrical equipment and systems that are at or beyond normal life expectancy. Not all of the equipment will need to be replaced, but controls and linkages may still need to be upgraded and/or recalibrated.

The University has undertaken several energy savings projects since 1999. These projects range from replacing electric fired boilers with natural gas boilers, to replacing light fixtures and/or ballasts to convert from T12 to T8 florescent lamps, to the implementation of water saving features on all water fixtures, to the installation of sensors to turn vending machine light off when no one is near them, to the retro-commissioning of four major buildings (Kettler, Neff, Science Building and Engineering Technology) to replacing pneumatic controls with Direct Digital Controls. One significant cost and use of energy is in the illumination of campus and campus buildings. Where possible incandescent lamps have been replaced with compact florescent lamps. Our current plan it to replace most if not all of our campus

fixtures with LED fixtures. Physical Plant has made a commitment to only replace or add new LED lighting for reasons of sustainability. All of these efforts incrementally reduce energy consumption.

Human behavior is another component of energy consumption, and it is extremely difficult to manage. People need to take the initiative to switch off the lights, lower the hood sash, put on an extra layer of clothing in the winter, and understand that it might be a bit warm and humid in Indiana in the summer and a bit cold in the winter. Changing human behavior is infinitely more difficult than building or modifying buildings but it could have some of the most rewarding cost and energy saving results.

As a partner in the NPDES (National Pollutant Discharge Elimination System), Fort Wayne District, the University is managing storm water to reduce the amount of pollutants entering the rivers and aquifers. Best management practices such as the separation of storm and sanitary sewers into independent systems has been done. The careful use of salt on the roads, and an increase in the use of brine and ice melt on walks coupled with effective mechanical removal of ice and snow effectively keeps sand out of the storm water system. The University has constructed significant storm water detention basins and intends to construct more rain gardens and bio-swales to allow natural systems to filter out contaminants. The University carefully monitors all outfall locations for storm water on campus and has protocols in place for the elimination of pollutants found to be discharging from these structures.

Two major pedestrian bridges have been constructed using Transportation Enhancement funds which promote pedestrian and bicycle access to campus and reduce the need for vehicular transport. There are plans to add one more bridge across Coliseum to help connect the campus to existing bicycle and pedestrian trails on both sides of the highway.

Tree planting programs on campus have provided enhanced visual and natural cooling conditions. Approximately 15 % of the campus acreage has been preserved as natural woodlands, providing wonderful environmental areas for people and habitats for wildlife. On the main campus there have been some trees removed to make way for building and drives, but for every tree that has been removed five to seven new trees have been planted.

Recent building projects such as the new Student Services Library complex (approximately 172,000 SF) have been designed to take advantage of natural day-lighting, which reduces the need for artificial lighting during most of the time the campus is open for operations.

Building Services and maintenance operations use as many products and processes as possible that are environmentally friendly and reduce energy consumption. Examples of this are the exclusive use of low odor low VOC paint, paper products that are made from recycled materials, preventative maintenance programs to keep HVAC systems operating at the highest efficiency possible, and the use of organic fertilizers along with carefully managed weed and pest controls to be timed to be effective with the lowest possible rates.

Land fill diversion (reducing our waste stream) has been a long term goal of the Physical Plant. The University has ongoing recycling efforts for office paper, beverage cans and bottles, and separate systems to process electronic equipment (e-waste) and scrap metals collected from building renovation projects. The Single Stream Comingled recycling plan has been in place for several years. All staff are encouraged to use this service. Construction standards have incorporated metals and plastics recycling into all new projects for the past 10 years. Also the University has incorporated the use of Green

Building practices, as set forth by the USGBC, within its construction specification for about the same time period.

Salvaged and surplus furniture and equipment are being marketed for reuse or dismantled and sorted into commodity product streams that will be reused in innovative manufacturing processes. Our construction projects require contractors to sort and separate materials from demolition activities into containers so that most of the volume of material can be recycled rather than taken to land fill sites.

The Physical Plant has implemented as many online electronic forms as is practical to reduce paper use. All of the Drawings and specifications for construction projects that we do with outside contractors are distributed electronically as digital images. Most construction correspondence is managed electronically. Only financial data is processed in hard copy as required by Purdue as a part of the capital construction process.

**Response to 2.11 – Determine the campus community’s acceptable level of investment in Athletics (from David Wesse, VC of Financial Affairs):**

- In response to the concerns shared in an earlier report of the University Resources Policy Committee (URPC) and as part of the university’s own due diligence, IPFW engaged Alden & Associates, Inc., to review our IPFW athletics program.

We asked Alden to provide recommendations on potential cost-cutting measures and their impact on the university’s compliance with Title IX, NCAA regulations, and other contractual obligations.

The scope of the study included both small and large-scale possibilities, including changes such as reclassification from NCAA Division I to Division II.

After careful review, the consultants produced a detailed report with these recommendations:

- Remain in NCAA Division I and continue focusing on developing an athletics program focused on quality in every area, particularly in the student-athlete experience.
- Evaluate the number of sports offered.
- Expand fundraising in an aggressive and strategic manner.

Financially the report highlights:

“The (IPFW) athletics budget maximizes the resources available and has been astutely developed but has suffered setbacks.”

“Financially, the institution’s intercollegiate athletics program sits in the bottom 15% of NCAA Division I...”

It should be noted that the report also highlights the academic performance of our student athletes:

“The overall GPA for IPFW student athletes for the fall 2014 semester was 3.17. It is worth noting that this is the fourth consecutive year that the student-athletes earned a 3.1 or higher; for the past 12 years, IPFW student-athletes have earned GPA’s at or above a 3.0.”

“In comparing the 2007-2008 Freshman Cohort Graduation Rates of IPFW’s student athletes of 59% to the overall undergraduate students’ graduation rate of 25%, it is significantly higher than the IPFW undergraduate student graduation rate.”

**The complete report is attached.**

- As part of a continuing effort to focus on its institutional mission while meeting the challenges of the current budgetary environment, IPFW discontinued the men's and women's Division 1 tennis teams at the end of the 2014-15 athletic year. This provided \$450,000 for reallocation and reinvestment in university programs focused on student success, retention, and recruitment.

When the above was done IPFW announced its commitment to continuing in NCAA Division 1, with 14 men's and women's teams. The decision to eliminate the tennis program was based on the both the recommendations of external consultants and an internal review with the goal of gaining the greatest benefit while making the least impact on students and staff.

- Below are links to the NCAA Financial Audit and USA Today’s list of NCAA Division I athletics programs and finances.

The NCAA requires that institutions submit revenues and expenses for their athletic department as well as other general information annually. Categories of revenues and expenses are provided but Institutional Support and Student Fees are shown as revenue.

USA Today provides a different presentation of the NCAA Financial Audit information by providing a revenue category called Total Subsidy. The Total Subsidy amount is made up of Student Fees and School Funds (Institutional Support and Indirect Facilities). IPFW is ranked 220 of 231 public institutions and 9 of 9 in the Summit League in funding. IPFW is designated as a Limited Resource Institution which means bottom 15% of funding among all Division I programs.

[http://sidearm.sites.s3.amazonaws.com/ipfw.internetconsult.com/documents/2016/8/17/IPFW\\_NCAA\\_Financial\\_Audit\\_2014\\_15.pdf?id=3656](http://sidearm.sites.s3.amazonaws.com/ipfw.internetconsult.com/documents/2016/8/17/IPFW_NCAA_Financial_Audit_2014_15.pdf?id=3656)

<http://sports.usatoday.com/ncaa/finances/>

- Under the proposed 2.11 Plan 41 response, if IPFW’s budget were to decline by 5%, the IPFW Athletics budget will decline in proportion, with decreases coming *both* as a result of lost student fee revenue *and* a reduction in the General Fund subsidy.

However, apart from Plan 41, Athletics is now cutting its budget as part of the current budget reduction process. They have a target for budget cuts, plus the hiring freeze has impacted a number of positions that will not be filled - including one position frozen in Athletics and one position from the retirement incentive.

Keep in mind that university budget increases or decreases impact only the general fund subsidy portion of the Athletics budget. Under the recommendation the subsidy would be fixed as a percentage of the university current budget. So the subsidy would increase or decrease dependent on the overall size of our university budget. The percentage will remain unchanged, but the amount of the subsidy could go up or down – dependent on the overall size of the university budget.

Apart from the above, Athletics is, of course, being supported in its efforts to raise its own donations and to seek other sources of revenue. An example of this is the fact that IPFW Athletics recently proceeded with an Under Armour (UA) partnership for IPFW athletic performance gear. Under Armour is making a significant move into the world of collegiate sports. The total value of the IPFW agreement with Under Armour nears \$1 million, in total, over a ten year period.

- Peter Iadicola, at the request of the Senate, conducted a student and employee survey about IPFW Division I sports. Surveys were completed by 1,963 students and 678 faculty and staff members. Results of the survey found that 86% of students and 80% of faculty and staff agreed or strongly agreed that “The athletic accomplishment of our students in the D-1 athletic programs increases the prestige of IPFW,” and 86% of students and 65% of faculty and staff agreed or strongly agreed that “IPFW should continue to participate in Division 1 Athletics.” Specific benefits of Division I athletics included, among others, “creation of community and school spirit, creating student oriented events, and contributing to a positive image for the university in the local community and the state of Indiana.” The results of the survey supported the recommendations of the Alden Group, IPFW’s national athletic consultants, who reached many of the same conclusions.

**A complete copy of the survey is attached.**

IPFW is committed to Division 1 status, the Summit League and the fielding of competitive sports teams for the foreseeable future. This is being accomplished while our Athletic budget is ranked, per USA TODAY, as the 220th lowest funded Division 1 team (out of 240 or so) in the US. While not all IPFW teams may have positive won/loss records, we believe that all teams have proven to be very competitive both in their athletic and academic endeavors. Attached Senate Reference No. 13-38 speaks clearly to many of these accomplishments (benefits) in the second half of the report.

To enhance transparency, financially, the accounting for IPFW Athletics has been transitioning from a mix of some funds coming from IPFW's Continuing Ed revenue and some funds from the general fund to a process where all funding will be accounted for as flowing through the general fund.

The Budget office is working closely with the Business Manager of Athletics to assure effective and efficient use of resources while ensuring accountability and transparency. Also, to increase transparency, as suggested in the USAP report, an announcement will be made to the campus via 'Inside IPFW' or the 'Chancellor's Greeting' that the most current audited NCAA " Consolidated Statement Of Revenue and Expenses" report (see attached) will be linked to the Athletics' home page. In addition there will be a link to the Equity in Athletics Data Analysis (EADA) where interested parties can search for IPFW athletic data over time and/or in comparison to other programs <http://ope.ed.gov/athletics/#/>

**Response to 2.12 – Adopt policies to maximize revenue in student housing (from David Wesse, VC of Financial Affairs):**

Currently, IPFW has completed a Request For Information (RFI) regarding the possibility of having a Senior Living Center on campus in one of the facilities at Housing and to determine the demand in the market for such arrangements. The RFI was only the first step in many before identifying this as the option to pursue as an alternative use of the facilities for the near term. Options such as leasing a building or potential selling a building for this alternate use have been discussed, but will need a more defined scope to determine viability based upon financial regulations related to the debt issued for the construction of the facilities. Other potentially viable opportunities may include a dedicated Honors Housing Building, a Living Community model where students of similar majors could be grouped by floors or other opportunities not yet identified. To proceed with any alternative use, thorough market analysis will have to be completed, evaluated and then a model will need to be developed in such a way that the outcomes contribute positively to the mission of the University.

Once the Spring Semester is complete in May, IPFW Student Housing has traditionally seen occupancy levels decline to roughly 25% of capacity for the summer. During the time frame of May, June, July, and August, opportunities such as summer conferences and Athletic Camps can generate some revenue to help supplement the budget and make use of the facilities during the period in which they are vacant prior to the Fall Semester. Currently, the pool of conferences is minimal, so to grow this rental opportunity at IPFW Student Housing, we will focus on collaborating the efforts of Special Events, Campus Safety, Campus Food Services, Student Housing and the City of Fort Wayne’s Visitor’s Bureau to make IPFW available for multiday events that can allow conference attendees to stay at our Housing during the events. This new opportunity will take some time to grow. We will begin with smaller events, as available since these types of events are normally booked out a couple of years in advance, while we learn and continually develop the business model for this new venture while being mindful of the financial regulations related to the debt of the facilities.

**Response to 3.4. –Invest in Enrollment Services Center (from David Wesse, VC of Financial Affairs):**

Funds for the creation of the Mastodon Hub came from cutting Tennis and votes by the University Budget Committee on the disposition of funds is given.

- *“Enrollment Management requests \$85,000 for the SLATE Customer Relationship Management Software License. UBC endorses the allocation of \$85,000 on a recurring basis from the FY 2017 “Tennis Money,” but requests that the Vice Chancellor for Academic Affairs and Enrollment*

Management provide annual updates to the UBC on the performance of the software. **10 in favor of the recommendation, 0 opposed.**

- Enrollment Management requests \$115,398 (including S&W and Fringe Benefits) for three CULs for Financial Aid and \$109,200 for two CULs for the Registrar to staff the new Enrollment Services Center. UBC endorses the allocation of \$115,398 for three Financial Aid CULs and \$54,600 for one Registrar CUL to staff the Enrollment Services Center, to be funded on a recurring basis from the FY 2017 "Tennis Money." **9 in favor of the recommendation, 0 opposed.**
- Enrollment Management requests \$22,544 to increase the S&E budget for Student Information Systems. UBC endorses the allocation of \$22,544 for Student Information Systems S&E on a non-recurring basis from the FY 2016 "Tennis Money." If Enrollment Management requests an increase to the Student Information Systems S&E budget again next year, we highly recommend that the request include a report on the uses of this year's non-recurring allocation and any resulting performance improvements. **10 in favor of the recommendation, 0 opposed.**
- Enrollment Management requests \$134,440 (including S&W and Fringe Benefits) for two business analyst positions in Student Information Systems. UBC endorses the allocation of \$134,440 for two business analyst positions in Student Information Systems, to be funded on a recurring basis from the FY 2017 "Tennis Money." **10 in favor of the recommendation, 0 opposed.**
- Enrollment Management requests \$50,000 to be added to the existing budget of \$250,000 for Call to Action Marketing. UBC endorses the allocation of \$41,158 for Call to Action Marketing on a non-recurring basis from the FY 2016 "Tennis Money." **10 in favor of the recommendation, 0 opposed.**
- Enrollment Management requests an increase of \$11,371 to the Financial Aid S&E budget for postage as a result of new requirements for financial aid mailings. UBC endorses the allocation of \$11,371 for postage for Financial Aid S&E, to be funded on a recurring basis from the FY 2017 "Tennis Money." **10 in favor of the recommendation, 0 opposed.**
- Enrollment Management requests an increase of \$15,000 to the Registrar S&E budget for the purchase of new computers for new staff and for training and professional development. UBC does not endorse the allocation of \$15,000 for Registrar S&E, and recommends that any increase in the Registrar S&E budget be funded through internal reallocation from within Enrollment Management. **9 in favor of the recommendation, 0 opposed."**

**Response to 3.10 – Invest in the technology needed to enhance student learning, increase the quality of instruction, improve business processes and remain current with student expectations (from David Wesse, VC of Financial Affairs):**

During the summer of 2016 the following twenty-two (22) classroom technology upgrades were completed:

Kettler Hall – 9 classrooms upgraded to Crestron digital touch panel controls including new projectors, Bluray players, and document cameras. Two of these rooms have multiple projectors.

Neff Hall – 5 classrooms upgraded to Crestron digital touch panel controls including new projectors, Bluray players, and document cameras.

Science Building – 4 classrooms upgraded to Crestron digital touch panel controls including new projectors, Bluray players, and document cameras.

Liberal Arts – 2 classrooms upgraded to Crestron digital touch panel controls including new projectors, Bluray players, and document cameras.

Dolnick Center – 2 classrooms upgraded to Crestron digital touch panel controls including new projectors, Bluray players, and document cameras.

15 of the aforementioned rooms received new lecterns as well.

This new classroom model provides a great user experience by delivering crisp images and audio with simple and intuitive controls.

ITS has provided cost estimates for classroom technology upgrades / replacements for an additional 40 classrooms in Kettler Hall, 12 classrooms in Neff, and 21 classrooms in Neff, as part of a \$17 million funding request for FY 2018.

**Communication plan relating to 3.10 (from Marcia Dixson, Assistant VC for Teaching and Learning)**  
(black indicates what was done this time, blue indicates changes for next round)

**Summer 2015:** Physical Plant contacted Assistant Vice-Chancellor for Teaching and Learning (AVCTL, on the first day of her new job 😊) to request information about what faculty want in classrooms given state money to be used for that purpose.

**Early fall 2015:** Classroom space committee was formed including representation from: physical plant, ITS, faculty, dean, student, registrar, purchasing (later in the process), and AVCTL.

**Early fall 2015:** Requests were solicited from chairs regarding what renovations they felt would enhance the learning environment in rooms for which their department had priority scheduling. We received 72 requests as part of this project.

**Fall 2015:** The classroom space committee first considered criteria to use when evaluating the requests. These included:

- Room usage: How many students (given Fall 2015 numbers) were currently using the room? How many of the courses offered were 100 and 200 level (which is when we currently lose the most students)?
- Renovation need: How recently was this room renovated, if ever?



- **Cost:** How much will it cost to renovate this room (given we had specific limited funding).

**Early Fall, 2016** (for renovations in Summer 2018): Given previously generated criteria and average cost/square foot in each building, Space Committee (AVCTL, Registrar and Physical Plant) will do priority ranking of rooms - accomplished

**Mid Fall 2016/Spring, 2017:** If we get approval/funding, chairs of departments with priority scheduling for those rooms will be asked for the type of renovation that would be most useful to the kind of teaching generally done/desired.

**Late Fall 2016:** Send list of the nine rooms we expect to renovate in Summer 2017 to chairs who had requested these renovations in the previous round.

**Spring, 2017:** If indicated by the nature of the requests, the classroom space committee will be reconstituted to make decisions. List given to Registrar to move classes for Summer 2018. Any changes of capacity also made with Registrar and departments to move courses beginning Fall 2018.

**Fall/Spring 15/16:** Let chairs know the priority ranking of rooms and if we cannot do all of what they wanted.

**Spring 2016:** Piloted new furniture in one room in LA. Move summer classes from rooms to be renovated.

**Summer** (bleeding into fall) **2016:** Do the work in the six-eight or twelve-fourteen weeks that the rooms can be emptied (depending on the room)

**Just before fall classes 2016:** Moved classes for which new furniture caused more of a decrease in capacity than expected.

**Summer 2017:** Renovation of nine rooms

**Fall 2017:** Pilot any new innovations that could be in multiple classrooms. Get finalized list to departments regarding rooms and expected changes.

**Spring 2018:** If we get approval/funding, get expected construction timeline to departments and the campus as a whole.

**Summer 2018:** Do at least three updates regarding construction. Offer training for any new tech put in rooms.

**Fall 2018:** Troubleshoot (if we do many rooms, there is no expectation that everything will be perfect although we certainly will test during summer). Get feedback about changes and how well they are working. Goal: 8 or above for overall means. Celebrate a job well done!

**Response to USAP 3.11 - Improve the physical appearance of the campus grounds (from Jay Harris, Director of Physical Plant).**

First of all it must be acknowledged that “beauty is in the eye of the beholder”. It must also be stated that the grounds of IPFW is first and foremost a college campus, not a botanical garden or arboretum. It is also fair to say that over the past five years as budget cuts have impacted the Physical Plant that high maintenance features like large plantings of spring, summer and fall annual flowers had to be drastically pared down. Very limited plantings of hardy annuals at key locations have been maintained. Many of the annual flower beds have been replanted with perennials. Even some of the perennial beds have been reduced because of the significant labor expense in keeping them weed free and healthy. A number of large trees have been removed from campus either because of disease or insect invasion like emerald ash bore which has killed off most of the ash trees on campus. Other trees have been removed because of storm damage or they have overgrown the space in which they were planted. In some cases trees have been removed to make way for roadway improvements, or for some new building addition or site change. Other maintenance cost savings and sustainability measures have included leaving some large unused turf areas such as between Broyles and Crescent Ave. in a natural state with only a narrow boarder surrounding this prairie like area manicured.

On a more positive note, the quality of the turf campus wide has been drastically improved with in implementation of environmentally friendly organic fertilization, careful limited use of herbicides and pesticides. Newer disease and drought tolerant varieties of grass have been introduced where ever possible. As a result fewer broad leaf weeds are present on campus which not only helps the appearance of the turf areas but improves the health of campus lawn areas as well.

Even though there have been a number of larger trees lost, there has been an intentional tree planting program that has installed well over 1000 trees in the past ten years. There has also been an intention to use a wide variety of trees so that the impact of trees lost to disease and pests in the future will have less impact on campus.

In an effort to respond to the National Pollutant Discharge Elimination System (NPDES) mandated by the EPA and IDEM a number of storm water retention and detention basins have been created including bio swales and rain gardens. The rain gardens have a large variety of native plants that can survive in the unusual environment where it can be flooded at some points and dry at others. These natural filters help to improve water quality of the rivers from which Fort Wayne draws its drinking water.

Irrigation of important turf and landscaped areas is expensive because we must use domestic city water as the source. A recent project to isolate our irrigation system and meter its use will cut our water bill nearly in half because we will not have to pay the sanitary sewer rate for that water use. As a result we will be able to introduce irrigation into some key areas like the Science Mall and the areas on the both sides of the main walk way between campus and student housing. Those projects will be undertaken in the next few months. Along with the planting of several new trees through the heart of campus to help it become greener and more pleasant.

Most of the intensive site work that has disrupted the campus landscape over the past several years is now complete. Once the base plantings of trees have been completed and turf area restored, there will be an opportunity to look at a few small pockets of space near entrances and along major walks where some shrubs that exhibit interesting flower, fruit and fall color as well as perennials and a few annual flowers will be introduced into the campus fabric.

Since the landscape is a living and growing organism there will be new life, growth, but also death. The goal is to find the right balance that will fit within our capacity to maintain the landscape and to introduce new plants and site features to the campus grounds that enhance the campus experience and provide a safe environment for everyone. Any and all additional funding directed toward campus beatification will be used to escalate this plan and process.

The same Landscape Architect that designed the original plantings around Kettler, Neff, Helmke and Walb over 40 years ago is being consulted on the future development of the rest of the campus landscape.

MEMORANDUM

TO: Fort Wayne Senate

FROM: Kathy Pollock, Chair  
Executive Committee

DATE: October 31, 2016

SUBJ: Subcommittee reports on Action Plan 41

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WHEREAS, on September 13, 2016, the Executive Committee of the Fort Wayne Senate charged Senate committees and subcommittees with reviewing and reporting upon the action items contained in "Action Plan 41" associated with USAP Recommendations 2.4, 2.5.4, and 4.3; and

WHEREAS, the subcommittees met subsequently to create written reports (attached) to document due diligence; and

BE IT RESOLVED that the Fort Wayne Senate recognize the attached reports are a clear indication that the charges were met and tasks completed.

Approved

A. Downs  
J. Malanson  
M. Masters  
K. Pollock, Chair  
A. Schwab  
B. Valliere

Non Voting

M. Coussement

Absent

B. Redman

### **Action Plan 41 – Senate Library Subcommittee Report on Recommendation 3.9**

The Senate Library Subcommittee was tasked with responding to the following item in Action Plan 41:

III. Invest to Generate Revenue – Invest in retention and student success – Invest in new and expanded programs – Invest so units can excel

#### **3.9 Invest in Helmke Library**

Plan 2020 Alignment: I.B.

Action Items:

1. Implement fundraising plan for naming opportunities
2. Increase digital collections holdings
3. Increase number of discipline specific librarians

Responsibility: VCAA/EM, VCFAA

Senate committees and subcommittees were charged with writing up a brief report that does the following:

1. Communicate with the responsible administrators identified in Action Plan 41 to develop an understanding of the administration's timelines and plans for next steps. This information should be included in your report to the Senate.
2. Evaluate the feasibility of the action items associated with each USAP Recommendation proposed by the administration.
3. Make recommendations on how to proceed with each USAP Recommendation. These recommendations can be an endorsement of the administration's proposed action items, timelines, and plans; a proposal to scrap any or all of the proposed action items; a proposal for an entirely new approach to the USAP recommendation; or whatever else the committee feels appropriate to recommend.

1. For 3.9, the administrative timeline and plan (in this case from the Vice Chancellor for Academic Affairs) is as follows:

Priority: Academic Affairs Primary Task

Recommendation: Invest in Helmke Library

Task: Continue to make strategic investments in Helmke

Date: Ongoing

- Action Item 1: Work closely with IPFW Advancement team during the Library and Learning Commons Naming Opportunities fundraising campaign and ongoing fundraising efforts
- Action Item 2 and 3: Meet with VCAA one/month to discuss library needs
- Action Item 2: Prepare budget request according to VCAA process
- Action Item 3: Prepare librarian and staff personnel requests according to VCAA process outlined in [OAA Memorandum 15-3 Guidelines for Faculty Position Requests](#)

2. For 3.9, The Subcommittee notes the following regarding the feasibility of the action items:

**Action Item 1: Implement fundraising plan for naming opportunities**

- Library and IPFW Advancement have launched the Naming Opportunities Campaign and are already receiving donations through that campaign. This campaign ends December 31, 2016
- **Feasibility:** Ongoing annual campaigns to add to the Library Endowment and the proposed Technology Endowment should be feasible and effective.

**Action Item 2: Increase digital collections holdings**

- Subscription-based digital collections (e.g., e-journals, e-books, databases)
  - Continued annual zero-based evaluation of serials subscriptions
  - Current annual budget request for serials in the last three budget cycle has been based upon average serials price increases (5-7% in recent years), and
  - Requests by departments for items needed for new programs or expanded programs.
- **Feasibility:** VCAA has been able to increase serials budget by the recommended percentage increase in serials prices (which maintains the current collection). VCAA has not been able to increase budget to add new subscriptions for new programs or expanded programs in the last two budget cycles.

**NOTE:** Anticipated changes in the IPFW Management agreement that could require a split from the IU Library system to the Purdue library system will be extremely costly (over several million dollars) and will significantly reduce access to research resources for students and faculty.

- Digital collections created by the library (e.g., mDON, Opus, Digital University Archive)
  - mDON: Adding new collections at a very reduced rate, due to lack of staff and funding. Applying for federal grants under the Library Services and Technology Act and developing more partnerships with campus and community groups is a priority.
  - Opus: Continued thoughtful and forward-looking reorganization and training of staff and librarians has made it possible to implement and manage current Opus collections. There remain very few resources for continued growth.
  - Digital University Archive: Addition of one new staff and a small S & E budget for the creation of phase one of a digital university archive.

- **Feasibility:** With the budget shortfall, it may be difficult to appropriate additional funds for digital collections. The top priority is filling the Digital Initiatives Assistant position that has been frozen in order to build the university archives before materials are lost. It is especially important to preserve the university's history as we anticipate undergoing several changes in the near future.

### **Action Item 3: Increase number of discipline specific librarians**

- Due to a retirement the library will be losing its Head of Technical and Information Technology Services in the Spring 2017 semester. This librarian position is mission critical for IPFW. All electronic resources are purchased, linked and maintained by this librarian. The librarian makes sure electronic resources are available on and off-campus, 24-7. The librarian also works with our vendors and our consortia libraries to negotiate the best contracts for our resources. This position must be filled as soon as possible. In addition, anticipated changes in the IPFW Management agreement that could require a split from the IU Library system to the Purdue library system will require a complete change in the library's cataloging, circulation, acquisition, and, public access catalog. Many of these changes will need to be made and managed by the Head of Technical and Information Technology Services. IPFW cannot make a transition of this magnitude without a librarian in this position.
  - University Archives Assistant position that was recently frozen also needs to be filled in order to fulfill our commitment to preserving the history of IPFW. Harvesting and digitizing university documents, photos, and media has slowed considerably due to lack of staff.
  - Depending upon the changes in programs at IPFW, the library has had long-range plans to have three librarians associated with COAS – Science, Social Sciences, and Humanities.
  - The library is also in need of an instructional designer to help with online tutorials and other teaching tools for information literacy.
- **Feasibility:** It is mission critical that we fill the Head of Technical and Information Technology Services position in order to insure access to our e-collections both on- and off-campus and to work with IU, Purdue and other Indiana academic libraries to negotiate subscription contracts favorable to IPFW.

**NOTE:** Anticipated changes in the IPFW Management agreement that could require a split from the IU Library system to the Purdue library system will require a complete change in the library's cataloging, circulation, acquisition, and, public access catalog. Many of these changes will need to be made and managed by the Head of Technical and Information Technology Services. IPFW cannot make a transition of this magnitude without a librarian in this position.

### 3. Senate Library Subcommittee Recommendations

The library is in agreement with the USAP recommendations and the administration's proposed action items.

However, impending changes in the IPFW management agreement and relationships with Purdue and IU library systems will inevitably disrupt the current effectiveness and quality of library services. These current action plans will need to be re-addressed when the final results of the IPFW Management Agreement is reached.



# Senate Advancement Advisory Subcommittee – Report on Action Plan 41 Recommendations

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The Advancement Advisory Subcommittee met on October 19, 2016 at 6pm, where Vice Chancellor Fincannon and Jack Patton gave presentations on the Office's activities as well as its plans and timelines regarding the various items related to the Office's involvement in Action Plan 41.

Our subcommittee was charged with providing recommendations on the following Action Plan 41 items: 3.7, 3.8 (marketing-related aspects) and 2.9 (marketing-related aspects). The committee unanimously found the Office's plans and timelines a reasonable response to the recommendations. Below each bullet point below we include a description of the Office's plans and timelines. With this report, we include the slides from the presentation Vice Chancellor Fincannon gave to us as well as a copy of the website modernization plan, shared with us by Jack Patton.

We are happy to answer any additional questions URPC might have about what our committee learned during our meeting. We are also happy to meet again to provide further recommendation or deliberate over additional items URPC may charge to us.

Respectfully submitted,

Stephen Buttes  
Assistant Professor of Spanish and Culture Studies  
Chair, Advancement Advisory Subcommittee

### **3.7 Develop and implement a strategy for increasing endowments, sponsorships, student scholarships, and fundraising at all levels by providing appropriate resources to Advancement, making it a university-wide strategic priority**

- Develop deans' initiatives programs for academic fundraising
  - Vice Chancellor Fincannon's office held a workshop in fundraising for the deans in Fall 2016 and plans to continue and improve these initiatives in the coming years.
  - College Advisory Councils are a point of focus for deans' activities in development.
- Establish general scholarship fund
  - No specific information on a general scholarship fund was discussed during our meeting, but 59% of the Office's raised funds (\$6,670,124 in 2016) is marked for student support. A portion of this money is targeted for scholarships. Some scholarships are distributed to students with specific degree programs.
- Set specific fundraising goals with identified projects
  - A featured initiative is the Weitzman Society, which began with a 3 million dollar gift from the Weitzmans. These scholarships go to one education and one engineering student each year, to honor the donors. This project has expanded into the Weitzman Society, which is an initiative focused on planned giving (or, remembering IPFW in a will or estate). The Office has acquired 28 planned gifts through this initiative and has a target of 100 for 2016.
- Implement ongoing professional development for deans and chairs
  - Deans' workshops will be implemented on a regular basis.
  - Vice Chancellor Fincannon's office has been surveying development activities pursued by chairs (e.g. finding out information about department newsletters, possible solicitations made by chairs, etc.). This information will be integrated into the Office's plans for the future.
- Establish student scholarship fundraising as a dean-level priority for AY 16/17
  - This was a topic developed in the deans' workshop listed above.
- Target corporate contributions
  - The Office has plans to develop 1-, 3- and 5-year targets for corporate contributions. Metrics for these initiatives are planned for June 30, 2017.
- Establish vibrant Annual Campaign
  - The Office has a 10% Alumni giving target through planned solicitations.
  - The Office has a desire to increase participation in the faculty-staff annual campaign, which saw major gains in 2015. Given the recent recommendations at the university, the Advancement Advisory Subcommittee suggested (after a request for feedback from the committee) that this campaign be postponed for 2016. This is an area for potential growth as an annual campaign the future given last year's success (90% growth in 2015 from 2014).
  - The Office has engaged and plans to continue to grow retired faculty/staff annual giving. Growth in this area has been through planned giving in the past. Current plans are oriented toward a true annual campaign.

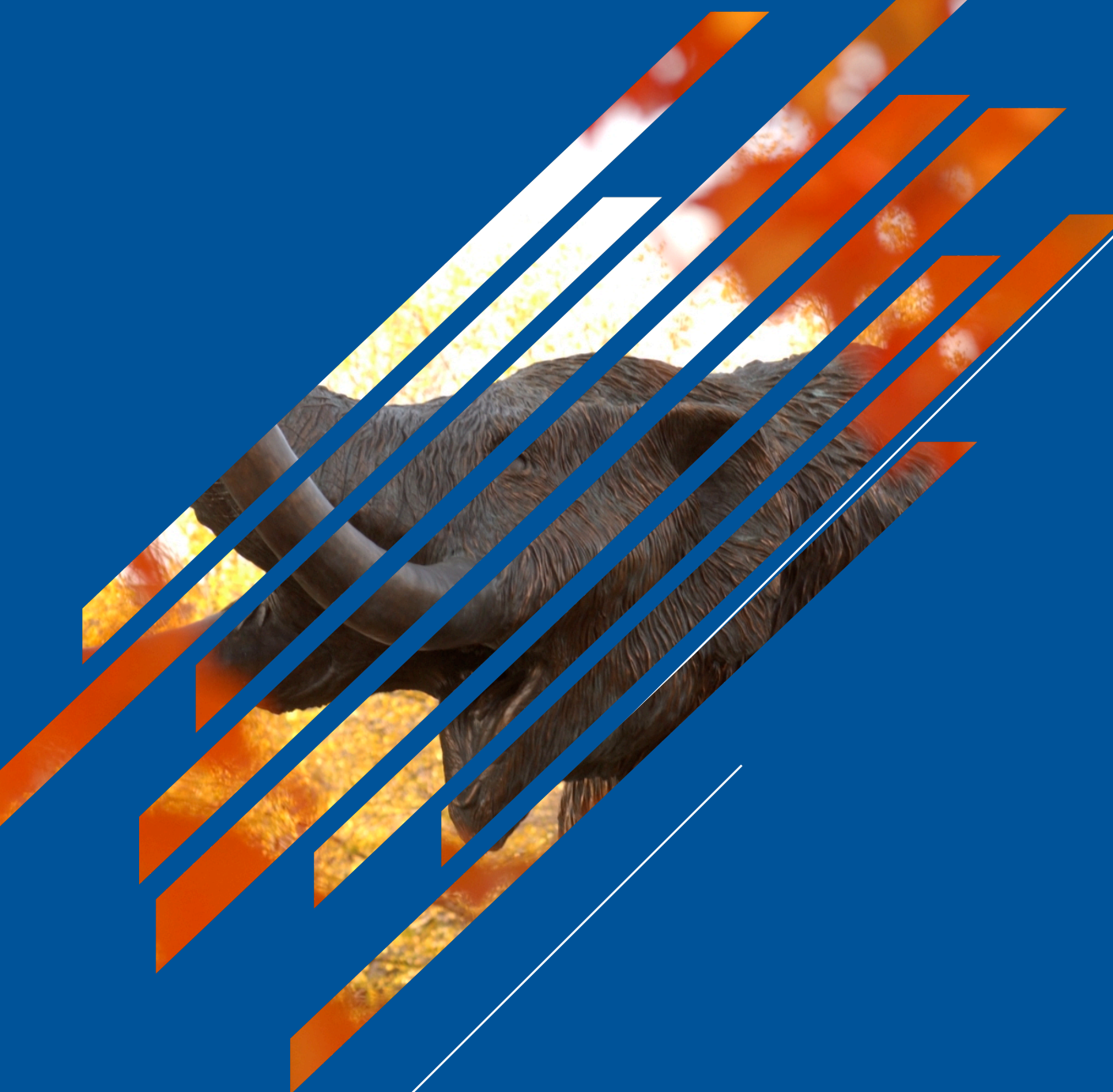
- Engage Alumni Association in fundraising
  - The Office is working to identify alumni-owned businesses to promote them and cultivate them as resources and potential donors. This is linked to the 10% target with aspirations for a 20% alumni giving in the near future.

### **3.8 Develop and implement a university-wide strategic marketing plan that includes modernizing ipfw.edu**

- Regarding the marketing plan, Jack Patton developed and utilized audience profiles to implement brand positioning.
  - He worked with Center for Social Research to identify Collegiate Connection and other prospective students [ethnographic characteristics (behaviors) and psychographic characteristics (attitudes and aspirations)]
    - This orients messaging for advertising campaigns (IPFW Proud)
- Regarding the modernization of ipfw.edu, we include the website modernization plan with this document. The timeline for implementing the website modernization is as follows:
  - Request for Proposals (RFP) being authored now (mid-October). In early November, it will be distributed to vendors.
  - Jack will select vendors in December with a timeline proposed by late December/early Jan. 2017.
  - Web Advisory Committee gave top five priorities to guide website redesign and details of the RFP.
  - Phased launch will begin in Spring 2017: top level university content, enrollment management, recruitment, retention and advancement are marked at the first phase of the rollout.
  - The second phase of the rollout will be focused in academic units. Further details are included with this report in the website modernization plan.

### **2.9 Transition to an embedded service model**

- Evaluate liaison model for Marketing
  - Only two Marketing Specialists (who can embed in colleges) are available for the entire university. The Office needs more resources to truly transition to embedded service and therefore it is not feasible at this time of constrained resources.



# Division of Advancement

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ANGIE FINCANNON, Ed.D.

INDIANA UNIVERSITY  
PURDUE UNIVERSITY  
FORT WAYNE



# OUR MISSION

ALUMNI, DEVELOPMENT,  
MARKETING COMMUNICATIONS, and COLLEGE TV

## UNIVERSITY MISSION

Indiana University–Purdue University Fort Wayne (IPFW) is a comprehensive university that provides local access to globally-recognized baccalaureate and graduate programs that drive the intellectual, social, economic, and cultural advancement of our students and our region.

## ADVANCEMENT MISSION

The mission of the Indiana University–Purdue University Fort Wayne Advancement Division is to **promote, advocate, communicate,** and **connect** the university through stakeholder engagement and support.



# LEADERSHIP TEAM

Angie Fincannon, *Vice Chancellor for Advancement*

Bernie Lohmuller, *Director of College TV*

Colleen Dixon, *Executive Director of Advancement Services*

Dan Gebhart, *Business Manager and Contract Specialist*

Eve Colchin, *Director of Development/Major Gifts*

Jack Patton, *Executive Director of Marketing Communications*

Justin Shurley, *Director of Development for Athletics/External Affairs*



# IPFW GIFTS

FIVE-YEAR AVERAGE

\$5,298,120

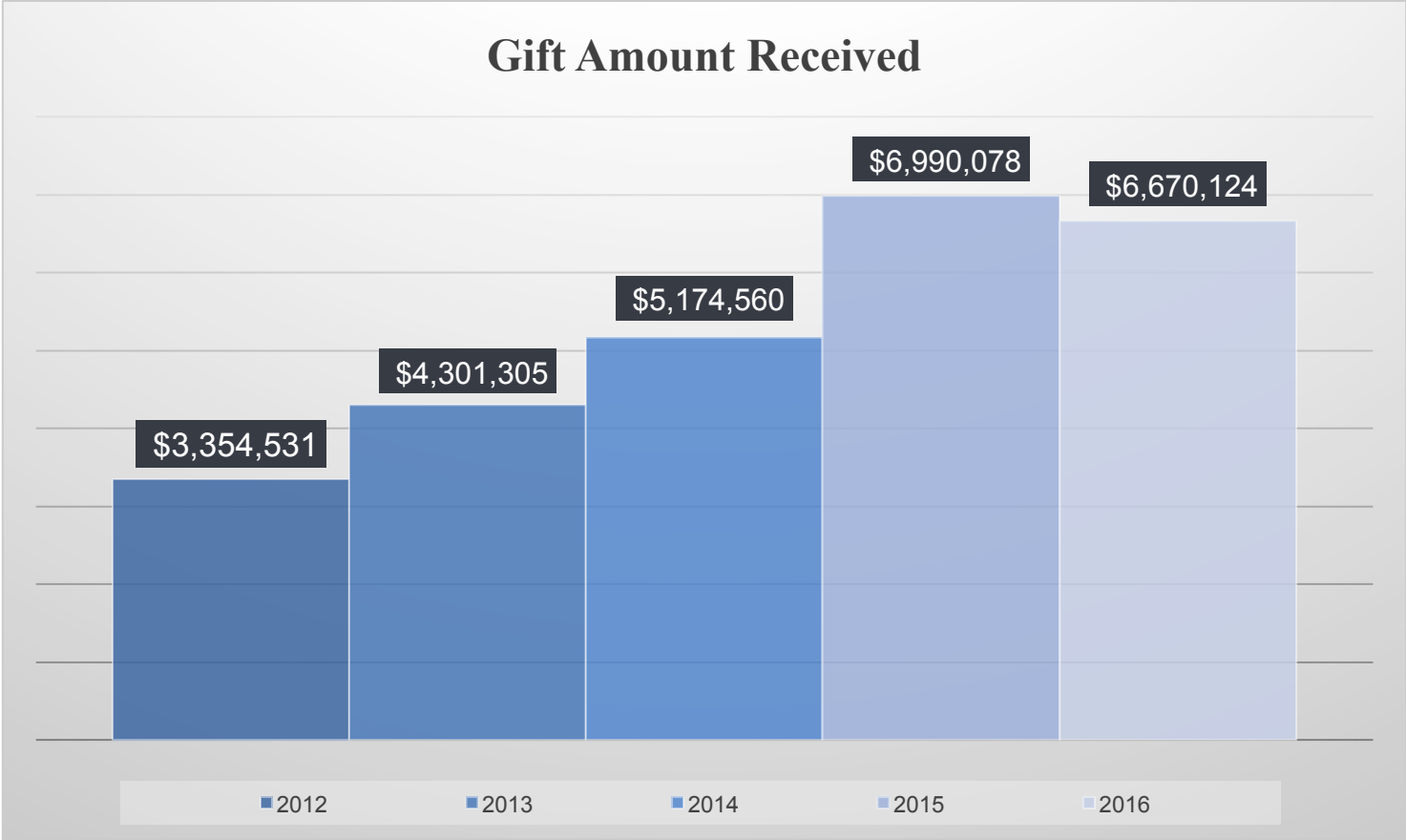
FISCAL YEAR 2016

\$6,670,124



# IPFW GIFTS

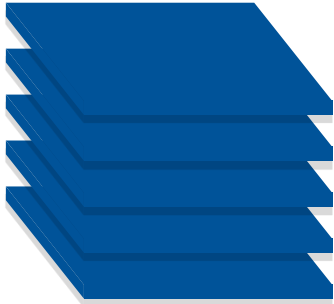
SINCE FISCAL YEAR 2012



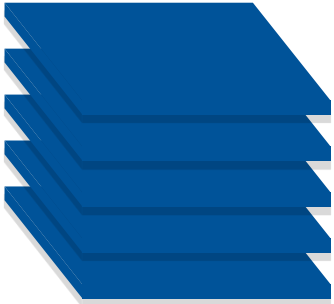


# Fiscal Year Gifts to IPFW

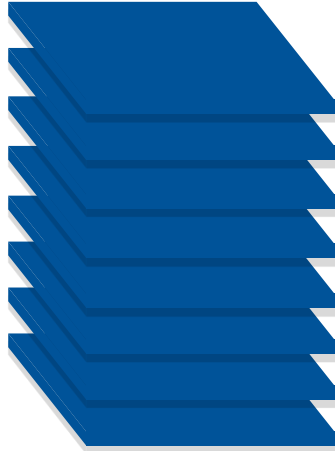
\$3,455,508  
Cash



\$3,214,616  
Other

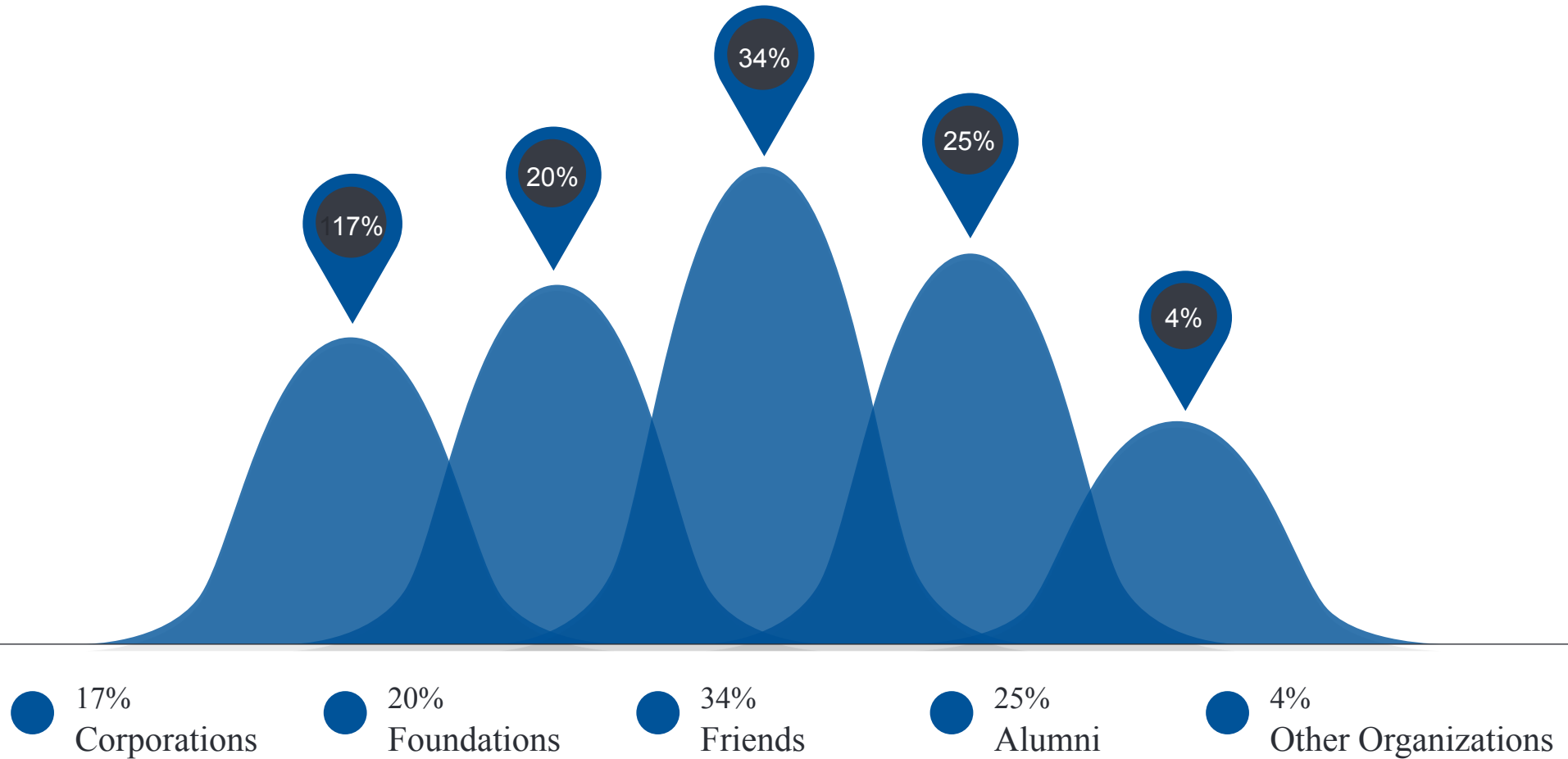


\$6,670,124  
Total



# Source of Gifts

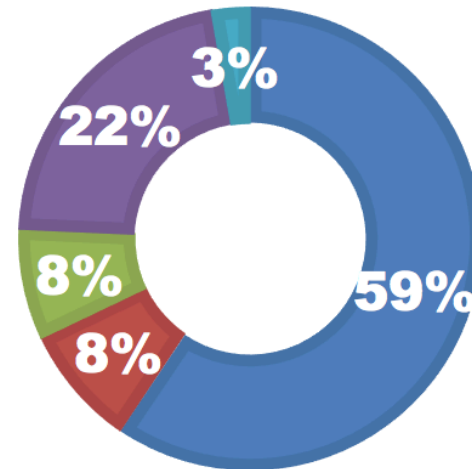
TOTAL RAISED FY 2016: \$6,670,125



# Purpose of Gifts

## WHAT DO GIFTS SUPPORT?

- **Student Support**
- **Faculty Support**
- **Facilities**
- **Programs and Projects**
- **Unrestricted**



Total Raised FY16: \$6,670,125



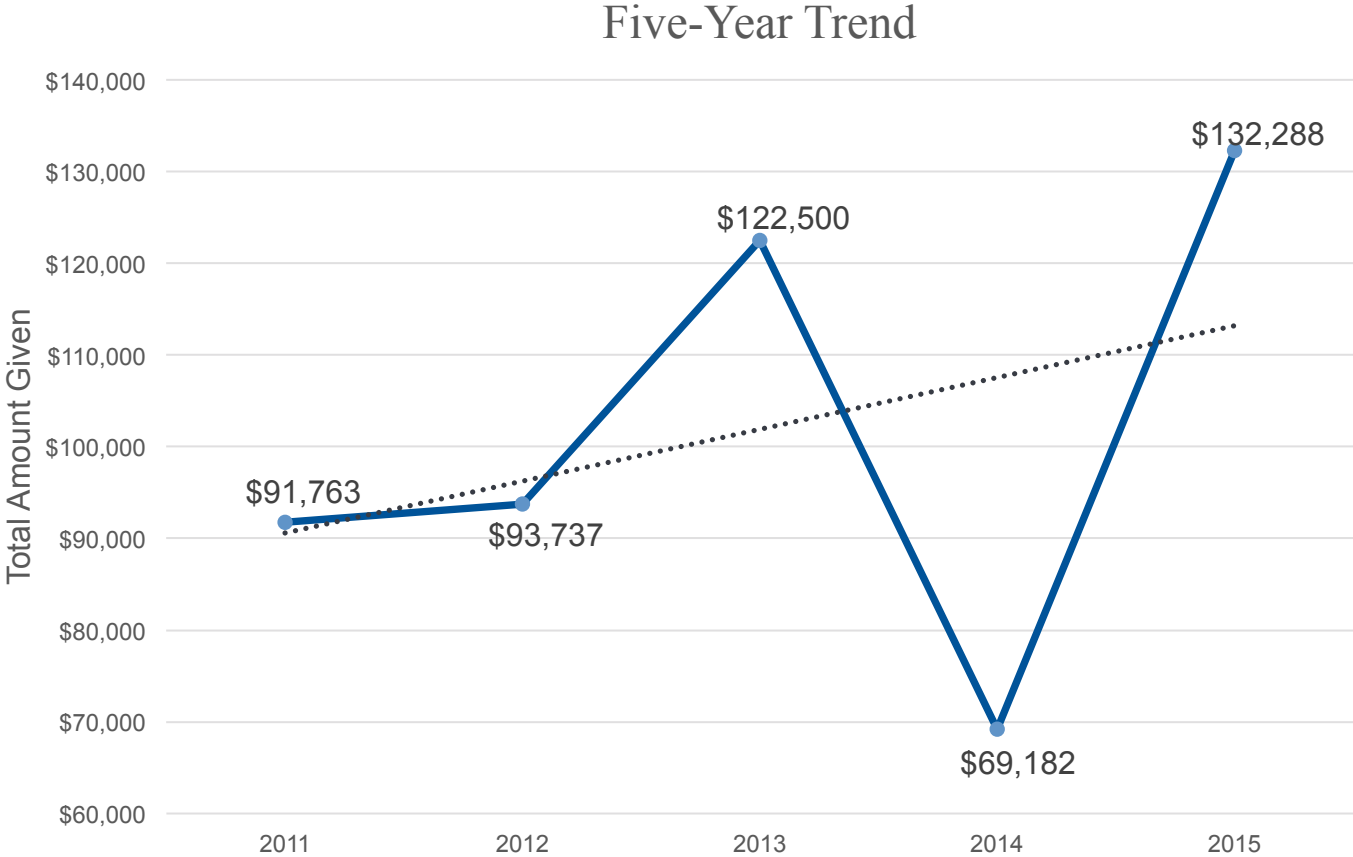
# Priority #1 & Key Indicators

INTEGRATED, COMPREHENSIVE  
ANNUAL GIVING PLAN

- Research
- Deans' Fall Appeal
- Faculty Staff Giving  
(Common Goal)

# Priority #1 & Key Indicators

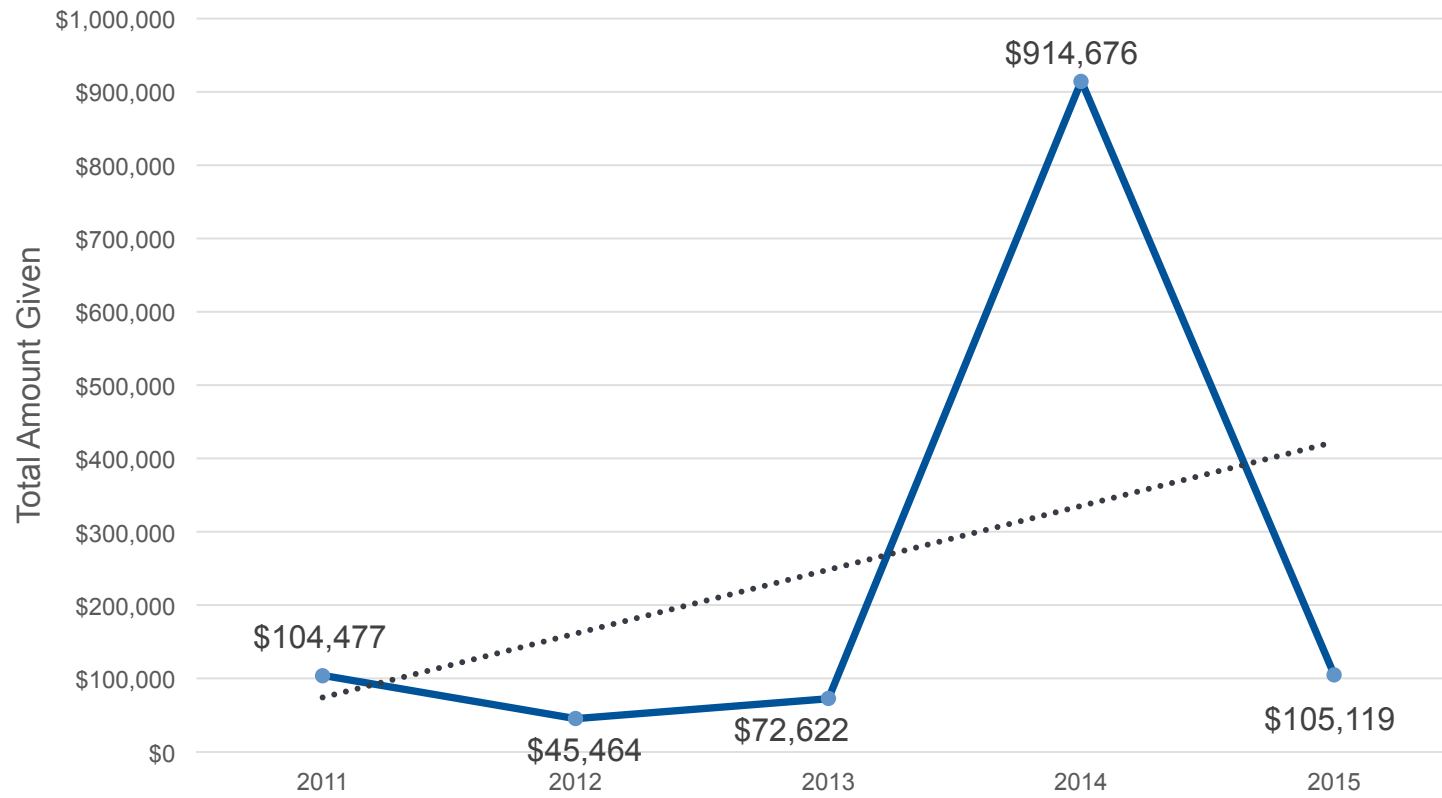
## ANNUAL GIVING FOR CURRENT FACULTY AND STAFF



# Priority #1 & Key Indicators

## ANNUAL GIVING FOR RETIRED FACULTY AND STAFF

Five-Year Trend



# Priority #2 & Key Indicators

INTEGRATED ALUMNI RELATIONS MODEL

Develop independent IPFW  
association

---

Increase alumni giving

---

Boost alumni-owned business  
support



# Priority #3 & Key Indicators

CREATE A SUSTAINABLE DEVELOPMENT PROGRAM  
THAT YIELDS \$10M ANNUALLY



- Planned giving
  - Weitzman Society Members:  
Currently 28 planned gifts
- New endowments and scholarships
  - 189 current endowments:  
\$53,000,000 total





# Priority #3 & Key Indicators

CREATE A SUSTAINABLE DEVELOPMENT PROGRAM  
THAT YIELDS \$10M ANNUALLY

- Academic partnership
  - Deans' workshop and toolkit
  - College Advisory Councils
- Corporate partnerships
- Foundations and grants
  - Build and grow relationships and opportunities



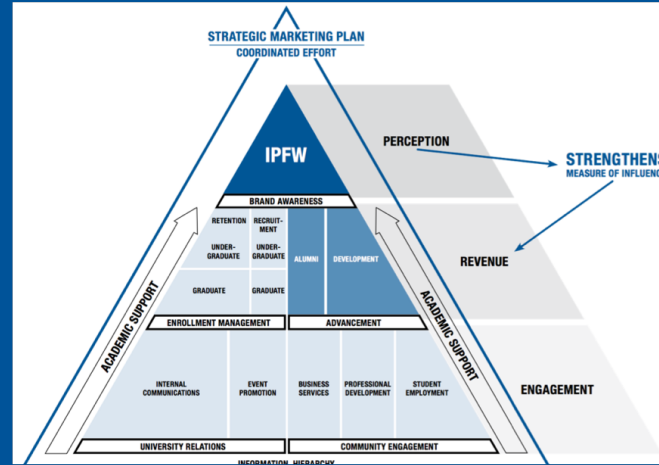
# Priority #4 and Key Indicators

## IMPLEMENT STRATEGIC MARKETING INITIATIVES

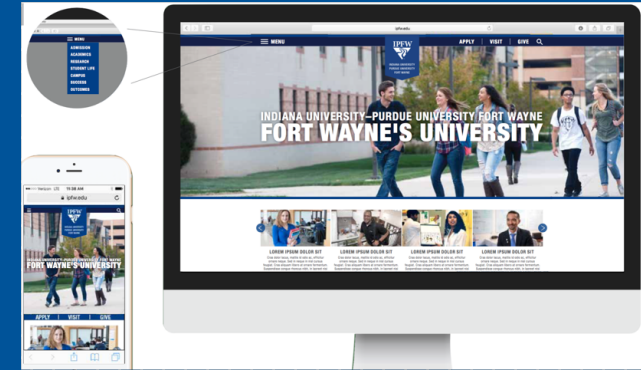


### Market Research

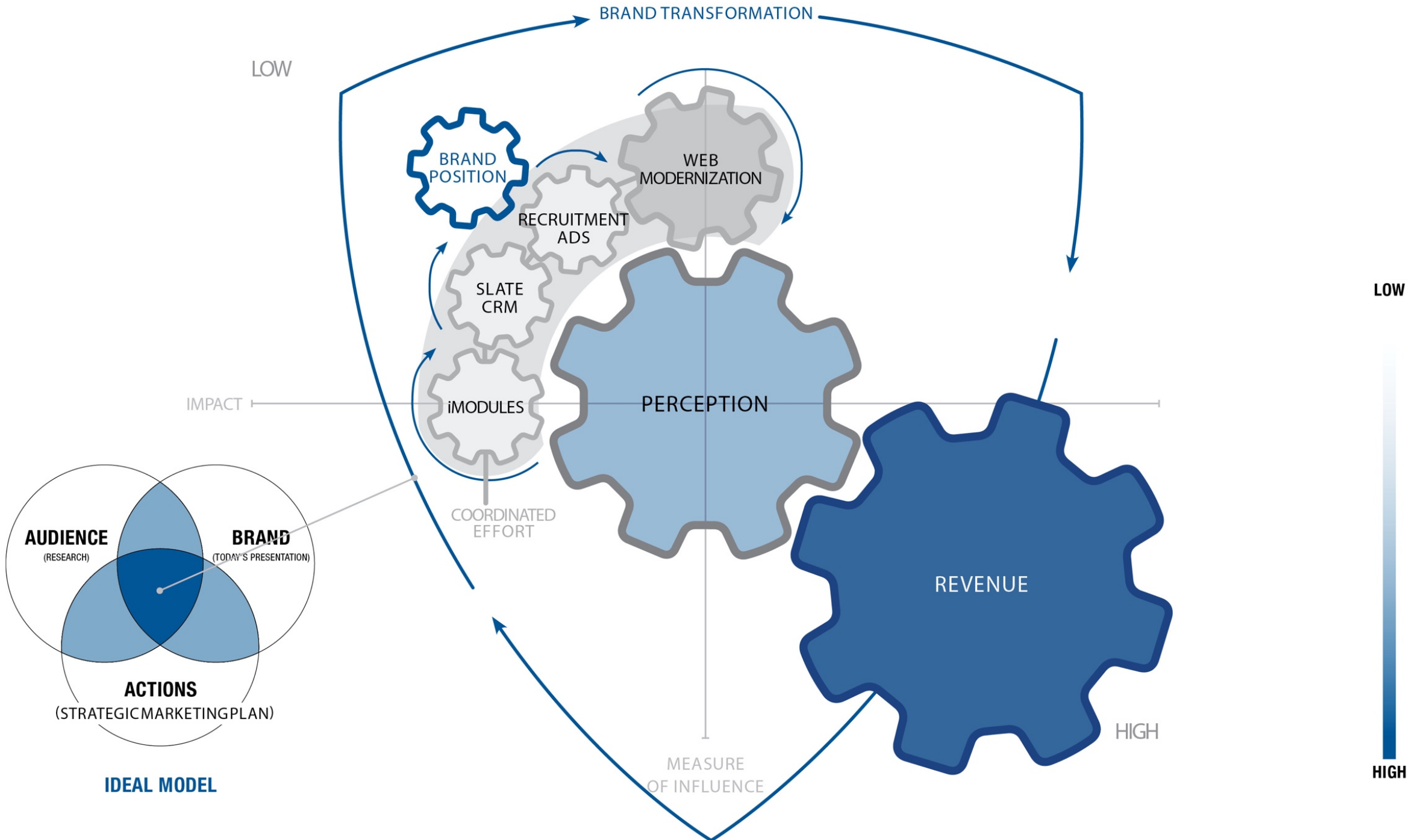
(students, alumni, and donors)



### University Marketing Plan



### Website Modernization Plan



# BRAND TRANSFORMATION PLAN

## DEVELOP

### FALL 2016

- Fully develop and research/test concept for brand and sub-brands (colleges)
- Develop phase I Web modernization plan— Enrollment Management and Advancement
- Incorporate into Admissions' Slate CRM and advertising assets
- Integrate Advancement's iModules launch
- Conduct another round of personaresearch with students, alumni, and donors

## LAUNCH

### SPRING 2017

- New brand and sub-brand positioning
- Launch phase I Web experience— Enrollment Management and Advancement
- New Admissions CRM and advertising assets— fall 2017 matriculation
- New donor, alumni, and college-level communications via iModules
- Work with colleges to provide training

## DEVELOP

### SUMMER 2017

- Continue sub-brand and additional brand positioning (across all units)
- Launch campus training for brand and Web
- Develop phase II Web modernization plan— departments and auxiliary units
- Start full cycle student recruitment cycle
- Build Advancement plans for colleges

## LAUNCH

### FALL 2017

- Remaining brand positioning— departments and auxiliary units
- Phase II Web modernization plan— departments and auxiliary units
- Advancement plans for colleges

# TIMELINES

Priority #1, Integrated, comprehensive annual giving plan

Priority #2, Integrated alumni relations model

Priority #3, Create a sustainable development program that yields \$10M annually

Priority #4, Implement strategic marketing initiatives

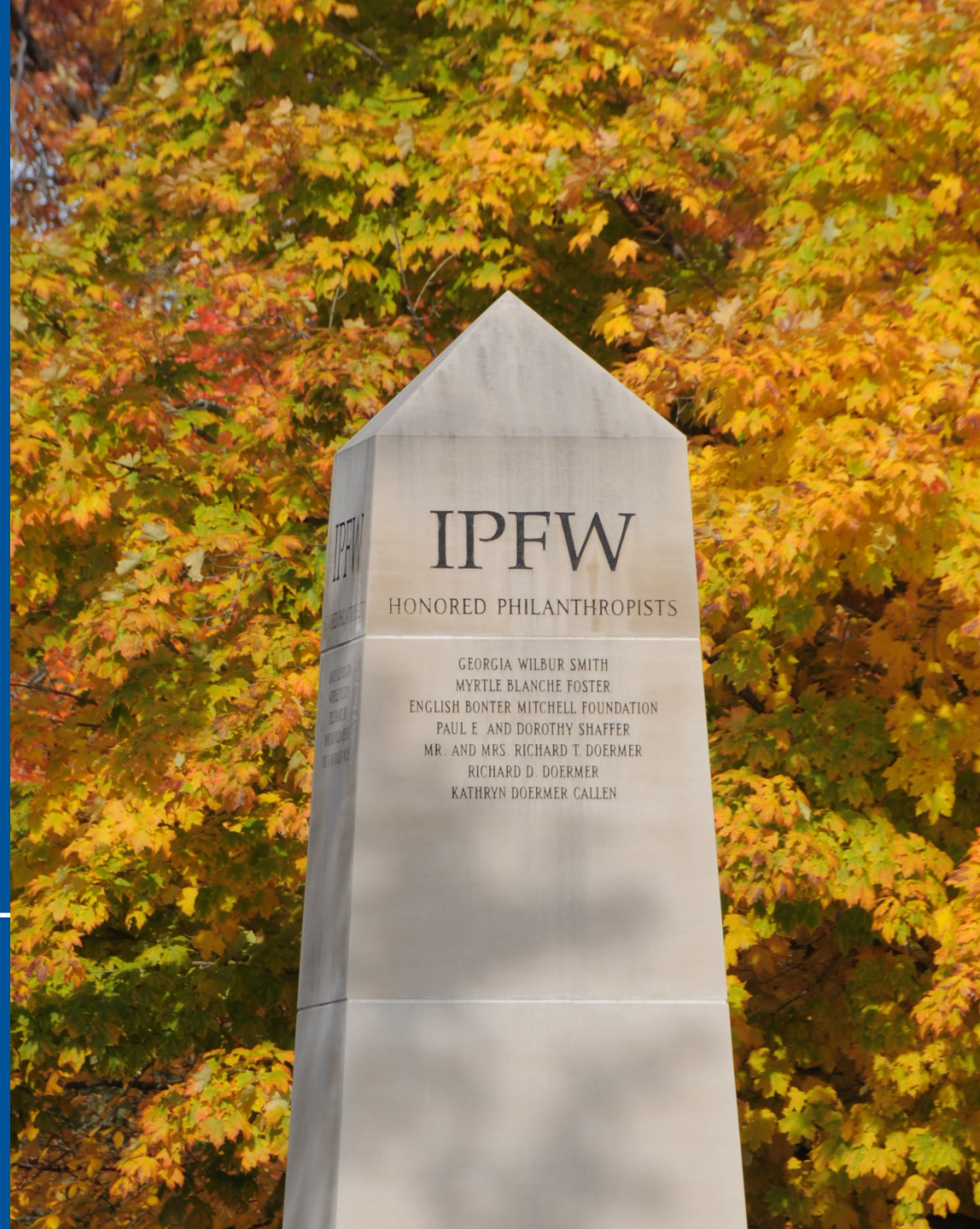
Performance metrics due June 30, 2016



# THANK YOU

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PROMOTE · ADVOCATE · COMMUNICATE · CONNECT



IPFW  
HONORED PHILANTHROPISTS

GEORGIA WILBUR SMITH  
MYRTLE BLANCHE FOSTER  
ENGLISH BONTER MITCHELL FOUNDATION  
PAUL E. AND DOROTHY SHAFFER  
MR. AND MRS. RICHARD T. DOERMER  
RICHARD D. DOERMER  
KATHRYN DOERMER CALLEN



# Website Modernization Plan

Proposal • January 21, 2016 • Version 3.2

## BACKGROUND

In 2008 the university made a significant investment in a Web content management system developed by dotCMS. Direct costs of that investment have been approximately \$375,000 (including training) since 2008, with indirect costs (FTE) estimated at \$174,150 annually. While the university has paid for annual licensing, hardware, maintenance, support, and training for the system, more investment is needed to improve the site's design and functionality. Currently, the site's design and functionality are lagging behind in five key areas that adversely affect the user experience and should be a cause for concern given that the website is our primary marketing tool.

The modernization plan proposes to address those key areas and offer solutions to improve the user experience.

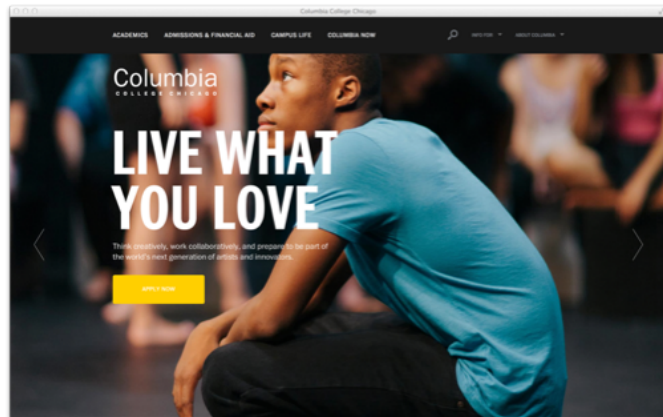
## KEY ISSUES

The following have been identified as key issues with the university's website:

1. **Accessibility.** The system templates, widgets, and applications do not meet accessibility requirements and put the university at legal risk. Additionally, publishers need greater support as well as increased accountability in creating content that meets accessibility requirements.
2. **Mobile.** The use of smart devices has skyrocketed since 2008, yet the site is not mobile-friendly, nor is the content deliverable to the mobile app currently in development. Some statistics shed light on the current demand for mobile:
  - 80% of Internet users have a smartphone.
  - 34% of Internet users search using a smartTV.

- 9% of users use a smart watch to search the Internet. This number is expected to increase dramatically as Apple releases the Apple Watch in April 2015.

Since July 2011, desktop traffic on the website has dropped by 0.4%, and we have seen only a 2.8% increase in mobile traffic. The marginal gain in mobile traffic should be substantially higher given the dramatic increase in smart-device adoption and is most likely due to the website’s lack of mobile-friendliness. If we continue these trends we risk losing greater numbers of prospects. We have an opportunity to address this issue head on.



**Home Page, Columbia College Chicago**  
Nationally recognized design of Columbia College Chicago.

**3. Demand for new features.**

The university’s website design and functionality have remained essentially the same since 2008, yet new developments in technology and design trends have continued to press forward. User expectations have risen equally as much. This has created a demand for new design and functionality that is greater than what current staffing levels in Marketing Communications and Information Technology Services can offer. Outsourcing the development of new features is essential.

- 4. Content quality.** The quality of published content is inconsistent throughout the site, and we see too many incidents of outdated, obsolete, and inaccurate content. Additionally, content is formatted inconsistently, or inappropriately, thus contributing to a poor user experience. Lack of structured content types means publishers (through no fault of their own) are left to make their own formatting decisions. Templates and pages are outdated and do not support new content needs. Applications such as the events calendar (currently under development in spring 2016) and the news room need a major overhaul. While addressing the



urgent needs of individual unit sites at the expense of the system as a whole, we have been neglecting our most important client—the university.

5. **Governance.** Revised governance is needed to solve the four key issues outlined above. Not enough accountability exists for how content is created on the site. Insufficient standards and support for creating brand-appropriate content contribute to the situation as well. There is no service-level agreement (SLA) for the Web content management system. Finally, not enough quality assurance exists to correct issues with content quality.

Please see “IPFW Website Design: Key Issues, Solutions, and Outcomes” for a detailed listing of key issues, recommended solutions, and outcomes.

## PROPOSAL

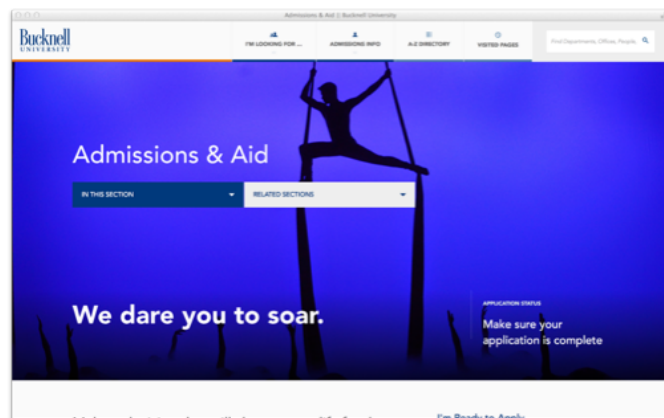
This proposal (1) outlines **solutions** to each of these key issues, (2) proposes **outsourcing** the development to modernize the site, and (3) recommends establishing **new governance** to implement and sustain the modernization plan.

## OPTIONS

The university is at a crossroad with its website and has an opportunity to make significant improvements that can meet campus demand as well as user expectations.

Our choices appear as follows:

1. Approve the proposal and solutions outlined in this document and address these issues head on.
2. Abandon the use of the university’s Web content management system (100,000+ pages) in favor of a Web presence of fewer than 1,000 pages



**Admissions Home Page, Bucknell University**  
Nationally recognized design of Bucknell University.

centrally maintained by Marketing Communications. This will mean shutting down several dozen websites and creating demand to hire additional Web staff in Marketing Communications to maintain a “core site.” One unintended consequence will be the proliferation of “rogue” sites hosted in the cloud that fail to meet brand standards or are unsupportable.

3. Maintain the status quo and fail to solve the key issues described above.

## OBJECTIVES

The following objectives have been outlined to address the key issues with the website.

1. **Accessibility.** Ensure that all templates, themes, widgets, and applications in dotCMS meet strict accessibility requirements.
2. **Mobile.** Update the system so that content delivery is mobile-friendly and portable to the mobile app currently under development.
3. **Demand for new features.** Provide publishers with new features the campus demands and our users expect.
4. **Content quality.** Improve content quality while minimizing the impact on current resources.
5. **Governance.** Establish clear governance, standards, and training to implement and maintain the modernization plan.

## GOALS

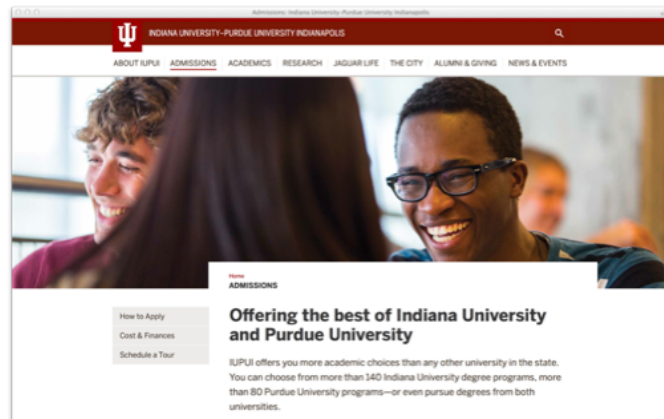
Meeting the following goals will help the university provide solutions to the key issues with its website and position it to support the strategic goals of the university.

1. **Accessibility.** Ensure that system components as well as publisher content comply fully with accessibility requirements.
  - **System level.** Ensure that system templates, themes, widgets, and applications conform to 508 Accessibility and Web Content Accessibility Guidelines 2.0 Level AAA requirements.

- **Content level.** Update standards, support, and training to help publishers create content that meets accessibility requirements for the modernized website. **Structured content types.** Develop structured content types that make it easier for Web publishers to meet accessibility compliance.
- **Annual publisher certification program.** Make accessibility a central component of publisher training and annual certification.

**2. Mobile.** Create a user-friendly experience for desktop, mobile, and wearable devices.

- **System level.** Ensure that templates, themes, widgets, and applications function equally well on desktop and smart devices.
- **Content level.** Update standards, support, and training to help publishers create content that scales appropriately for desktop and mobile devices.
- **Structured content types.** Develop structured content types that make it easier for Web publishers to create mobile-friendly content.
- **HTML5.** Revamp the underlying source code to deliver content to mobile as well as social-media platforms.
- **Annual publisher certification program.** Make mobile-friendliness a central component of publisher training and annual certification.



**Admissions Home Page, IUPUI**

Streamlined content and navigation are combined with authentic photography.

**3. Demand for new features.** Modernize the site by offering new features that the campus demands and users expect.

- **Visual design.** Update the visual design so that it meets current design trends and user expectations.
- **Identity System.** Apply signatures to unit-level websites and allow for more autonomy of unit site design.
- **Work smarter.** Find smarter and better ways to work with existing limited resources.
- **Efficiencies.** Leverage the efficiencies inherent in a Web content management system and make them work to our advantage.
- **Content redundancy.** Eliminate costs of third-party systems by replacing similar content and functionality with the Web content management system's capabilities.
- **Dynamic content.** Use structured content types and taxonomy to generate content automatically instead of placing this burden on our publishers.
- **Minimal resources.** Minimize the impact of the site modernization on Marketing Communications and IT Services staff by outsourcing development.
- **Personalization.** Personalize the user experience through customer profiles and targeted content.

**4. Content quality.** Improve the quality of content across the website.

- **Structured content types.** Develop structured content types that simplify the publishing process for publishers and make it easier for them to comply with standards.
- **Templates and page types.** Create new templates and page types that vastly improve the user experience.
- **Messaging.** Align messaging, authentic storytelling, and clearer calls-to-action to support strategic goals:
  - IPFW as a university of choice
  - Affordability and high quality of programs and services
  - Integrity, significance, and value of Indiana University and Purdue University degrees
  - Student success through learning, engagement, and outcomes

- Signature programs
  - Interdisciplinary, graduate, and international programs
  - IPFW as an intellectual, social, economic, and cultural driver
  - Diversity of the IPFW community
  - Philanthropic support
  - **Search engine optimization (SEO).** Improve search by increasing SEO rankings for important keywords.
  - **Domain authority.** Leverage SEO, navigation, and Web tools to raise domain authority of the website.
  - **Wayfinding.** Employ effective landing and category pages to improve content search and wayfinding.
  - **Web traffic.** Improve Web traffic for these key traffic indicators:
    - **Abandonment.** Decrease the number of visitors who abandon the site.
    - **Visit time.** Increase the time visitors spend on the site.
    - **Return visits.** Increase the number of return visits to the site.
    - **Submissions.** Increase the number of form submissions on the site.
    - **Click-throughs.** Improve how visitors click to find information on the site.
5. **Governance.** Establish new governance and policies for decision-making, input and feedback, adoption, and implementation of the plan. Sustain the plan beyond launch.
- **Roles and responsibilities.** Identify key roles and responsibilities for supporting the modernization plan.
  - **Stakeholders.** Meet with key stakeholders for feedback, input, and collaboration on the plan.
  - **Service-level agreements (SLAs).** Create service-level agreements at the administrative and publisher levels.
    - Outline administrative responsibilities and accountability for the plan.
    - Establish responsibilities and accountability for publishers.

- **Standards.** Provide standards for all new templates, themes, content types, and widgets to promote brand-appropriateness and a consistent user experience.

- **Guidelines.** Offer easy-to-understand guidelines for every content type provided in dotCMS.

- **Content policies.** Develop clear policies for specific types of content such as the homepage, A-Z index, landing pages, banners, events, etc.



**Events Calendar, Oberlin College**

User-friendly and easy-to-search events calendar built in dotCMS.

- **Content ownership.** Identify who is responsible for content, particularly content shared by multiple units.
- **Job descriptions.** Add standard language to job descriptions that specifies Web responsibilities for all publishers, their supervisors, and unit heads.
- **Training and support.** Provide training (in-class and video shorts) focused on standards and guidelines for the creation of brand-appropriate content.
- **Annual publisher certification program.** Establish a publisher certification program to provide accountability to standards, policies, and training annually. Revoke system access to publishers who do not meet certification standards.
- **Student Web publishers.** Hire and certify students to support unit-level websites.
- **Web expert group.** Cultivate a group of key publishers who can share content expertise with the rest of the WebCMS publisher community. Offer tutorials, blogging, and video shorts for supplemental instruction.

- **User testing policies.** Establish policies for testing and receiving feedback on system functionality. Focus on mobile and accessibility.
- **Benchmarks.** Establish clear benchmarks and metrics by which to measure success.
- **Design updates.** Apply regular updates to templates, themes, widgets, and applications.
- **System upgrades.** Stay current with the dotCMS system software.
- **Content review.** Conduct semesterly content reviews to remove obsolete content or update content.
- **Editorial calendar.** Align brand messaging and featured content with an editorial calendar. (Note: This portion of the plan has been approved and is currently under development in spring 2016.)
- **New features.** Release 1–2 new content features annually.

## AUDIENCES

As part of the website modernization, the plan will clearly define our target audiences and target content based on user expectations.

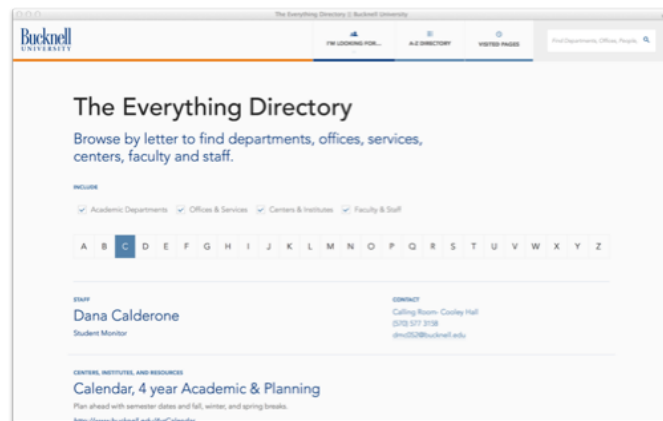
- **Customer profiles.** Create customer profiles for each key audience.
- **Targeted content.** Deliver content targeted to each customer profile:
  - Prospective students/guardians
  - Admitted students
  - Enrolled students
  - High school guidance counselors/teachers/principals
  - Alumni/prospective alumni
  - Donors/prospective donors
  - Faculty and staff/prospective faculty and staff

- Local community-at-large
- Key influencers
- Industry colleagues/publications

## COMPETITION

Design and technology have changed dramatically since 2008. Below are general design trends found on today’s modern websites. The modernization plan should seek to integrate most if not all the design areas identified here:

- **Mobile.** Content scales appropriately for both smart and desktop devices.
- **Greater social integration.** Nearly all content is expected to be social in some way.
- **Storytelling and interaction.** The strongest way to engage users is to tell stories they can relate to and offer ways for them to interact and engage with content and other users.
- **Google maps integration.** Greater use of Google maps for wayfinding of events and locations helps users to show up.
- **Photography.** Professional, high-quality images play a more important role in page design than ever before.
- **Background video.** Sites are using background video to create impressions of activity and place.



### A–Z Directory, Bucknell University

Exemplary A–Z directory for finding departments, offices, services, centers, faculty, and staff.



- **Energy and space.** Modern sites convey more energy and excitement and take advantage of space on the page.
- **Typography.** Due to improvements in font support, typography on the Web now matches typography seen in print.
- **Flat design.** The trend of flat design continues to convey the flat nature of touch screens.
- **Longer scrolling pages.** Users are now accustomed to longer pages (provided design and content are compelling).
- **Simplicity.** Greater emphasis is being placed on simplicity in Web and mobile design.
- **New menus.** Advanced, user-friendly menu systems are being used to improve the user experience on both desktop and mobile devices.
- **Performance and speed.** Users are charged for data usage, so speed is of the essence now more than ever.
- **Better multimedia experiences.** Users expect to have richer interactive experiences in the form of video, audio, animation, etc.
- **Subtle animations.** Modern websites enhance user interaction with clean, subtle animations that reinforce usability.
- Key features of the following university websites have been identified, and further research will be conducted pending approval of the proposal:
  - Primary Competitors
    1. Purdue University
    2. Indiana University
    3. Indiana University–Purdue University Indianapolis
    4. Ball State University
  - Sites for Feature Comparison

1. University of Notre Dame
2. Oberlin College\*
3. UTHealth—The University of Texas Health Science Center at Houston\*
4. Arizona State University\*
5. Taylor University\*
6. Pittsburg State University\*
7. Aquent\*
8. BBC News
9. Bucknell University
10. Columbia College Chicago
11. Indiana Tech
12. University of Saint Francis
13. Ivy Tech Community College

\*dotCMS customer

## ASSETS

Assets such as systems should be viewed as investments. The university has invested significantly in the following assets and should leverage these existing assets to advance the website to the next level.

- dotCMS Enterprise Content Management System. Build on, extend, and improve the university's content management system.



The Source, Oberlin College

Blogging home page featuring university stories with a conversational tone.

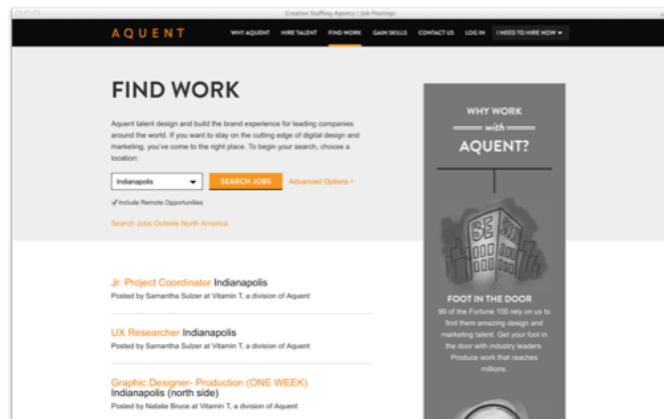
- **Identity system.** Apply the identity system to unit-level websites.
- **Standards.** Build on existing standards and apply them to the modernization plan.
- **Digital asset management.** Continue to replenish the digital asset management system and update it with new photography and graphics.
- **Training.** Improve and expand existing training for the modernization plan.
- **Compliance Sheriff.** Use Compliance Sheriff and other tools to analyze accessibility compliance of templates, themes, widgets, and applications (system level) as well as content (publisher level).
- **Publisher base.** Empower the publisher community to create brand-appropriate content.
- **Content.** Adapt content (text and images) from existing websites and printed materials.
- **Analytics.** Expand our existing Google Analytics to track more relevant data, set benchmarks for the site modernization, and make decisions for continuous improvement.
- **Mobile app.** Ensure that modernized content integrates well with the mobile app.
- **Other systems.** Explore content integration with online systems such as myIPFW, Acalog (academic bulletin), Taleo (ipfw.jobs), IntelliResponse (Ask the Don), Extensis Portfolio (digital asset management), etc.

## DELIVERABLES

Contract with a dotCMS partner agency to create the following updated components in the university's Web content management system. Ensure that stakeholders and the agency have signed off on the requirements and use cases before implementation begins. The project should avoid scope creep so that all deliverables are met on time.

- **Templates.** These establish the baseline for how various types of pages are branded and structured.
- **Landing pages.** For use as home pages for units or campaign landing pages.
  - **Jumbo.** For use by the IPFW home page, large sites, major campaigns, or featured sites.
  - **Wide.** Appropriate for large sites and significant featured content.
  - **Narrow.** Appropriate for medium-sized sites and minimal featured content.
  - **Simple.** Appropriate for modest sites and minimal featured content.
  - “One-page Website.” Appropriate for landing pages and sites requiring a single page with animated scrolling.

- **Category pages.**  
Help users more easily find what they are looking for by allowing them to sort more easily through large categories of content.



**Job Site, Aquent**

Excellent job-posting site housed in dotCMS and integrated with Taleo (the system used by IPFW Human Resources and Purdue University).

- **3-Column.**  
Filterable  
sorting page  
with left-hand navigation and right-side related column.
- **2-Column.** Filterable sorting page with left-hand navigation.
- **1-Column.** Filterable sorting page with no navigation.
- **Detail pages.** Appropriate for body copy with detailed information.

- **3-Column.** Standard detail page with left-hand navigation and right-side related content.
- **2-Column.** Standard detail page with left-hand navigation.
- **1-Column.** Standard page for applications such as the events calendar.
- **HTML Newsletter.** Allow publishers to include and relate existing Web page content for broadcast to email distribution lists.
  - **3-Column.** Standard HTML email template with left and right columns.
  - **2-Column.** Standard HTML email template with right-side column.
  - **1-Column.** Standard HTML email template with no callouts.
- **Themes.** Themes reinforce the brand while allowing for variation in visual design through color, typography, spacing, icons, etc. The proposed themes offer possibilities for adding variation to sites on the ipfw.edu domain.
  - **Future.** Projects energy.
  - **Traditional.** Conveys tradition.
  - **Modern.** Feels contemporary.
  - **Simple.** Looks essential.
  - **Elegant.** Is formal.
  - **Casual.** Looks fun.
  - **Mastodon.** Is tough.
  - **Warm.** Shows warmth.
  - **Cool.** Looks crisp.
  - **Neutral.** Conveys quietness.

- **Structured Content Types.** Structured content creates consistent formatting, makes it easier to publish content in a consistent manner, allows content to be reused and dynamically shared across the site, centralizes information on the site for easier updates, and, ultimately, improves the user experience.

- The following is a representative list of content types designed to improve content commonly found on university websites. (See “Website Modernization Deliverables” for a complete listing of proposed content types.)

- Academic programs and courses
- Campus buildings and locations
- Events (updated with geolocation and event registration)
- Blogs
- Announcements
- Featured content (faculty, programs, blogs, etc.)
- Committees
- Policies
- Documents
- FAQ
- People



Home Page, BBC News

BBC websites set the highest bar for governance, standards, and accessibility.

- Experts
  - Jobs
  - Offices/departments
  - Contact information
  - Student organizations
  - Testimonials
  - Wiki
  - Etc.
- **Widgets.** Widgets make it easy for publishers to add content to parts of a website that normally require complex programming. These are commonly found in systems like WordPress and SquareSpace. Below is a representative list of widgets designed to provide better interactive user experiences. (See “Website Modernization Deliverables” for a complete listing of proposed widgets.)
    - Map widget
    - Multimedia banners
    - Polls
    - Photo slideshow
    - Video gallery
    - Events listing
    - Social media widgets (e.g., Facebook, Twitter, LinkedIn, Instagram, Pinterest)
    - Etc.
  - **Applications.** Applications are larger interactive tools that simplify complex content and transactions. The following are identified as vital to a university website:

- Events calendar with event registration and geolocation for wayfinding (currently under development in spring 2016)
- Virtual tour with photo and video galleries
- Interactive map with geolocation data for wayfinding
- Advanced search for general site content as well as specific content types such as academic programs and courses, people, departments and offices, etc.
- Advanced people search (directories) for faculty, staff, students, and alumni.
- Digital asset management for searching, browsing, filtering, and sorting downloadable files such as images.
- Job site for viewing current job postings and applying for jobs. Also used by employers to browse for potential candidates (i.e., students).
- Storefront for creating an easy experience for users to purchase tickets and online merchandise. Integrate with Touchnet for payment security.
- Etc.
- **Taxonomy.** Taxonomy refers to the categories and tags that allow content to be filtered, sorted, and related. This capability—one of the most powerful of Web content management systems—is what allows publishers and users to sort through large amounts of content. Ultimately, strong taxonomy greatly improves the user experience.
  - **Categories.** Content classification for better sorting and filtering.
  - **Tags.** Publisher- and user-generated keywords for sorting content.

## FINANCING THE PLAN

The plan will require financing and outsourcing the development of new features for the university's Web content management system.



- Approximately two-thirds of the estimated costs will go to the development of templates, structured content types, applications, widgets, and taxonomy. The remainder is needed to develop new types of content (e.g., initial launch of featured stories, photography, and video) as well as rollout support for departments.

#### Plan Estimate

Type of Work Outsourced	Deliverables	Responsibility	Estimated Amount
Site development	Themes, templates and content/page types, applications, and widgets	dotCMS Partner Agency	\$150,000
Backend support	System administration and enhancements	dotCMS Inc.	\$25,000
Content development	Strategic content	Marketing agency	\$25,000
Content migration assistance	Help departments with content	Student Web support	\$25,000
<b>Total Estimate</b>			<b>\$225,000*</b>

- The request is an investment of approximately \$2.25 per Web page.
- Additionally, the university should invest \$30,000 annually to renew system features.
- Note: A phased approach introduces several difficulties in implementing the plan. The pros and cons of such an approach must be carefully considered.
- \*The Total Estimate does not include the \$29,500 allocated for the Events Calendar currently under development (spring 2016). Rapidly changing web technologies and a phased implementation may affect the total estimate.

## RETURN ON INVESTMENT

- Successful implementation of the plan should result in a return on investment in the form of the following:
  - **Increased traffic, leads, and actions.** The modernized site boosts traffic and lead generations. A better user experience drive traffic to online actions such as applying, registering, purchasing, contacting, and making requests.

- **Fewer content and system silos.** Phase out existing vendor systems whose content and services can be effectively replaced by the Web content management system. Deliver features in the WebCMS such as chat, HTML email, blogging (Wordpress, Squarespace), virtual tour, interactive map, flip book, student organization content, FAQ systems, etc., that would otherwise be outsourced to a vendor.
- **Lower direct and indirect costs.** Eliminate direct and indirect costs of supporting many disparate systems.
- **Improved self-service.** Lower administrative costs through more effective self-services (ticket purchases, event registration, people directory updates, etc.).

## IMPLEMENTATION

The following identifies what is needed to implement the plan and ensure fulfillment of accessibility compliance, mobile delivery, new feature deliverables, content quality assurance, and revised governance.

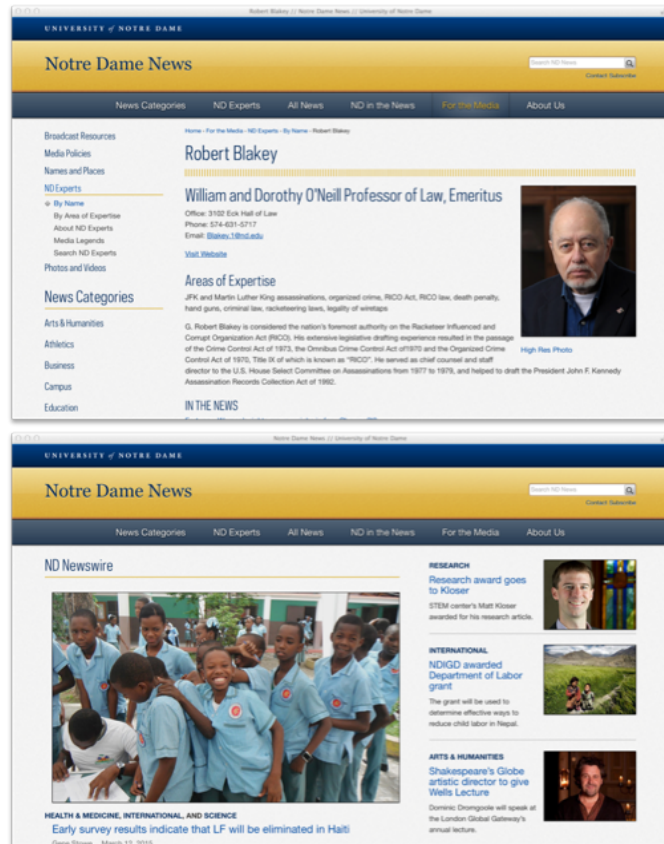
- Governance and roles
- Service-level agreements (SLAs)
- Digital strategy
- Marketing strategy
- Content strategy
- Search engine optimization (SEO) strategy
- Social Web strategy
- Content policies
- Standards and guidelines
- Training and support
- Annual publisher certification program

- Rollout plan
- Prioritization/migration plan
- Evergreen maintenance plan

## PROJECTED TIMELINE

Note: Timeframes below need to be adjusted pending approval of the plan and the implementation strategy.

- Brief—Phase 1 (approximately 3 months)
  - **Project definition.**  
Understand what the modernization plan is about.
  - **Target audiences/customer profiles.** Define and understand website users and customer profiles.
  - **Goals.** Establish clear target goals.
  - **Technical specs.** Define specifications such as browser and mobile support.
  - **Content inventory.** Establish the required content to be featured on the site.
  - **Resources.** Evaluate available assets such as systems and content.
  - **Project timeline.** Define project milestones and required time allotment.
  - **Project budget.** Identify necessary costs and define overall budget.



### News Site and Experts Guide, Notre Dame

Well designed news site emphasizing photography and connecting news with faculty expertise.

- **Proposal feedback.** Seek proposal feedback and approval to proceed.
- **Planning—Phase 2 (approximately 3 months)**
  - **Research and concepts.** Conduct marketing research and create initial concepts.
  - **Information architecture.** Define website structures and content navigation.
  - **Taxonomy.** Develop categories and tags for filtering and relating content.
  - **Page layout.** Establish layouts for the different types of pages required.
  - **Usability.** Ensure ease of use through proper presentation of content.
  - **Wireframes and mockups.** Create initial page, widget, and application layouts and mockups.
- **Design—Phase 3 (approximately 2–3 months)**
  - **Color scheme.** Choose relevant colors based on identity system and research.
  - **Identity architecture.** Apply unit-level signatures to the design of pages.
  - **Artwork.** Design artwork such as banners and photographic treatments.
  - **Visual elements.** Design the site’s visual elements such as buttons and icons.
  - **Typography.** Choose appropriate font families, sizes, and other properties.
  - **Themes.** Create brand-appropriate themes that offer design variation across the site.
  - **Rich media.** Create required rich media such as animations and video.
- **Development—Phase 4 (approximately 3–6 months)**
  - **Staging servers.** Install the server to set up and test new design and capabilities.

- **Accessibility and standards.** Establish standards for new pages and content types.
- **Framework.** Develop the code framework.
- **Templates and themes.** Develop new templates and themes.
- **Widgets and applications.** Develop widgets (e.g., Facebook activity feed, Twitter timeline, top FAQs, etc.) and applications (e.g., events calendar, flip book viewer, digital asset management, etc.).
- **Functionality.** Implement the functionality for required features.
- **Content.** Integrate content within the website.
- **Site performance.** Ensure proper access speed and performance.
- **Security and permissions.** Implement necessary security and permissions for new templates, themes, widgets, and applications.
- **Workflows.** Implement and test publishing workflows for quality assurance.
- **Push publishing.** Test new push publishing feature in dotCMS.
- **Markup.** Implement required markup for SEO, social media, analytics, etc.
- **Launch—Phase 5 (length of phase to be determined)**
  - **Testing.** Conduct final testing of website features.
  - **Quality assurance.** Perform quality assurance tasks such as link checking and proofreading.
  - **Web analytics.** Test integration of Web analytics.
  - **Communication plan.** Communicate new features, rollout, and resources to campus.
  - **Training and documentation.** Provide training and documentation to campus.

- **Annual publisher certification program.** Establish a publisher certification program to reinforce training and standards annually.
- **Production server.** Push new templates, themes, widgets, and applications to live server.

#### Maintenance—Phase 6 (ongoing)

- **Support and troubleshooting.** Ensure technical support and troubleshooting of issues.
- **Design updates.** Continue improvement with planned updates to design.
- **Functionality updates.** Continue improvement with planned updates and new releases to site functionality.
- **Content updates.** Provide an editorial calendar and scheduled tasks for continuous updates to content.

## NEXT STEPS

1. Evaluate/adopt the plan
2. Establish plan governance
  - Executive in charge
  - Information Technology Policy Committee
    - Web Advisory Committee
  - Key stakeholder groups
    - Chancellor
    - Student Affairs and Enrollment Management
    - Academic Affairs
    - Financial and Administrative Affairs
    - Advancement
  - Information Technology Services
  - Marketing Communications
  - WebCMS backend team
  - WebCMS frontend team

- WebCMS publishers
- 3. Finance the plan (project budget)
- 4. Define scope of plan (project brief)
- 5. Identify the deliverables (vendors)
- 6. Commit to project timeline

## WEB ADVISORY COMMITTEE

The plan was reviewed and has been endorsed by the Web Advisory Committee. Feedback was sought via email and discussion of the plan took place during a meeting March 13, 2015. The plan has been well received and revisions have been made based on feedback.

- [Vacant], Alumni Relations
- James Burg, College of Education and Public Policy
- Steve Carr, Department of Communication
- Kenneth Christmon, Diversity and Multicultural Affairs
- [Vacant], Department of Visual and Communication Design
- [Vacant], Division of Continuing Studies
- Tonishea Jackson, Admissions
- John Kaufeld, Office of the Chancellor
- [Vacant], Human Resources and Office of Institutional Equity
- Jack Patton (co-chair), Marketing Communications
- Carlos Pomalaza-Raez, Department of Engineering
- Kasey Price, Student Life and Leadership
- Jeff Tipton, Information Technology Services
- Cheryl Truesdell, Helmke Library
- Barton Tyner (co-chair), Marketing Communications
- Maureen Davey, Marketing Communications

- Valerie Gough, Marketing Communications
- [Vacant], Student Representative(s)

Additionally, Eric Wagenfeld from Services for Students with Disabilities and Bruce Kingsbury from the Department of Biology have reviewed and expressed support of the plan.

## REFERENCES

- Lee Gardner, **“Your College’s New Website Is Student-focused, Mobile-friendly, and Probably Long Overdue”** (Washington, D.C.: Chronicle of Higher Education, November 24, 2014).
- Paul Boag, **“Digital Change in Higher Education [video]”** (Boagworld: March 15, 2015).
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- Paul Boag, ***Digital Adaptation*** (Freiburg, Germany: Smashing Magazine GmbH, 2014).
- Stewart Foss, Cody Foss, and Andy Foss, ***The eduStyle Guide to Usable Higher-ed Homepage Design*** (eduStyle, 2009).
- Lance Loveday and Sandra Niehaus, ***Web Design for ROI: Turning Browsers into Buyers and Prospects into Leads*** (Berkeley, California: New Riders, 2008).
- Steve Mulder and Ziv Yaar, ***The User Is Always Right: A Practical Guide to Creating and Using Web Personas for the Web*** (Berkeley, California: New Riders, 2007).
- Erika Hall, ***Just Enough Research*** (New York: A Book Apart, 2013).
- Karen McGrane, ***Content Strategy for Mobile*** (New York: A Book Apart, 2012).



- Erin Kissane, ***The Elements of Content Strategy*** (New York: A Book Apart, 2011).
- Breandán Knowlton, ***A Practical Guide to Managing Web Projects*** (Penarth, United Kingdom: Five Simple Steps, 2012).

To: URPC  
From: ACITAS  
Date: October 28, 2016  
Re: Action Plan 41 report on 1.2, 2.9, and 3.8

This September, the Senate Executive Committee directed ACITAS to research, evaluate the feasibility of, and make recommendations about how to proceed with items 1.2, 2.9, and 3.8 of IPFW's Action Plan 41.

## **Item 1.2**

### **Research**

ACITAS communicated with Irah Modry-Caron about the IR office's progress and plans relating to institutional data. Ira reported that they are evaluating data warehouse vendors and determining which reports and dashboards will be most helpful to IPFW leadership. They have already published several dashboards for deans and chairs. They are also working on streamlining some reports through Banner and Cognos.

### **Feasibility**

ACITAS believes that this action plan item is valuable and will be feasible if the IR department receives the necessary financial resources to follow through with their data warehousing plan.

### **Recommendation**

ACITAS recommends that IR be fully supported in pursuing fulfillment of item 1.2. We recommend that data and dashboards be made available to the campus community (rather than just administrators) whenever possible.

## **Item 2.9**

### **Research**

ACITAS talked with ITS about the current model of departmental support and discussed the possibility of moving to a more distributed model. Currently, ITS issues are handled by ITS centrally unless a department has funded a "Local Service Provider" (LSP) who provides intermediary support for that department. Right now there is no evidence to suggest that this service model is problematic. Mandating a distributed service model would disrupt current workflows and put an unnecessary financial burden on either ITS or the departments.

### **Feasibility and Recommendations**

ACITAS believes a distributed model is feasible but not advantageous. We recommend that the current service model for ITS remain in place, with the understanding that this model may need review in the future based on shifting

needs across campus. We strongly recommend that ITS have the opportunity to rehire critical staff after the early retirement buyout to ensure that the current level of ITS support can be maintained across campus.

### **Item 3.8**

#### **Research**

ACITAS met with members of the Website Modernization Team, led by Jack Patton. They are midway through an extensive process of detailing the requirements, personas, and processes for a new IPFW.edu website. The team is currently drawing up an RFP that could be submitted for bids in the near future, with early implementation rolling out as early as spring or summer of 2017. The team is using personas, personalization, and responsive (mobile-friendly) design principles with a focus on recruitment, retention, and advancement for their models. They are also prioritizing accessibility, which is federally mandated and which our current website does not offer in full. The team is working with a budget of about \$250,000. They are also developing plans for site governance, which will include ongoing training.

#### **Feasibility**

ACITAS believes that modernization of IPFW.edu is both essential and feasible. However, the team has a relatively small budget for the size and scale of the web development that is needed, which could create problems going forward.

#### **Recommendation**

ACITAS recommends that the web team proceed with its current plans as quickly as possible. We fully support this effort and recommend that the team be given the financial support necessary to accomplish its objectives in a timely fashion. We encourage the development team to continue using user-centered design principles and to do as much user experience research as possible throughout the design and deployment process. We fully support the team's plans for ongoing training requirements for content creators and we recommend that campus units consider prioritizing the role of web management and content creation since it is a key marketing function.

TO: Fort Wayne Senate  
FROM: Kate White, Acting Chair, Curriculum Review Subcommittee  
DATE: October 20, 2016  
SUBJECT: Proposals for Bachelor of Science in Actuarial Science and Bachelor of Science in Applied Statistics

Curriculum Review Subcommittee members support the proposal for a Bachelor of Science in Actuarial Science and find that the proposal requires no Senate review. We also support the proposal for a Bachelor of Science in Applied Statistics and find that it requires no Senate review.

Approving

Not Approving

Absent

S. Baddam  
R. Duchovic  
C. Duncan  
D. Lui  
S. Skekloff  
J. Smith  
K. White  
M. Yamanda

A. Montenegro

## Program Description

**Bachelor of Science in Actuarial Science  
To Be Offered by the College of Arts and Sciences  
Indiana University Purdue University Fort Wayne**

**1. Characteristics of the Program**

- a. **Campus:** Indiana University Purdue University Fort Wayne
- b. **Scope of delivery:** On-campus and online
- c. **Mode of Delivery:** Classroom/lab
- d. **Other delivery aspects:** Co-ops, Internships
- e. **Academic unit offering program:** Department of Mathematical Sciences in the College of Arts and Sciences

**2. Rationale for the Program****a. Institutional Rationale (Alignment with the Institutional Mission and Strengths)**

- **Why is the institution proposing this program?**

The objective is to establish a Bachelor of Science in Actuarial Science (BSAS) at Indiana University Purdue University Fort Wayne (IPFW). According to the U.S. Bureau of Labor Statistics, the employment outlook for actuaries is much higher than the overall average, with a projected increase of 18% from 2014 to 2024. The outlook in Northeast Indiana, with its concentration of specialty insurance companies, is also favorable. Companies such as Lincoln Financial Group and Swiss Re hire approximately five to seven entry-level actuaries each year, and other local employers hire several more. It is projected that the demand for individuals prepared in actuarial science will increase in the next decade. A consistent stream of highly prepared actuarial students will help to maintain and grow the insurance and reinsurance industry in Northeast Indiana. To respond to this need, an actuarial science program offering a bachelor's degree is needed in the region to prepare students for entry into actuarial positions as well as to engage institutions of higher education in partnerships with insurance companies. Currently, no institution in Northeast Indiana offers a bachelor's degree in actuarial science.

Actuarial Science majors will be encouraged to earn a secondary major in statistics. The proposed actuarial science and applied statistics programs have been developed to provide students with a broad array of analytical skills which are desirable in today's society of intensive data analysis and modeling.

The Department of Mathematical Sciences offers a Bachelor of Science in Mathematics with an Actuarial Science option. This degree program meets the requirements of the Society of Actuaries (SOA) for inclusion on their listing of Universities and Colleges with Actuarial Programs (UCAP). The proposed program

in Actuarial Science will provide focus in alignment with professional standards. While still maintaining a strong mathematical foundation, it will feature an expansion of theories and applications of financial modeling, promoting the academic and professional growth of future actuaries. The curriculum includes coursework addressing the content for three of the SOA exams as well as meeting the requirements for the SOA Validation by Educational Experience (VEE).

- **How is it consistent with the mission of the institution?**

IPFW's mission is to provide "local access to globally recognized baccalaureate and graduate programs that drive the intellectual, social, economic, and cultural advancement of our students and our region." The vision of the institution is to be known for "respected signature programs, and graduates prepared to improve the quality of life in their communities as well as compete locally, regionally, and globally." Offering a BSAS would be consistent with both the mission and vision statements. Development of the program will foster opportunities for year-round and semester internships/co-ops for students in the local industry. It will also provide qualified graduates prepared for entry-level positions locally, regionally, and globally. A consistent stream of highly prepared actuarial students will help to maintain and grow the insurance and reinsurance industry in Northeast Indiana.

- **How does the program fit into the institution's strategic and/or academic plan?**

The first goal of the IPFW strategic plan is to "Foster Student Success" with the associated process goal to "Develop signature programs." One of the key strategies associated with this process goal is to "Identify and develop signature programs that respond to regional needs, build on faculty expertise, and uniquely distinguish IPFW from other institutions." IPFW would be unique in that no other institution in Northeast Indiana offers a BSAS.

A second strategy is to "Build and strengthen relationships with regional partners to increase research and scholarly collaborations in signature programs." IPFW has already begun building and strengthening these relationships. The Department of Mathematical Sciences has established an Actuarial Advisory Board, with members from Lincoln, Swiss Re, Medical Protective and Buck Consultants, to provide guidance on the actuarial science curriculum and better meet the needs of the local industry. As the program is developed and expanded, more scholarly collaborations are anticipated.

Another key strategy is to "Promote majors and programs with strong job placement opportunities in the region and beyond." Given the demand for graduates with a background in actuarial science, offering a BSAS would clearly meet this objective. Job placement has already been very successful with four

internships and five full-time employment hires in the last two years. The proposed degree is expected to provide students with the knowledge and skills to be more competitive in the job market.

- **How does this program build upon the strengths of the institution?**

IPFW has an established foundation for this program through the Actuarial Science option of the Bachelor of Science in Mathematics. The proposed BSAS degree would build on the curriculum currently in place. Working toward the goal of establishing a signature program in actuarial science, the Department of Mathematical Sciences has accomplished the following in the past two years: becoming the only program in Northeast Indiana with UCAP classification by the SOA; growing the enrollment in the actuarial science option by 300% (17 in 2013 and 50 in 2015); establishing a Student Actuarial Club to inform students about actuarial careers and introduce employers to the local talent; establishing an Actuarial Award co-sponsored with Swiss Re to reimburse exam costs to students successfully passing SOA exams; establishing an Actuarial Advisory Board with members from local industry; and developing new actuarial courses (Financial Mathematics, Models of Financial Economics, and a practicum to help students prepare for SOA exams).

**b. State Rationale**

- **How does this program address state priorities as reflected in *Reaching Higher, Achieving More*?**

The proposed BSAS program addresses several goals described in *Reaching Higher, Achieving More*. One goal is to “align the state’s higher education system to meet Indiana’s economic and workforce needs.” As will be discussed in part c. below, there is a growing need for actuaries in the state, and more specifically, in the Northeast Indiana region. The BSAS program will align strongly with this goal by graduating students who are qualified to step into actuarial positions.

The program will also meet the goal of “Producing quality college degrees and certificates that are valued by students and employers” specified in *Reaching Higher, Achieving More*. “Actuary” is consistently listed among the top five most desirable occupations. For example, the 2015 annual report by CareerCast.com ranked “Actuary” as the best job of 2015 ([see list](#)). A program preparing students for this career is valued by the local industry as well as students.

Finally, since the proposed program was developed following the Society of Actuaries’ curriculum recommendations, it aligns with the goal to “attain a standard of academic quality that ensures Indiana’s college credentials are universally recognized for their rigor and value.”

**c. Evidence of Labor Market Need**

**i. National, State or Regional Need**

**• Is the program serving a national, state, or regional labor market need?**

The BSAS program would serve a labor market need at the national, state and regional levels. According to the Bureau of Labor Statistics ([Bureau web site](#), July 6, 2016), the occupational outlook for actuaries is much higher than average for the next decade, with a projected change from approximately 24,600 jobs in 2014 to 29,000 in 2024 (i.e., an 18% increase). The Bureau reports that “Actuaries will be needed to develop, price, and evaluate a variety of insurance products and calculate the costs of new, emerging risks.” Graduates educated in actuarial science are needed in the insurance, pension, and financial industries.

State long-term projections for actuaries developed by Labor Market Information ([www.projectionscentral.com](#)) estimate similar employment growth over the same 10-year period for Indiana (330 to 380 or 15.2%) and the contiguous states: Michigan (410 to 510 or 24.4%), Ohio (1,010 to 1,160 or 14.9%), and Illinois (1,220 to 1,420 or 16.4%). Average annual openings in the occupation for these states are projected to be 20, 20, 50, and 60, respectively.

As mentioned previously, companies such as Lincoln Financial Group and Swiss Re hire approximately five to seven entry-level actuaries each year, and other local employers hire several more.

**ii. Preparation for Graduate Programs or Other Benefits**

**• Does the program prepare students for Graduate Programs or provide Other Benefits to students besides preparation for entry into the labor-market?**

Graduates of the BSAS will be prepared to enter a graduate program in Actuarial Science, if they desire.

Actuarial Science is an academic subject for scientific and mathematical study as well as research within the liberal arts tradition. As such, the program will enrich the educational experience of students beyond preparation for a job.

**iii. Summary of Indiana DWD and/or U.S. Department of Labor Data**

**• Summarize the evidence of labor market demand for graduates of the program as gleaned from employment projections made by the Indiana Department of Workforce Development and/or the U.S. Department of Labor.**

As mentioned in part i. above, The Bureau of Labor Statistics predicts an 18% increase in actuarial jobs (approximately 4,400) from 2014 to 2024. The employment outlook for actuaries is projected to grow much faster than the 7% average for all occupations nationally.



For those with a Bachelor's Degree, the Indiana Department of Workforce Development indicates a 25.9% job growth for actuaries nationally. The demand for actuaries with a Bachelor's degree in the Northeast region of Indiana (Economic Growth Region: EGR3) is growing at approximately three times the rate (27.6%) when compared to the state of Indiana (9.5%).

More specific details on short-term projections as well as projections across all industries can be found in Appendix 2.

#### **iv. National, State, or Regional Studies**

- **Summarize any national, state, or regional studies that address the labor market need for the program.**

Findings of the Insurance Labor Market Study conducted by the Jacobson Group and Ward Group in 2016 indicate that 66.3% of companies plan to increase staff during the next 12 months and that Technology, Claims, and underwriter roles are expected to show the greatest growth. The projection is for the creation of new jobs in the industry resulting from an increase in industry employment over the next 12 months ([see study](#)).

Findings discussed in the *Regional Intel Report* of the IPFW Community Research Institute indicate that approximately 3,600 regional openings in the next decade will be in analytical fields. This could lead to a potential supply shortage since the report also specifies that degree completions in mathematics and statistics have remained relatively flat, from 31 in 2003 to 35 in 2014. Additional studies by this same group indicate a growing demand in the Finance and Insurance sector.

Results from additional studies can be found in Appendix 3.

#### **v. Surveys of Employers or Students and Analyses of Job Postings**

- **Summarize the results of any surveys of employers or students and analyses of job postings relevant to the program.**

Job postings for a variety of sites were analyzed in July 2016 for actuaries.

- A search of CareerCast.com listed 395 job postings for actuaries in the United States. Of these postings, 2 were in Indiana, 17 were in Illinois, and 5 were in Michigan.
- A search of Monster.com listed over 1,000 jobs for actuaries. Sixty-eight jobs were in Indiana, and 547 were in one of the contiguous states: 306 in Illinois, 111 in Michigan, and 130 in Ohio.
- A search of the CareerOneStop.com Job Finder found 1,917 jobs for actuaries in the United States. Twenty-three of these jobs were in Indiana,

130 in Illinois, 47 in Michigan, and 48 in Ohio.

- A search of the Society of Actuaries Job Center website posted 131 actuarial jobs for Actuarial candidates with 1-5 SOA exams passed. Of these postings 2 were in Indiana, 15 in Illinois, 2 in Michigan, and 10 in Ohio. The Casualty Actuarial Society listed 19 jobs for candidates with a four-year degree on their [www.careers.casact.org/jobs/](http://www.careers.casact.org/jobs/) website. Of these postings 1 was in Indiana, 4 in Illinois, 1 in Michigan, and 0 in Ohio.

Links to the aforementioned sites as well as a list of actuary jobs posted by CareerOneStop in the states of Indiana, Illinois, Michigan, and Ohio can be found in Appendix 4.

**vi. Letters of support**

- **Summarize, by source, the letters received in support of the program.**

**3. Cost of and Support for the Program**

**a. Costs**

**i. Faculty and Staff**

- **Of the faculty and staff required to offer this program, how many are in place now and how many will need to be added?**

Mathematics and statistics courses in the current Actuarial Science option of the Bachelor of Science in Mathematics are taught by a number of faculty members in mathematical sciences. Among these is a locally respected and published Fellow of the SOA who is a fully-benefitted, half-time professional actuary-in-residence. Four faculty members (corresponding to 3.5 FTE) with Ph.D.'s in Statistics or Biostatistics teach the courses approved for Validation by Educational Experience (VEE) by the SOA. A roster of the current faculty in the Department of Mathematical Sciences can be found in Appendix 6. Courses in accounting, economics, and finance are taught by faculty in the Doermer School of Business.

It is expected that the offering of a BSAS degree will lead to an increased enrollment at IPFW and in Mathematical Sciences. Lines for 1.5 FTE tenured/tenure-track faculty members in actuarial science and/or statistics will be required to teach additional courses for the program. An additional 1.5 FTE lines will be needed for the proposed Applied Statistics degree, for a total of 3 FTE lines needed for both degrees. Faculty would be teaching courses utilized in both degrees. As the program grows, additional faculty may be required in mathematics for support courses in the long-term.

No additional staff support will be required beyond what currently exists in the Department of Mathematical Sciences.

## ii. Facilities

- **Summarize any impact offering this program will have on renovations of existing facilities, requests for new capital projects (including a reference to the institution's capital plan), or leasing of new space.**

IPFW and the Department of Mathematical Sciences have made substantial investments in classroom and research facilities to support programs in mathematics and statistics. To meet curricular needs, four classrooms equipped with computing facilities for instructors and students are dedicated for use by the Department. Two of these rooms, Kettler 123 and Kettler 218, have been renovated recently to update available technology and to provide learning environments which encourage student collaboration. In addition, the Department has six dedicated classrooms in which technology is available for instructor use, but which are not equipped with laptops for student use.

The Department will need to renovate the two additional computer-equipped classrooms, Kettler 216 and Kettler 220 to update technology and to encourage student collaboration, as was done in Kettler 218. Since students in the actuarial science program take many of the same courses as in the applied statistics program, both programs are facilitated with these renovations. The renovations could be done in different years and the cost of these renovations is approximately \$150,000 for each classroom. Three to four years in the future, an additional dedicated classroom with technology for instructors and students may be required to meet the increased frequency of course offerings. Additional details are provided in Appendix 7.

One-two equipped faculty offices (including office furniture, telephones, and computers) will be needed for the additional actuarial science/statistics faculty. (Between the requests for the actuarial science and applied statistics, three faculty offices will be needed.)

## iii. Other Capital Costs (e.g. Equipment) \*

- **Summarize any impact offering this program will have on other capital costs, including purchase of equipment needed for the program.**

Licenses for specialized software not already provided by the university may need to be purchased to support curricular and research programs.

Depending on their areas of expertise, additional equipment may need to be purchased for supporting the research programs of new faculty members.

## b. Support

### i. Nature of Support (New, Existing, or Reallocated)

- **Summarize what reallocation of resources has taken place to support this program.**

The proposed BSAS program primarily uses courses currently offered in existing programs in the University. Given the anticipated enrollment increase and new course offerings, an additional 1.5 FTE full-time tenured/tenure-track actuarial science faculty lines will be required.

- **What programs, if any, have been eliminated or downsized in order to provide resources for this program?**

No programs have been eliminated to provide resources for this program. We anticipate that the proposed program will replace the Actuarial Science option of the Bachelor of Science in Mathematics.

#### ii. **Special Fees above Baseline Tuition**

- **Summarize any special fees above baseline tuition that are needed to support this program.**

No special fees above the baseline tuition are being proposed for this program.

#### 4. **Similar and Related Programs**

##### a. **List of Programs and Degrees Conferred**

##### i. **Similar Programs at Other Institutions**

The following institutions in Indiana offer undergraduate degrees in actuarial science:

##### Public four-year institutions

- Ball State University, Muncie (B.S. in Actuarial Science)\*
- Indiana University Northwest, Gary (B.S. in Actuarial Science)\*
- Indiana University South Bend (B.S. in Actuarial Science)
- Indiana University Purdue University Indianapolis, Indianapolis (B.S. in Actuarial Science)\*
- Purdue University, West Lafayette (B.S. in Actuarial Science)\*

##### Private four-year institutions

- Butler University, Indianapolis (B.A. and B.S. in Actuarial Science)\*
- DePauw University, Greencastle (Bachelor's in Actuarial Science)\*
- Grace College, Winona Lake (B.A. and B.S. in Actuarial Science)
- St. Mary's College, Notre Dame (B.S. in Statistical and Actuarial Mathematics)\*
- University of Indianapolis (Bachelor's in Actuarial Science)\*
- Valparaiso University, Valparaiso (B.S. in Actuarial Science)\*

\*-also listed on the SOA's UCAP

No other four-year institution in Northeast Indiana offers a Bachelor of Science degree in Actuarial Science.

**ii. Related Programs at the Proposing Institution**

Bachelor of Science in Mathematics with an option in Actuarial Science

**b. List of Similar Programs Outside Indiana**

The following four-year public institutions in Michigan and Ohio offer undergraduate degrees in actuarial science:

- Central Michigan University, Mount Pleasant, MI (B.A. and B.S. in Actuarial Science)\*
- Eastern Michigan University, Ypsilanti, MI (B.A. and B.S. in Actuarial Science and Economics)
- Ferris State University, Big Rapids, MI (B.S. in Actuarial Science)\*
- Michigan State University, Lansing, MI (B.S. in Actuarial Science)\*
- Oakland University, Rochester Hills, MI (B.S. in Actuarial Science)
- The University of Michigan, Ann Arbor, MI (Bachelor's in Actuarial Mathematics)\*
- Bowling Green State University, Bowling Green, OH (B.S. in Actuarial Science)\*
- The Ohio State University, Columbus, OH (B.A. and B.S. in Actuarial Science)\*
- Ohio University, Athens, OH (B.S. in Actuarial Science)\*

\*-also listed on the SOA's UCAP

**c. Articulation of Associate/Baccalaureate Programs**

- **For each articulation agreement, indicate how many of the associate degree credits will transfer and apply toward the baccalaureate degree.**

As of June 2016, the Indiana Commission on Higher Education website does not list any Transfer Single Articulation Pathways in progress for actuarial science (<http://www.in.gov/che/3138.htm>).

**d. Collaboration with Similar or Related Programs on Other Campuses**

- **Indicate any collaborative arrangements in place to support the program.**

No plans are currently in place to collaborate with similar or related program on other campuses.

**5. Quality and Other Aspects of the Program**

**a. Credit Hours Required/Time To Completion**

- **Credit hours required for the program and how long a full-time student will need to complete the program.**

The BSAS will require 120 credit hours for students who are ready to enter Calculus in their first semester. A full-time student averaging 15 credits per semester can complete the program in eight academic semesters over four years. A sample four-year plan is provided in Appendix 10.

**b. Exceeding the Standard Expectation of Credit Hours**

- **If the baccalaureate degree program exceeds 120 credit hours, summarize the**

**reason for exceeding the standard expectation.**

The BSAS does not exceed the standard 120 credit hour limit.

**c. Program Competencies or Learning Outcomes**

- **List the significant competencies or learning outcomes that students completing this program are expected to master.**

Students should be able to reason mathematically.

- Students will demonstrate an understanding of the calculus: The differential and integral calculus of one and multiple variables, infinite series, the geometry of Euclidean space, and theorems of Green, Gauss, and Stokes. [MA 26300]
- Students will demonstrate an understanding of elementary linear algebra: Linear transformations, finite dimensional vector spaces, matrices, determinants, systems of linear equations. [MA 35100]
- Students will demonstrate understanding of high-level topics such as sets, logical inference, induction, recursion, counting principles, binary relations, vectors and matrices, elementary graphs, and algorithm analysis. [MA 17500]

Students should be good problem solvers.

- Students will demonstrate the ability to translate real-world or discipline-specific problems into mathematical language, and the solutions of mathematical problems into ordinary language. [STAT 51100]
- Students will demonstrate the ability to choose, apply, and adapt appropriate strategies to solve diverse problems. [STAT 51100]
- Students will be able to use computers for analysis and data management. [CS 11400]

Students should be able to understand and apply mathematical concepts to other disciplines.

- Students will understand basic applications of the calculus to the physical sciences and engineering, and be able to use appropriate techniques in various contexts. [MA 26300]
- Students will understand basic applications of linear algebra and be able to use appropriate techniques in various contexts. [MA 35100]
- Students will be able to calculate present values, future values, mortgage rates, and internal rates of return. [MA 27300]

- Students will be able to price bonds and calculate the yield of the bond. [MA 27300]
- Students will understand the financial tools and measurements used to manage risk, including duration, convexity, asset-liability matching, and interest rate swaps. [MA 27300]
- Students will be able to build binomial models for stock prices and interest rates. They will be able to use these models to price financial instruments, including call options, put options, bonds, and interest rate swaps. [MA 49000 – MFE course]

Students should have sufficient preparation in calculus, linear algebra, probability, and statistics to pass the preliminary actuarial science examinations and obtain VEE credit from the Society of Actuaries.

- Students should be able to make statistical inference by applying hypothesis tests and confidence intervals. [STAT 51700]
- Students should be able to apply calculus to solve certain probability and estimation problems. Students should be able to distinguish between different probability models and apply them in problem solving. [STAT 51600]
- Students should be able to fit a regression model, perform a diagnostic analysis, and make appropriate inferences from data. [STAT 51200]
- Students should be able to calculate interest rates, present values, future values, bond prices, and loan payments. [MA 27300]
- Students should be able to use a binomial stock price model to calculate option prices, forward prices, prepaid forward prices, futures prices, and exotic option prices. The student should be able to use the Black-Scholes model to calculate call option and put option prices. The student should understand the Greek measurements related to options and should be able to perform delta-hedging. The student should be able to use a binomial interest rate model to price bonds, interest rate derivatives, and options on bonds. [MA 49000 – MFE course]

#### d. Assessment

- **Summarize how the institution intends to assess students with respect to mastery of program competencies or learning outcomes.**

The Department of Mathematical Sciences has a common assessment procedure for evaluating its various programs. For each outcome, a criterion for success is

defined and courses are identified where the outcome is addressed. Assessment items are embedded on assignments, examinations, and/or projects for the identified courses and student data on these items are collected by the instructor each time the course is offered. The courses used for the assessments are offered on a regular basis since they are part of the program. The data are tabulated by an assessment committee and used longitudinally to measure progress toward achievement of the program goal. Each fall semester the results from the previous year are discussed by the department with the intention of implementing recommended changes during the following year.

Assessment of the BSAS will follow this same procedure. Outcomes will be assessed in the courses listed in part c above.

Data will be collected in designated courses each time the courses are offered. The first longitudinal review of the program will be made in the third year of the program.

**e. Licensure and Certification**

- **State License:**

No state licenses apply to this program.

- **National Professional Certifications (including the bodies issuing the certification):**

Graduates of the program are encouraged to pass at least three of the five preliminary SOA exams (Exams P, FM, and MFE) based on coursework offered in the curriculum.

In addition to the exams, the SOA grants Validation by Educational Experience (VEE) in three areas: Applied Statistical Methods, Economics, and Corporate Finance. A university may submit course syllabi to meet VEE requirements. Courses required in the BSAS have been approved as meeting VEE requirements in all three areas through 12/31/2018. Students who earn at least a B- in the designated courses may apply for VEE from the SOA after passing at least two SOA exams.

- **Third-Party Industry Certifications (including the bodies issuing the certification):**

No third-party industry certifications apply to this program.

**f. Placement of Graduates**

- **Describe the principle occupations and industries, in which the majority of graduates are expected to find employment.**

Most of the graduates of the program are expected to work in the life insurance, health insurance, or the property/casualty insurance industry. Others are expected to work in pension consulting. Some are expected to work for regulatory bodies, such as the Indiana Department of Insurance. Some are also expected to work in



the fields of investments and finance.

- **If the program is primarily a feeder for graduate programs, describe the principle kinds of graduate programs, in which the majority of graduates are expected to be admitted.**

Alumni of the program may also pursue admission into graduate programs in Actuarial Science.

**g. Accreditation**

- **Accrediting body from which accreditation will be sought and the timetable for achieving accreditation.**

While not an accreditation, the current degree program meets the requirements of the SOA for inclusion on their listing of Universities and Colleges with Actuarial Programs (UCAP). The Department of Mathematical Sciences will apply for inclusion of the BSAS degree on UCAP list, pending approval of the program.

- **Reason for seeking accreditation.**

The UCAP list serves as a resource for students searching for an actuarial program. Inclusion on the list assists in the recruitment of students into this major.

**6. Projected Headcount and FTE Enrollment and Degrees Conferred**

- **Report headcount and FTE enrollment and degrees conferred data in a manner consistent with the Commission’s Student Information System.**

<b>Enrollment Projections</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Full-time	45	50	55	60	65
Part-time	5	5	5	5	5
<b>Enrollment Projections (FTE)</b>	50	55	60	65	70
Full-time	45	50	55	60	65
Part-time	3	3	3	3	3
<b>Degrees Conferred Projections</b>	10	11	12	13	15

(See Appendix 12 for the enrollment history in the related mathematics program.)

- **Report a table for each campus or off-campus location at which the program will be offered.**

All BSAS courses will be offered on the IPFW campus or online.

- **If a program is offered at more than one campus or off-campus location, a summary table, which reports the total headcount and FTE enrollments and degrees conferred across all locations, should be provided.**

Not applicable.

- **Round the FTE enrollments to the nearest whole number.**

See above table.

- **If the program will take more than five years to be fully implemented and to reach steady state, report additional years of projections.**

Not applicable.

## ***Appendix 1: Institutional Rationale Detail***

### ***IPFW Plan 2020: 2014-2020 Strategic Plan***

Link to the strategic plan: <https://www.ipfw.edu/about/strategic-plan/>

#### **MISSION**

Indiana University-Purdue University Fort Wayne is a comprehensive university that provides local access to globally recognized baccalaureate and graduate programs that drive the intellectual, social, economic, and cultural advancement of our students and our region.

#### **VISION**

IPFW will be the university of choice for the citizens of northeast Indiana and beyond. It will be recognized for a transformative learning environment characterized by intensive mentoring, excellence in faculty scholarship and knowledge creation, integration of life and work experiences, and community engagement. IPFW will be known for exceptional retention, persistence, and graduation rates, respected signature programs, and graduates prepared to improve the quality of life in their communities as well as compete locally, regionally, and globally.

#### **VALUES**

IPFW values:

- Access to affordable and high-quality programs and services.
- The integrity, significance, and value of the Indiana University and Purdue University degrees.
- An environment of open intellectual inquiry, mutual respect, shared governance, and civility.
- An environment that enhances learning by recognizing the inherent worth of all individuals and celebrating differences of culture, background, and experience among all individuals and groups.
- The highest ethical standards of equity, fairness, transparency, and academic integrity.
- A multifaceted and mutually beneficial collaboration with Fort Wayne and the greater northeast Indiana region.

#### **GOALS**

### ***Foster Student Success***

#### **A. Process Goal: Improve measurement of student learning.**

1. Improve quality and fidelity of assessment processes of degree/certificate programs, General Education program, and Baccalaureate Framework with dedicated resources.
2. Use assessment data to improve student learning.

**B. Process Goal: Increase student engagement.**

1. Increase opportunities for engaged and experiential learning including service learning and internship programs.
2. Expand impact and profile of Honors Program.
3. Expand number of degree programs that have gateway courses.
4. Expand use of high-impact instructional and advising interventions.
5. Transform the concept of the college classroom and the delivery of education.

**C. Process Goals: Increase interdisciplinary and graduate programs and internationalization of the curriculum.**

1. Develop and promote interdisciplinary programs where there are sufficient university assets available and anticipated employment needs.
2. Review, prioritize, and expand international agreements.
3. Promote academic programs for international market.
4. Expand support for international students.
5. Invest in academic programs with international curricula.
6. Increase support programs for international study for domestic students.
7. Establish links between baccalaureate and post-baccalaureate programs.
8. Respond to regional demand with appropriate post-baccalaureate credentials.

**D. Process Goal: Increase the diversity of the IPFW community.**

1. Develop activities and experiences that promote multiculturalism as a value.
2. Embrace a definition of diversity that includes a broader array of human differences.
3. Build and strengthen relationships as well as proactive programs and services designed to encourage enrollment of students from historically under-represented groups.
4. Recruit and retain a diverse faculty and staff at all institutional levels.

**E. Process Goal: Develop signature programs.**

1. Identify and develop signature programs that respond to regional needs, build on faculty expertise, and uniquely distinguish IPFW from other institutions.
2. Develop activities and experiences that promote success in student achievement through programs with strong student learning outcomes, high graduation rates, and strong job placement prospects.

3. Build and strengthen relationships with regional partners to increase research and scholarly collaborations in signature programs.
4. Promote majors and programs with strong job placement opportunities in the region and beyond.

### ***Promote the Creation, Integration, and Application of Knowledge***

#### **Process Goals:**

- A. Project future regional, national, and international demand for research and collaboration.
- B. Promote mentoring relationships between faculty and students engaged in creation, integration, and application of knowledge.
- C. Promote development of opportunities for faculty and student engagement with the community for the application and integration of knowledge.

### ***Serve as a Regional Intellectual, Cultural, and Economic Hub for Global Competitiveness***

#### **Process Goals:**

- A. Expand meaningful collaborations and research opportunities with regional, national, and global partners.
- B. Provide access to outstanding intellectual programming.
- C. Produce and sponsor outstanding cultural and artistic programming.
- D. Provide non-credit enrichment experiences for the community.
- E. Provide leadership in regional economic development.
- F. Serve as an exemplar of free and open discourse.

### ***Create a Stronger University through Improving the Support of Stakeholders and the Quality and Efficiency of the Organization***

#### **A. Process Goals: Measurement and metrics**

1. Prioritize and establish a set of appropriate performance metrics for all academic and non-academic units.
2. Establish an integrated system of program reporting, review, assessment, and accreditation that is aligned to performance metrics.

**B. Process Goal: Efficiency**

1. Allocate resources to priorities informed by performance metrics.
2. Decentralize resource distribution and control to lowest level, mission-focused administrative units.
3. Eliminate process barriers in enrollment management that impact student achievement.
4. Identify gaps in academic and program offerings and prioritize programs for creation, expansion, merging, or cessation.
5. Continue increasing transparency in resource allocation budget formation, administration, and personnel decisions.

**C. Process Goal: Philanthropic support**

1. Build infrastructure to support advancement goals and functions.
2. Implement a strategy for sustainable external funding of strategic priorities.
3. Re-envision Foundation Board as fundraising leadership board.
4. Enhance volunteer engagement in support of strategic goals and fundraising.

## Appendix 2: Summary of Indiana DWD and/or U.S. Department of Labor Data, Detail

The following tables were downloaded from the United States Bureau of Labor Statistics on July 7, 2016 (<http://www.bls.gov/ooh/math/actuaries.htm>). They provide employment data for actuaries as of May 2015 nationally, for Indiana and surrounding states, and for the Fort Wayne metropolitan area. While the state of Indiana is below the national average in employing actuaries, with a location quotient of 2.83, Fort Wayne has nearly a three times higher concentration for the occupation than the national average. Close to 3,000 actuaries were employed in Indiana, Illinois, Michigan, and Ohio in 2015. Graduates of the program also seek jobs in related fields, which are not included here.

Occupation: Actuaries (SOC code 152011) Period: May 2015				
Area name	Employment(1)	Employment percent relative standard error(3)	Annual mean wage(2)	Annual median wage(2)
National	19,770	3.6%	\$110,560	\$97,070

Occupation: Actuaries (SOC code 152011) Period: May 2015						
Area name	Employment (1)	Employment percent relative standard error (3)	Annual mean wage (2)	Annual median wage (2)	Employment per 1,000 jobs	Location Quotient
Indiana	260	13.3%	\$96,490	\$91,440	0.088	0.61
Illinois	1,410	15.0%	\$94,620	\$84,840	0.241	1.68
Michigan	370	24.3%	\$96,780	\$85,910	0.088	0.61
Ohio	940	24.1%	\$96,670	\$89,430	0.178	1.24

Occupation: Actuaries (SOC code 152011) Period: May 2015						
Area name	Employment (1)	Employment percent relative standard error (3)	Annual mean wage (2)	Annual median wage (2)	Employment per 1,000 jobs	Location Quotient
Fort Wayne, IN	80	35%	\$99,290	\$91,540	0.406	2.83

Footnotes:

(1) Estimates for detailed occupations do not sum to the totals because the totals include occupations not shown separately. Estimates do not include self-employed workers.

(2) Annual wages have been calculated by multiplying the hourly mean wage by 2080 hours.

(3) The relative standard error (RSE) is a measure of the reliability of a survey statistic. The smaller the relative standard error the more precise the estimate.

SOC code: Standard Occupational Classification code -- see <http://www.bls.gov/soc/home.htm>

Data extracted on July 7 2016



While the percent change in employment for 2014-2024 is projected to be 7% for all occupations in the U.S. economy, the outlook is substantially more favorable for actuarial jobs. The 2014-2024 projections of the Bureau of Labor Statistics are displayed in the following table, downloaded on July 7, 2016 from <http://www.bls.gov/ooh/math/actuaries.htm>. As can be seen, the total employment for actuaries is projected to grow 18.1%, from 24,600 jobs in 2014 to 29,000 jobs in 2024, indicating an increase of 4,400 jobs over the ten-year period. A positive percent change in employment is predicted in all industries, with the exception of actuarial jobs in the federal government. Furthermore, the percent change exceeds the national 7% rate for actuarial jobs in all industries except for hospitals, Codes 622000 and 622100. A 16.7% increase is projected for the finance and insurance industry, one of the critical sectors in the Northeast Indiana economy.

### Employment by industry, occupation, and percent distribution, 2014 and projected 2024

#### 15-2011 Actuaries

(Employment in thousands)

Industries with fewer than 50 jobs, confidential data, or poor quality data are not displayed

Industry		2014			2024				
Code and Title		Employment	% of industry	% of occupation	Employment	% of industry	% of occupation	% change	Employment change
TE1000	Total employment	24.6	0.0	100.0	29.0	0.0	100.0	18.1	4.4
TE1200	Total wage and salary employment	24.6	0.0	100.0	29.0	0.0	100.0	18.1	4.4
520000	Finance and insurance	17.5	0.3	71.5	20.5	0.3	70.6	16.7	2.9
523000	Securities, commodity contracts, and other financial investments and related activities	0.3	0.0	1.1	0.4	0.0	1.2	34.2	0.1
524000	Insurance carriers and related activities	17.2	0.7	70.1	20.1	0.8	69.2	16.5	2.8
524100	Insurance carriers	13.0	0.9	53.1	14.7	1.0	50.7	12.7	1.7
524200	Agencies, brokerages, and other insurance related activities	4.2	0.4	17.0	5.4	0.5	18.5	28.3	1.2
540000	Professional, scientific, and technical services	3.6	0.0	14.8	4.6	0.0	15.9	26.2	1.0
541000	Professional, scientific, and technical services	3.6	0.0	14.8	4.6	0.0	15.9	26.2	1.0

541900	Other professional, scientific, and technical services	0.2	0.0	1.0	0.3	0.0	1.0	24.2	0.1
550000	Management of companies and enterprises	2.1	0.1	8.7	2.6	0.1	8.9	20.7	0.4
560000	Administrative and support and waste management and remediation services	0.1	0.0	0.3	0.1	0.0	0.3	18.3	0.0
561000	Administrative and support services	0.1	0.0	0.3	0.1	0.0	0.3	18.3	0.0
620000	Healthcare and social assistance	0.1	0.0	0.5	0.1	0.0	0.5	28.3	0.0
621000	Ambulatory healthcare services	0.1	0.0	0.2	0.1	0.0	0.3	51.1	0.0
622000	Hospitals; state, local, and private	0.1	0.0	0.2	0.1	0.0	0.2	6.8	0.0
622100	General medical and surgical hospitals; state, local, and private	0.1	0.0	0.2	0.1	0.0	0.2	6.8	0.0
900000	Government	0.9	0.0	3.7	1.0	0.0	3.3	7.1	0.1
910000	Federal government	0.3	0.0	1.2	0.3	0.0	0.9	-9.6	0.0
9992-3	State and local government, excluding education and hospitals	0.6	0.0	2.4	0.7	0.0	2.4	15.6	0.1

Note: Red indicates a decline in employment from 2014 to 2024  
Source: Employment Projections program, U.S. Department of Labor,  
U.S. Bureau of Labor Statistics

Short-term and long-term projections for actuarial jobs were obtained from Projections Central (downloaded July 8, 2016 from the website <http://www.projectionscentral.com/>) for Indiana and surrounding states. The short-term projections from 2015-2017 for the state of Indiana indicate 20 annual openings, on average, with a projected increase in jobs of 5.4%. In the short-term, 170 average annual openings are projected for Indiana, Illinois, Michigan, and Ohio overall.

Area Name	Occupation Code	Occupation Name	Base Year	Base	Projection Year	Projection	Change	Percent Change	Average Annual Openings
Indiana	15-2011	Actuaries	2015	330	2017	350	20	5.4	20
Illinois	15-2011	Actuaries	2015	1,250	2017	1,310	60	4.5	60
Michigan	15-2011	Actuaries	2015	420	2017	450	30	7.1	30
Ohio	15-2011	Actuaries	2015	1,090	2017	1,150	60	5.5	60

Long-term projections from 2014-2024 show a 15.7% increase in actuarial jobs in Indiana compared to a 17.9% increase nationally. Similar increases are projected for Illinois, Michigan, and Ohio. In the long-term, an average of 150 annual openings is projected for Indiana, Illinois, Michigan, and Ohio overall.

Area Name	Occupation Code	Occupation Name	Base Year	Base	Projection Year	Projection	Change	Percent Change	Average Annual Openings
United States	15-2011	Actuaries	2014	24,600	2024	29,000	4,400	17.9	1,170
Indiana	15-2011	Actuaries	2014	330	2024	380	50	15.7	20
Illinois	15-2011	Actuaries	2014	1,220	2024	1,420	200	16.2	60
Michigan	15-2011	Actuaries	2014	410	2024	510	100	24.4	20
Ohio	15-2011	Actuaries	2014	1,010	2024	1,160	150	14.9	50

The following table shows the projected future demand for actuaries in the state of Indiana in 2022, provided by the Indiana Department of Workforce Development, downloaded on July 8, 2016. The projections are similar to those of the Projections Central.

## Future Demand for Indiana

Code	Title	Projected Demand -2022	Avg. Annual Openings	Avg. Annual New Openings	Percent of Total Openings	Avg. Annual Replacement Openings	Percent of Total Openings	Avg. Annual Wage in (2015)	Current Demand: Online Job Ads (2-mo. avg)
152011	Actuaries	471	16	4	25.00%	12	75.00%	\$96,490	31

Source: Indiana Department of Workforce Development, Research & Analysis, Long-term Projections

The following tables were downloaded from the Indiana Department of Workforce Development on July 8, 2016. They contain the employment and job outlook for actuaries in 2022 for the United States, the state of Indiana, and EGR3, the Economic Growth Region for Northeast Indiana containing Fort Wayne. Specifically, for those individuals with a Bachelor’s Degree, the Indiana Department of Workforce Development indicates a 25.9% job growth for actuaries nationally. A favorable outlook exists for actuaries with a Bachelor’s degree in the Northeast region of Indiana. The demand for these individuals in EGR3 is growing at approximately three times the rate (27.6%) when compared to the state of Indiana (9.5%).

### Side-by-Side Comparison - Actuaries in 2022

	U.S. 2022	Indiana 2022	EGR 3
<b>Employment and Openings</b>			
Projected Occupational Employment	30,600	471	71
Average Annual Openings	1,320	16	3
Openings to Fill by 2022	13,200	160	30
Growth Rate	25.9 %	9.3 %	24.6 %

<b>Job Growth by Educational Requirement</b>			
Less Than a H.S. Diploma	0.0 %	0.0 %	0.0 %
H.S. Diploma	0.0 %	0.0 %	0.0 %
Post Secondary Certificate or Some College	0.0 %	0.0 %	0.0 %
Associate Degree	0.0 %	0.0 %	0.0 %
Bachelor's Degree	25.9 %	9.5 %	27.6 %
Advanced Degrees	25.9 %	9.1 %	21.4 %
<b>Job Distribution by Educational Requirement</b>			
Less Than a H.S. Diploma	0.0 %	0.0 %	0.0 %
H.S. Diploma	0.0 %	0.0 %	0.0 %
Post Secondary Certificate or Some College	0.0 %	0.0 %	0.0 %

Associate Degree	0.0 %	0.0 %	0.0 %
Bachelor's Degree	51.5 %	51.6 %	52.1 %
Advanced Degrees	48.5 %	48.4 %	47.9 %

**Source:** Indiana Department of Workforce Development, Research & Analysis, Long-term Projections

### ***Appendix 3: National, State, or Regional Studies, Detail***

The Jacobson Group and Ward Group published a study investigating insurance industry hiring trends in the United States in February, 2016. ([https://jacobsononline.com/uploadfiles/industry\\_labor\\_mkt\\_study\\_summary\\_q12016\\_final.pdf](https://jacobsononline.com/uploadfiles/industry_labor_mkt_study_summary_q12016_final.pdf))

Findings of their Insurance Labor Market Survey in the first quarter of 2016 indicate that:

- “66.3% of companies plan to increase staff during the next 12 months driven by 68% in the Life/Health category. These are the highest percentages expected in the history of the survey.”
- “Technology, Claims, and Underwriter roles are expected to grow the greatest during the next 12 months.”
- “Technology, Actuarial, and Analytic positions are the most difficult to fill.”

The IPFW Community Research Institute has published several regional studies, including employment projections and training needs. Some relevant findings of these studies are provided below.

*Labor Market Analysis in Northeast Indiana, January 2011*

(<http://www.neindiana.com/docs/workforce/monster---labor-market-analysis-in-northeast-indiana.pdf?sfvrsn=6>)

- “Finance & Insurance was the largest sector across all three periods; it accounted for 15% of all National and 6% of NE Indiana job opportunities.”
- There was a 51% increase in Northeast Indiana job postings in the Finance and Insurance sector from 1,165 in the first half of 2009 to 1,764 in the first half of 2010.
- “Finance & Insurance job postings and resumes are primarily in Allen County, where 88% of job postings and 70% of candidates are located.”



*Occupational Projections and Training Needs for Northeast Indiana to 2018, February 2011*

<http://www.neindiana.com/docs/workforce/occupational-projections-training-needs-for-northeast-indiana-to-2018.pdf?sfvrsn=4!>

- “Other drivers of employment growth in NE Indiana include a general turnaround in US manufacturing, a reversal of the decline in the insurance cluster and continued growth in the health care and transportation clusters in Northeast Indiana.”
- “The forecast suggests that the percent of openings for workers with a college or advanced degree will increase while openings for high school graduates or workers with less than a high school diploma will drop. The forecast suggests that 30% of the training requirement will be at the Bachelor’s or higher degree level and another 7% will require a post-secondary degree or certificate.”
- “The category of Bachelor’s degree plus work experience includes many of the middle and upper management jobs in the regional economy. This is an important category in the competitiveness of the region since it represents jobs that are filled through regional or national searches in the absence of local talent. Local talent and advanced degrees in these fields are a competitive advantage while a lack of local talent is a competitive disadvantage for the region. Over half of the jobs in this category involve management occupations. Another 44 percent consists of management analysts, which is an important occupation in finance and insurance. Another one of the occupations on the list was mentioned in our insurance focus group: Actuaries.”
- The Financial Services and Insurance “Cluster has bottomed, will grow at national rates in future.”

*Allen County Insight, April 2013*

<https://www.ipfw.edu/dotAsset/9a5b34bd-69da-4750-98ce-45cb954dcb64.pdf> )

Allen County in 2013, the Finance and Insurance sector accounted for \$1,468,688,679 or 9.2% of the Gross Regional Product.

*Indiana Business Review, Winter 2013*

<http://www.ibrc.indiana.edu/ibr/2013/outlook/fortwayne.html> )

The *Fort Wayne Forecast 2014* indicated growth in Finance and Insurance employment from the first quarter of 2012 to the first quarter of 2013.

Industry	Employment		Change 2012 Q1 to 2013 Q1		2013 Q1 Average Annual Wage
	2012 Q1	2013 Q1	Number	Percent	
Finance and Insurance	8,485	8,572	87	1.0%	\$73,965

*Regional Intel Report* by the IPFW Community Research Institute, 2015-2016

[https://ind657-my.sharepoint.com/personal/oxtobyj\\_ipfw\\_edu/Documents/USAP%20-%202015-16/Regional%20Intel%20Report.pdf](https://ind657-my.sharepoint.com/personal/oxtobyj_ipfw_edu/Documents/USAP%20-%202015-16/Regional%20Intel%20Report.pdf)

- “Approximately 17% (nearly 3,600) of regional openings over the next decade will be in analytical fields – potential connections to growth areas like Big Data, fraud prevention, market research, etc.”
- IPFW conferred 61% of all awards in the Northeast Indiana region since 2003 (268 of 441)
- Since 2003 the region’s completions in mathematics and statistics have remained flat; during this same period there has been a near doubling of completions at the state and national levels.

Region	Completions		Percent Change
	2003	2014	
Northeast Indiana Region	31	35	12.9%
State	514	991	92.8%
Nation	19,657	36,259	84.5%

## ***Appendix 4: Surveys of Employers or Students and Analyses of Job Postings, Detail***

A search of CareerCast.com listed 395 job postings for actuaries in the United States. Of these postings, 2 were in Indiana, 17 were in Illinois, and 5 were in Michigan.

**Link:** <http://www.careercast.com/jobs/results/keyword/actuaries>

A search of Monster.com listed over 1,000 jobs for actuaries. Sixty-eight jobs were in Indiana, and 547 were in one of the contiguous states: 306 in Illinois, 111 in Michigan, and 130 in Ohio.

**Link:** <http://www.monster.com/jobs/search/?q=Actuary>

A search of the Society of Actuaries Job Center website posted 131 actuarial jobs for Actuarial candidates with 1-5 SOA exams passed. Of these postings 2 were in Indiana, 15 in Illinois, 2 in Michigan, and 10 in Ohio. The Casualty Actuarial Society listed 19 jobs for candidates with a four-year degree on their [www.careers.casact.org/jobs/](http://www.careers.casact.org/jobs/) website. Of these postings 1 was in Indiana, 4 in Illinois, 1 in Michigan, and 0 in Ohio.

**Link:** <http://jobs.soa.org/jobseeker/search/results/>

A search of the CareerOneStop.com Job Finder found 1,917 jobs for actuaries in the United States. Twenty-three of these jobs were in Indiana, 130 in Illinois, 47 in Michigan, and 48 in Ohio.



### **CareerOneStop Job Finder**

**We found 23 job(s) for actuaries in Indiana.**

**We found 47 job(s) for actuaries in Michigan.**

**We found 48 job(s) for actuaries in Ohio.**

**We found 130 job(s) for actuaries in Illinois.**

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Associate Actuary	Milliman	Indianapolis, Indiana	05/26/2016
Consulting Actuary	Milliman	Indianapolis, Indiana	05/26/2016
Actuarial Analyst- Exam	Milliman	Indianapolis, Indiana	07/01/2016
Actuarial Consultant (ASA or FSA)	Milliman	Indianapolis, Indiana	07/01/2016
Actuarial Data Analyst	Milliman	Indianapolis, Indiana	06/08/2016
Associate Actuarial Consultant	Exl Service	Indianapolis, Indiana	07/12/2016
Actuarial Analyst - Multiple Locations	UnitedHealth Group	Indianapolis, Indiana	06/13/2016
Actuarial Consultant (FSA)	Milliman	Indianapolis, Indiana	07/01/2016
Consulting Actuary (Financial Reporting Emphasis)	Milliman	Indianapolis, Indiana	06/27/2016
Consulting Actuary (Financial Reporting Emphasis)	Milliman	Indianapolis, Indiana	05/26/2016
Director, Actuarial Valuation, VUL	Lincoln Financial Group	Fort Wayne, Indiana	04/15/2016
Consultant, Actuarial Recruiting	Lincoln Financial Group	Fort Wayne, Indiana	05/28/2016
AVP, Senior Actuary Head of Valuation - Fixed, Fixed Indexed	Lincoln Financial Group	Fort Wayne, Indiana	07/08/2016
Healthcare Data Analyst	Milliman	Indianapolis, Indiana	07/01/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Business Info Analyst Sr - 119821SK	Anthem, Inc	Indianapolis, Indiana	07/06/2016
Pricing Analyst - Multiple Locations	UnitedHealth Group	Indianapolis, Indiana	05/25/2016
Analyst - Healthcare Business	Rose International INC	Indianapolis, Indiana	06/29/2016
Dir Network Management- Long Term Support Services120054	Anthem, Inc	Indianapolis, Indiana	07/11/2016
Reporting Analyst	AIG	Jeffersonville, Indiana	05/27/2016
Cost of Care Director - 118866	Anthem, Inc	Indianapolis, Indiana	06/03/2016
Benefits Admin Sr. Assoc	Xerox	Fort Wayne, Indiana	06/30/2016
Benefits Admin Assoc	Xerox	Indianapolis, Indiana	06/17/2016
Tax Services Senior - PAS- Tax Technical	EY	Indianapolis, Indiana	07/08/2016
Actuary Manager	Blue Cross Blue Shield of Michigan	Detroit, Michigan	05/27/2016
Actuary Product Pricing Lead	Blue Cross Blue Shield of Michigan	Detroit, Michigan	05/24/2016
Actuarial Consultant HSS	McKinsey and Company	Detroit, Michigan	07/13/2016
Retirement/Pension Actuary - Senior Consultant	Deloitte	Detroit, Michigan	04/23/2016
Informatics Analyst I – Actuarial Analytics	Blue Cross Blue Shield of Michigan	Detroit, Michigan	06/21/2016
Informatics Analyst I - Actuarial Analytics - ACT0	Blue Cross Blue Shield (Bcbs) Of Michigan	Detroit, Michigan	06/22/2016
Director, Insurance Risk Oversight	Jackson National Life	Lansing, Michigan	06/15/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
	Insurance Company		
Warranty Data Analytics Manager	General Motors	Warren, Michigan	06/03/2016
Product Development Analyst	The Auto Club Group	Dearborn, Michigan	07/13/2016
Senior Analyst - Warranty Data Analytics and Reporting	General Motors	Warren, Michigan	06/03/2016
Senior Sales Information Analyst - Analytics and Reporting, Business Segment Performance	Blue Cross Blue Shield of Michigan	Detroit, Michigan	05/13/2016
Liability Claims Data Analyst	Trinity Health	Livonia, Michigan	05/26/2016
Risk Management Manager	Meijer	Grand Rapids, Michigan	07/13/2016
Business Info Analyst Sr - 119821SK	Anthem, Inc	Dearborn, Michigan	07/06/2016
Solution Manager Ingenuity	McKinsey and Company	Detroit, Michigan	07/13/2016
Commercial Property Inspections Loss Control	Verisk Insurance Solutions - Commercial Property	Lansing, Michigan	06/24/2016
Dir Network Management- Long Term Support Services120054	Anthem, Inc	Dearborn, Michigan	07/11/2016
Associate Director, Benefits and Wellness	Eastern Michigan University	Ypsilanti, Michigan	07/08/2016
Departmental Analyst 12 (Performance Based CW Analyst)	State of Michigan	Lansing, Michigan	07/14/2016
Data Scientist Ingenuity	McKinsey and Company	Detroit, Michigan	07/13/2016
Model Risk Consultant, Risk Dynamics	McKinsey and Company	Detroit, Michigan	07/13/2016
Enterprise Risk Management (ERM) Analyst	Blue Cross Blue Shield of	Detroit, Michigan	06/27/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
	Michigan		
Sr. Accountant Corporate Accounting and Employee	Federal Mogul Powertrain	Southfield, Michigan	06/25/2016
Trust Analyst, Detroit, MI	Comerica	Detroit, Michigan	06/17/2016
Cost of Care Director - 118866	Anthem, Inc	Dearborn, Michigan	06/03/2016
Director of Commercial Underwriting	Farmers Insurance	Caledonia, Michigan	05/25/2016
Product Development Specialist	Meridian Health Plan	Detroit, Michigan	06/22/2016
Trust Analyst, Detroit, MI	Comerica Management Co Inc.	Detroit, Michigan	06/19/2016
Trust Analyst, Detroit, MI	Comerica Management Co Inc.	Detroit, Michigan	06/19/2016
Healthcare Provider Network Contractor - Michigan	UnitedHealth Group	Southfield, Michigan	05/10/2016
Healthcare Provider Network Contractor - Michigan	UnitedHealth Group	Kalamazoo, Michigan	05/10/2016
Senior Finance Analyst - Employee Benefits and Compensation	General Motors	Detroit, Michigan	05/07/2016
Configuration Analyst	McLaren Health Plan	Flint, Michigan	04/22/2016
Claim Associate	The Auto Club Group	Grand Rapids, Michigan	07/11/2016
Claim Associate-Auto Physical Damage	The Auto Club Group	Auburn Hills, Michigan	07/11/2016
Claim Associate	The Auto Club Group	Auburn Hills, Michigan	07/11/2016
Temporary Auto Claim Associate	The Auto Club Group	Auburn Hills, Michigan	07/11/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Claim Associate - Meemic Personal Injury Protection	The Auto Club Group	Auburn Hills, Michigan	07/11/2016
Hospital Contract Negotiator.	Aetna	Detroit, Michigan	05/19/2016
Senior Financial Analyst - Pharmacy	Meridian Health Plan	Detroit, Michigan	05/11/2016
Healthcare Provider Network Contract Manager - Michigan	UnitedHealth Group	Battle Creek, Michigan	04/15/2016
Healthcare Provider Network Contract Manager - Michigan	UnitedHealth Group	Kalamazoo, Michigan	04/15/2016
Healthcare Provider Network Contract Manager - Michigan	UnitedHealth Group	Grand Rapids, Michigan	04/15/2016
Healthcare Provider Network Contract Manager - Michigan	UnitedHealth Group	Portage, Michigan	04/15/2016
Healthcare Provider Network Contract Manager - Michigan	UnitedHealth Group	Southfield, Michigan	04/15/2016
Healthcare Provider Network Contract Manager - Michigan	UnitedHealth Group	Detroit, Michigan	04/15/2016
Chief Underwriting Officer - Midwest	The Hanover Insurance Group	Howell, Michigan	05/19/2016
Actuarial Analyst	Great American Insurance Co.	Cincinnati, Ohio	06/13/2016
Actuarial Analyst	Great American Insurance Co.	Cincinnati, Ohio	05/14/2016
Actuarial Consultant, NF	Nationwide	Columbus, Ohio	07/14/2016
Sr Actuary, Specialty Ins	Nationwide	Columbus, Ohio	06/21/2016



<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Associate Actuary - Spec Ins	Nationwide	Columbus, Ohio	06/23/2016
Dir, Actuarial Services	Medical Mutual of Ohio	Cleveland, Ohio	06/09/2016
Director Actuarial Services Government Programs	CVS Health	Solon, Ohio	06/26/2016
Senior Actuarial Analyst I - II	Great American Insurance Co.	Cincinnati, Ohio	05/14/2016
Senior Medical Economics Consultant	Aetna	Columbus, Ohio	07/12/2016
Business Info Analyst Sr - 119821SK	Anthem, Inc	Worthington, Ohio	07/06/2016
Business Info Analyst Sr - 119821SK	Anthem, Inc	Cincinnati, Ohio	07/06/2016
Business Info Analyst Sr - 119821SK	Anthem, Inc	Valley View, Ohio	07/06/2016
Business Info Analyst Sr - 119821SK	Anthem, Inc	Mason, Ohio	07/06/2016
Dir Network Management- Long Term Support Services120054	Anthem, Inc	Mason, Ohio	07/11/2016
Dir Network Management- Long Term Support Services120054	Anthem, Inc	Valley View, Ohio	07/11/2016
Dir Network Management- Long Term Support Services120054	Anthem, Inc	Cincinnati, Ohio	07/11/2016
Dir Network Management- Long Term Support Services120054	Anthem, Inc	Worthington, Ohio	07/11/2016
Vice President, Finance	Centene Corporation	Columbus, Ohio	05/17/2016
SR Finance Director	Aetna	New Albany, Ohio	07/13/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Senior Product Analyst	Great American Insurance Co.	Cincinnati, Ohio	07/01/2016
Senior Product Analyst	Great American Insurance Co.	Cincinnati, Ohio	06/25/2016
Director, Benefits Accounting	Eaton Corporation	Cleveland, Ohio	06/15/2016
Senior Production Underwriter / Production Underwriter	Great American Insurance Co.	Cincinnati, Ohio	06/03/2016
Cost of Care Director - 118866	Anthem, Inc	Cincinnati, Ohio	06/03/2016
Cost of Care Director - 118866	Anthem, Inc	Worthington, Ohio	06/03/2016
Cost of Care Director - 118866	Anthem, Inc	Valley View, Ohio	06/03/2016
Cost of Care Director - 118866	Anthem, Inc	Mason, Ohio	06/03/2016
Sr. Benefits Consultant	Battelle Memorial Institute	Columbus, Ohio	05/28/2016
Senior Accountant	AmTrust Financial Services	Cleveland, Ohio	07/08/2016
Buck Consultants - Sr. Administrative Assistant	Buck Consultants, LLC.	Cincinnati, Ohio	07/05/2016
Product Manager	First Acceptance	Columbus, Ohio	06/22/2016
Product Manager	First Acceptance	Cleveland, Ohio	06/22/2016
Vice President, Product Development	First Acceptance	Columbus, Ohio	05/22/2016
Vice President, Product Development	First Acceptance	Cleveland, Ohio	05/22/2016
Buck-Customer Svc Rep	Buck Consultants, LLC.	Maumee, Ohio	05/12/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Buck-Customer Svc Rep	Buck Consultants, LLC.	Maumee, Ohio	05/12/2016
Product Manager - Personal Lines	Progressive	Mayfield Village, Ohio	04/30/2016
Specialty Operations Coord	Sedgwick Claims Management Services, Inc.	Dublin, Ohio	04/20/2016
Specialty Operations Coord	Sedgwick Claims Management Services, Inc.	Cleveland, Ohio	04/28/2016
Senior Asset/Liability Analyst	KeyBank	Cleveland, Ohio	07/01/2016
Senior Web Analyst, Digital Acquisition	Progressive	Mayfield Village, Ohio	07/09/2016
Pricing Analyst	Park Place Technologies	Mayfield Heights, Ohio	05/05/2016
Pricing Analyst	Park Place Technologies	Mayfield Heights, Ohio	05/05/2016
Buck-Senior Associate, Health	Buck Consultants, LLC.	Maumee, Ohio	05/12/2016
Network Contract Manager - East, SE or Midwest - Telecommute	UnitedHealth Group	Cleveland, Ohio	05/10/2016
Pricing Analyst	Park Place Technologies	Mayfield Heights, Ohio	05/05/2016
Pricing Analyst	Park Place Technologies	Mayfield Heights, Ohio	05/05/2016
Sr. Human Resources Analyst	Owens Corning	Toledo, Ohio	06/28/2016
Actuary	Milliman	Chicago, Illinois	05/10/2016
Actuary	Zurich NA	Schaumburg, Illinois	05/26/2016
Actuary	Centene Corporation	Chicago, Illinois	05/02/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Associate Actuary	Blue Cross and Blue Shield of Illinois, Montana, N	Chicago, Illinois	06/23/2016
Associate Actuary	Blue Cross Blue Shield of Illinois	Chicago, Illinois	06/28/2016
Actuarial Project Manager / Associate Actuary	Milliman	Chicago, Illinois	05/06/2016
Consulting Actuary	Milliman	Chicago, Illinois	05/06/2016
Associate Actuary(34764)	Blue Cross Blue Shield of Illinois	Chicago, Illinois	06/29/2016
Lead Actuarial Associate	Blue Cross and Blue Shield of Illinois, Montana, N	Chicago, TX, Illinois	06/29/2016
Actuarial Analyst II	Zurich NA	Schaumburg, Illinois	05/27/2016
Senior Actuarial Analyst-Reserving	Zurich NA	Schaumburg, Illinois	05/26/2016
Lead Actuarial Associate	Blue Cross and Blue Shield of Illinois, Montana, N	Chicago, Illinois	07/06/2016
Actuarial Analyst Predictive Modeling	Zurich NA	Schaumburg, Illinois	04/25/2016
Lead Actuarial Associate(35088)	Blue Cross Blue Shield of Illinois	Chicago, Illinois	07/10/2016
Manager, Actuarial Services (commercial)	Centene Corporation	Chicago, Illinois	05/25/2016
Sr. International Actuarial Analyst	Towers Watson Delaware inc.	Chicago, Illinois	07/03/2016
Health and Benefits Actuarial Associate	Marsh & McLennan Companies	Chicago, Illinois	05/31/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Lead Actuarial Associate	Blue Cross Blue Shield of Illinois	Chicago, Illinois	07/10/2016
Senior Actuarial Assistant	Centene Corporation	Chicago, Illinois	07/01/2016
Life Actuary Senior Consultant	Deloitte	Chicago, Illinois	04/23/2016
Health Actuary Manager	Deloitte	Chicago, Illinois	06/08/2016
Health Actuary Senior Consultant	Deloitte	Chicago, Illinois	04/23/2016
Vice President, Actuary & Director II	Zurich NA	Schaumburg, Illinois	05/19/2016
Senior Actuarial Analyst - Technical Services	Zurich NA	Schaumburg, Illinois	05/26/2016
Vice President, Actuary & Director II	Zurich NA	Schaumburg, Illinois	05/19/2016
Actuarial Analyst I-Technical Services	Zurich NA	Schaumburg, Illinois	07/06/2016
Consulting Actuary - Medicaid	Milliman	Chicago, Illinois	04/20/2016
Actuarial Analyst II-Technical Services	Zurich NA	Schaumburg, Illinois	05/27/2016
Multiple Life Insurance Actuary Openings	CSC	Jacksonville, Illinois	06/27/2016
AVP Reserving Actuary-Global Corporate	Zurich NA	Schaumburg, Illinois	05/26/2016
Life Product Management-Actuary-Director	Allstate	Northbrook, Illinois	06/22/2016
Property & Casualty Actuarial Senior Manager	Deloitte	Chicago, Illinois	04/23/2016
Senior Actuarial Consultant - Mercer Marketplace	Marsh & McLennan Companies	Chicago, Illinois	06/15/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
AVP Actuary, Business Insights for Programs and Direct Markets	Zurich NA	Schaumburg, Illinois	05/26/2016
Property & Casualty Actuarial Senior Consultant	Deloitte	Chicago, Illinois	04/23/2016
Actuarial Intern (Lincolnshire) - Fall 2016	Aon Corporation	Lincolnshire, Illinois	04/23/2016
Junior Trader Consultant (Non-Actuarial)	Milliman	Chicago, Illinois	05/20/2016
Humana One/Medicaid TQP Associate Actuary	Humana	Chicago, Illinois	06/03/2016
MAPD Divisional Actuarial Director - Northern Division	Humana	Chicago, Illinois	07/07/2016
Consultant, Human Capital, Actuarial, Rewards & Analytics - Insurance Services	Deloitte	Chicago, Illinois	05/25/2016
Health and Benefits Assistant Vice President- Actuary (Lincolnshire or Chicago, IL; Milwaukee, WI; Southfield, MI and Minneapolis/Bloomington, MN)	Aon Corporation	Lincolnshire, Illinois	06/02/2016
Advisory Services Manager - Financial Services - Insurance and Actuarial Advisory Services - Property & Casualty	EY	Chicago, Illinois	06/22/2016
Advisory Services Manager - Financial Services - Insurance and Actuarial Advisory Services - Long Term Care Manager	EY	Chicago, Illinois	06/24/2016
International Consultant	Marsh & McLennan Companies	Chicago, Illinois	07/05/2016
Product & Pricing Specialist	Nationwide	Chicago, Illinois	07/12/2016
Insurance & Claims Analyst - Risk Management - 16-0546 f/t	Northwest Community Hospital	Arlington Heights, Illinois	05/13/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Pharmacist - Formulary Management	CVS Health	Northbrook, Illinois	05/06/2016
Manager, Health Outcomes & Analytics	Walgreens	Deerfield, Illinois	07/08/2016
Business Info Analyst Sr - 119821SK	Anthem, Inc	Deerfield, Illinois	07/06/2016
Business Info Analyst Sr - 119821SK	Anthem, Inc	Chicago, Illinois	07/06/2016
Business Info Analyst Sr - 119821SK	Anthem, Inc	Westchester, Illinois	07/06/2016
Retirement Provider Consulting - Senior Consultant	Deloitte	Chicago, Illinois	06/07/2016
Advanced Client Consultant(33248)	Blue Cross Blue Shield of Illinois	Chicago, Illinois	06/23/2016
Pricing Technician Analyst	Allstate	Northbrook, Illinois	06/02/2016
Benefits Analyst	Marsh & McLennan Companies	Vernon Hills, Illinois	05/25/2016
Financial Business Intelligence Technical Analyst(34004)	Blue Cross Blue Shield of Illinois	Chicago, Illinois	07/11/2016
Dir Network Management- Long Term Support Services120054	Anthem, Inc	Deerfield, Illinois	07/11/2016
Dir Network Management- Long Term Support Services120054	Anthem, Inc	Westchester, Illinois	07/11/2016
Dir Network Management- Long Term Support Services120054	Anthem, Inc	Chicago, Illinois	07/11/2016
Financial Business Intelligence Technical Analyst	Blue Cross and Blue Shield of Illinois, Montana, N	Chicago, Illinois	06/02/2016
Sr Manager Analytics & Reporting	Blue Cross and Blue Shield	Chicago, Illinois	07/01/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
	of Illinois, Montana, N		
Sr Director Financial Strategy and Planning(34630)	Blue Cross Blue Shield of Illinois	Chicago, Illinois	06/25/2016
Divisional Vice President Financial Operations(25144)	Blue Cross Blue Shield of Illinois	Chicago, Illinois	06/23/2016
Sr Director Financial Performance Monitor Reporting(34628)	Blue Cross Blue Shield of Illinois	Chicago, Illinois	06/25/2016
Manager, HR Due Diligence	KPMG	Chicago, Illinois	06/11/2016
Manager, HR Due Diligence	KPMG	Chicago, Illinois	06/14/2016
Contract Consultant	Allstate	Northbrook, Illinois	05/27/2016
Contract Analyst	Allstate	Northbrook, Illinois	05/26/2016
Encompass Project Manager	Allstate	Northbrook, Illinois	06/11/2016
Cost of Care Director - 118866	Anthem, Inc	Deerfield, Illinois	06/03/2016
Cost of Care Director - 118866	Anthem, Inc	Chicago, Illinois	06/03/2016
Cost of Care Director - 118866	Anthem, Inc	Westchester, Illinois	06/03/2016
Human Capital Mergers, Acquisitions, and Restructuring Senior Consultant	Deloitte	Chicago, Illinois	04/23/2016
Compensation Strategies Senior Consultant	Deloitte	Chicago, Illinois	04/27/2016
Product Management Program Manager	Allstate	Northbrook, Illinois	04/29/2016
Data Innovation Lab Practicum	Caterpillar	Champaign, Illinois	07/08/2016



<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Sr Manager Analytics & Reporting	Blue Cross Blue Shield of Illinois	Chicago, Illinois	07/08/2016
Buck-Sr Consultant, Absence Management	Buck Consultants, LLC.	Chicago, Illinois	07/08/2016
Human Resources Transaction Services Director - Labor Law	PwC	Chicago, Illinois	07/07/2016
Benefits - Financial Compliance and Reporting - Manager	United Airlines	Chicago, Illinois	06/29/2016
Business Practices & Project Consultant IV	Zurich NA	Schaumburg, Illinois	07/12/2016
Healthcare Provider Network Contract Manager - Chicago, IL	UnitedHealth Group	Chicago, Illinois	06/21/2016
Specialty Sales Project Manager	Aetna	Chicago, Illinois	06/15/2016
HRO Programmer Analyst Advanced - (Lincolnshire, IL)	Aon Corporation	Illinois	07/10/2016
Healthcare Provider Network Contractor - Iowa	UnitedHealth Group	Moline, Illinois	06/02/2016
Senior Defined Contribution Consultant	Marsh & McLennan Companies	Chicago, Illinois	05/18/2016
Statistical Modeler	RELX Group	Chicago, Illinois	04/19/2016
Analyst, Application Development	Lincoln Financial Group	Rolling Meadows, Illinois	04/15/2016
Healthcare Provider Network Contract Manager - Chicago, IL	UnitedHealth Group	Chicago, Illinois	05/10/2016
Healthcare Provider Network Contract Manager - Chicago, IL	UnitedHealth Group	Chicago, Illinois	04/16/2016
Healthcare Business Transformation Workday Financials Senior Associate	PwC	Chicago, Illinois	07/07/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Healthcare Business Transformation Workday Financials Manager	PwC	Chicago, Illinois	07/07/2016
Healthcare Business Transformation Taleo Lead - Senior Associate	PwC	Chicago, Illinois	07/07/2016
Pharmaceutical & Life Sciences Market Access - Director	PwC	Chicago, Illinois	07/07/2016
Healthcare Business Transformation Taleo Lead - Manager	PwC	Chicago, Illinois	07/07/2016
Workforce Management Kronos Healthcare Senior Consultant	PwC	Chicago, Illinois	07/07/2016
Procurement Specialist (670134)	Apex Systems	Northbrook, Illinois	06/28/2016
Managing Consultant	Aon Corporation	Chicago, Illinois	06/23/2016
Network Implementations Manager, Behavioral Health - Telecommute	UnitedHealth Group	Schaumburg, Illinois	06/23/2016
Senior Data Analyst(670954)	Apex Systems	Pekin, Illinois	06/21/2016
Insurance – Senior Examiner, Large Bank Supervision	Federal Reserve Bank	Chicago, Illinois	06/22/2016
Senior Data Analyst	Apex Systems, Inc.	Pekin, Illinois	06/21/2016
IT Systems Administrator II	Aon Corporation	Lincolnshire, Illinois	06/21/2016
Economics Performance Analytics Analytics - ERRM	Allstate	Northbrook, Illinois	06/14/2016
Network Implementations Manager, Behavioral Health - Telecommute	UnitedHealth Group	Schaumburg, Illinois	06/06/2016
Manager, Treasury Operations	Exelon Corporation	Chicago, Illinois	05/28/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Risk Governance Leader	Aon Corporation	Lincolnshire, Illinois	05/18/2016
Systems Analyst - Health and Welfare (Lincolnshire, IL, but will consider other locations and virtual for highly qualified candidate)	Aon Corporation	Lincolnshire, Illinois	05/23/2016
Senior Corporate Accountant	Illinois Tool Works, Inc.	Glenview, Illinois	05/22/2016
Experienced Associate, Tax Technology - Data Enablement	KPMG	Chicago, Illinois	05/11/2016
Risk Manager - GROWMARK, Inc. - Bloomington, IL	GROWMARK, Inc.	Bloomington, Illinois	05/19/2016
Manager, Tax Technology -Data Enablement	KPMG	Chicago, Illinois	05/11/2016
Senior Associate, Tax Technology - Data Enablement	KPMG	Chicago, Illinois	05/11/2016
Senior Relationship Manager - Allstate Roadside	Allstate	Northbrook, Illinois	07/09/2016
Pharma & Life Sciences Aggregate Spend Transparency Senior Associate	PwC	Chicago, Illinois	07/07/2016
Buck Consultants - Senior Consultant, Health (Pharmacy Consulting) - Remote	Buck Consultants, LLC.	Chicago, Illinois	07/05/2016
Guidewire Configuration - Senior Consultant	Deloitte	Chicago, Illinois	06/25/2016
Guidewire Integration - Senior Consultant	Deloitte	Chicago, Illinois	06/25/2016
Insurance Technology Senior Manager	Deloitte	Chicago, Illinois	06/22/2016
Insurance Technology Senior Consultant	Deloitte	Chicago, Illinois	06/22/2016
Insurance Technology Manager	Deloitte	Chicago, Illinois	06/24/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Health & Welfare - Lead Systems Analyst Advanced (CBA)	Aon Corporation	Lincolnshire, Illinois	06/18/2016
Insurance Technology Manager	Deloitte	Chicago, Illinois	06/18/2016
Head of Financial Institutions ~ HFP	The Hartford	Chicago, Illinois	06/13/2016
Senior Benefits Analyst (Lincolnshire OR Chicago)	Aon Corporation	Lincolnshire, Illinois	06/16/2016
Data Science Director - Operational Analytics	Allstate	Northbrook, Illinois	05/14/2016
Sourcing and Procurement Sr Consultant I - Professional Services	Allstate	Northbrook, Illinois	04/26/2016
Director, Contract Analytics	AbbVie	Lake County, Illinois	04/26/2016
Account Executive Bond/FPS	Travelers	Chicago, Illinois	05/16/2016
Advisory Services Manager - Financial Services - IT Risk & Assurance Services	EY	Chicago, Illinois	06/28/2016

Job postings here were provided by Direct Employers Association ([www.us.jobs](http://www.us.jobs)).

This information was retrieved on 7/14/2016 R 3:51 PM from Job Finder at CareerOneStop ([www.careeronestop.org](http://www.careeronestop.org)), sponsored by the U.S. Department of Labor, Employment, and Training Administration.

<http://www.careeronestop.org/toolkit/jobs/find-jobs.aspx>

## *Appendix 5: Letters of Support, Detail*

## Appendix 6: Faculty and Staff, Detail

Last name	First name	Academic Title	CIP code	Diploma Information	Area of Specialization
Akkari	Safwan	Associate Professor of Mathematical Sciences	27.01	Ph.D., Louisiana State University, 1988	Matroid theory, graph theory
Alexander	Deana	Continuing Lecturer in Mathematical Sciences	27.01	M.S., Purdue University, 2006	Online teaching, applied mathematics
Anderson	Jeffrey	Professor of Mathematics	27.01	Ph.D., Iowa State University, 1989	Partial differential equations, applied mathematics
Beineke	Lowell	Jack W. Schrey Professor of Mathematical Sciences	27.01	Ph.D., University of Michigan, 1965	Graph theory, combinatorics
Berry	Sandra	Associate Professor of Mathematics Education	27.01	Ph.D., Purdue University, 2007	Mathematics education
Chauhan	Chand	Associate Professor of Mathematics	27.01	Ph.D., The Ohio State University, 1983	Applied statistics, design of experiments
Coffman***	Adam	Professor of Mathematics	27.01	Ph.D., University of Chicago, 1997	Geometry, complex analysis, topology
Coroian	I. Dan	Associate Professor of Mathematics	27.01	Ph.D., University of Iowa, 1997	Numerical analysis, applied mathematics, mathematical modeling
Deng	Yihao	Associate Professor of Statistics	27.05	Ph.D., Old Dominion University, 2006	Regression analysis, generalized linear models, time series analysis
Dragnev*	Peter	Professor of Mathematics	27.01	Ph.D., University of South Florida, 1997	Analysis, potential theory, approximation theory
Francis	Joe	Professional Actuary in Residence/ Continuing Lecturer in Mathematical Sciences	27.01	B.S., DePauw University, 1987	Actuarial science

Last name	First name	Academic Title	CIP code	Diploma Information	Area of Specialization
Hersberger**	James	Professor of Mathematics	27.01	Ph.D., Purdue University, 1983	Problem solving, mathematical giftedness, school mathematics curriculum
LaMaster	John	Senior Instructor in Mathematics	27.01	M.S., Purdue University, 1992	Teaching with technology, math anxiety reduction, school mathematics curriculum
Legg	Alan	Visiting Assistant Professor of Mathematics	27.01	Ph.D., Purdue 2016	Complex Analysis
Lipman	Marc	Professor of Mathematical Sciences	27.01	Ph.D., Dartmouth College, 1976	Graph theory, discrete mathematics
Mau	Sue	Associate Professor of Math Education	27.01	Ph.D., Indiana University, 1992	Teachers' and students' mathematical understanding, teachers' professional growth
Osowski	John	Continuing Lecturer in Mathematics	27.01	M.A.S., The Ohio State Univ., 1985	Teaching of statistics, applied statistics
Pan	Yifei	Professor of Mathematical Sciences	27.01	Ph.D., University of Michigan, 1990	Complex analysis, partial differential equations, complex analytic dynamics
Townsend	Douglas	Professor of Mathematical Sciences	27.0101	Ph.D., University of Illinois, Ph.D., 1976	Approximation theory, applied statistics
Vandell	Robert	Associate Professor of Mathematics	27.01	Ph.D., Western Michigan University, 1996	Graph theory, graph connectivity, secondary math education
Vanderlaan	Cynthia	Continuing Lecturer in Mathematics	27.01	M.S., Indiana University, 1999	Precalculus curriculum development, teaching with technology
Wagner	Linda	Continuing Lecturer in Mathematics	27.01	M.S., Univ. of Illinois - Urbana/Champaign, 1978	Mathematics education, precalculus curriculum
Weakley	W. Douglas	Professor of Mathematics	27.01	Ph.D., Northwestern University, 1980	Graph theory, algebra covering codes, combinatorics
Weakley	Cecilia	Assistant Professor of Mathematics	27.01	Ph.D., University of North Carolina, 1978	Real analysis, topology

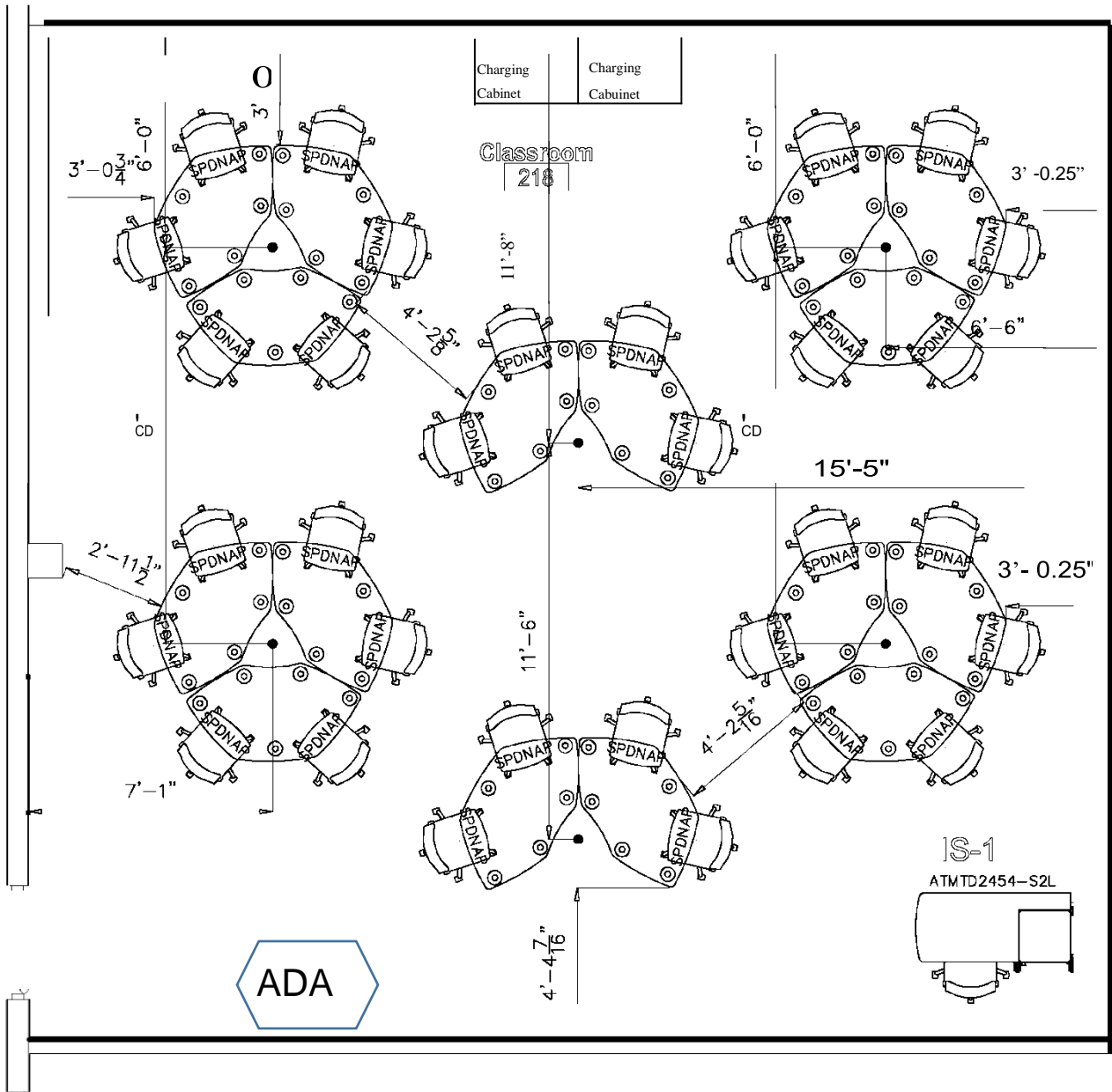
Last name	First name	Academic Title	CIP code	Diploma Information	Area of Specialization
Yorgov	Daniel	Visiting Assistant Professor in Applied Statistics	27.01	Ph.D., University of Colorado, 2016	Statistical genetics, high performance computing
Zhang	Yuan	Associate Professor of Mathematics	27.01	Ph.D., Rutgers University, 2009	Several complex variables, CR geometry, partial differential equations
Zook	Dianna	Instructor in Mathematics	27.01	M.A., Kent State University, 1979	Calculus and precalculus curriculum development, technology
Zubovic	Yvonne	Associate Professor of Mathematical Sciences	27.01	Ph.D., The Ohio State University, 1988	Biostatistics, survival analysis, applied statistics

**\* Chair of Department; \*\* Associate Chair of Department; \*\*\* Acting Chair of Department (July 1, 2016 – December 31, 2016)**



## Appendix 7: Facilities, Detail

During the summer of 2016, the classrooms Kettler 123 and Kettler 218 were under renovation. The renovation included upgrades to the available technology as well as reconfigurations of the layout to allow for students to collaborate in teams (see figure below). The estimated cost of these renovations is \$150,000 each, for a total of \$300,000.



Similar upgrades are required for Kettler 216 and Kettler 220 at an estimated cost of \$150,000 apiece.

## ***Appendix 8: Other Capital Costs, Detail***

Salaries and Wages	Recurring	\$112,500 (for 1.5 FTE)
Supplies and Expenses	Recurring	\$5,000
Other		\$5,000
		<ul style="list-style-type: none"><li>• e.g., office furniture, computer, software</li></ul>
Professional Development		\$7,500 (1.5 @ \$5,000)

## ***Appendix 9: Articulation of Associate/Baccalaureate Programs, Detail***

As of June 2016, the Indiana Commission on Higher Education website does not list any Transfer Single Articulation Pathways in progress for actuarial science.

**Link:** <http://www.in.gov/che/3138.htm>

## **Appendix 10: Credit hours Required/Time to Completion, Detail**

### **Curriculum and Requirements**

#### **Admission Requirements**

For a beginner regular admit, the admission requirements are:

- (1) High School G.P.A. of 2.5 or higher;
- (2) One of the following SAT/ACT Score requirements:
  - SAT Score (new scale) of 840 or above and Math SAT Score (new) of 420 or above;
  - SAT Score (old scale) of 1120 or above and Math SAT Score (old) of 380 or above;
  - ACT Score of 16 or above overall and ACT Score of 15 or higher in Math.

#### **Curriculum Requirements**

The Bachelor of Science in Actuarial Sciences consists of 120 credit hours distributed according to the following:

##### **Basic Mathematics Core (18 credits – must earn C- or higher in all courses)**

MA 16500 Analytic Geometry and Calculus I	(4 credits)
MA 16600 Analytic Geometry and Calculus II	(4 credits)
MA 26300 Multivariate and Vector Calculus or MA 26100 Multivariate Calculus	(4 credits)
MA 35100 Elementary Linear Algebra	(3 credits)
MA 36300 Differential Equations	(3 credits)

##### **Validation by Educational Experience (VEE) (18 credits)**

Applied Statistical Methods (take both, must earn grade B- or higher in each course)	
STAT 51200 Applied Regression Analysis	(3 credits)
STAT 52000 Time Series and Applications	(3 credits)

##### **Economics (take both, must earn grade B- or higher in each course)**

ECON E201 Introduction to Microeconomics	(3 credits)
ECON E202 Introduction to Macroeconomics	(3 credits)

##### **Corporate Finance (take both, must earn grade B- or higher in one course and C- or higher in the other)**

BUS F301 Financial Management	(3 credits)
BUS F303 <sup>1</sup> Intermediate Investments	(3 credits)

##### **Additional Required Courses (25 credits - must earn C- or higher in all courses)**

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<sup>1</sup> Students double majoring in Business may choose BUS F305 instead of BUS F303.

CS 11400 Introduction to Visual Basic	(3 credits)
MA 27300 <sup>2</sup> Financial Mathematics	(3 credits)
MA 49000-02 <sup>3</sup> Models for Financial Economics	(4 credits)
STAT 51100 Statistical Methods	(3 credits)
STAT 51600 <sup>4</sup> Basic Probability and Applications	(3 credits)
STAT 51700 Statistical Inference	(3 credits)
BUS A201 Principles of Financial Accounting	(3 credits)
BUS A202 Principles of Managerial Accounting	(3 credits)

**General Education Requirements** (see Bulletin or myBLUEprint for courses) (33 credits---  
Must earn C- or higher in all courses)

GA1 Category A1 (3 credits)	Written Communication
GA2 Category A2 (3 credits)	Speaking and Listening
GA3 Category A3 (3 credits)	Quantitative Reasoning (MA 16500 can be used)
GB4 Category B4 (3 credits)	Scientific Ways of Knowing
GB5 Category B5 (3 credits)	Social & Behavioral Ways of Knowing
GB6 Category B6 (3 credits)	Humanistic and Artistic Ways of Knowing
GB7/71 Category B7 or B71 (3 credits)	Interdisciplinary or Creative Ways of Knowing (foreign language courses 111 and 112)

Additional Credits - Category A or B (9 credits) - (foreign language courses 111/112, ENG W233, 2<sup>nd</sup> Science)

GCAP Category C8 – Capstone Experience (Upper level Actuarial Science Course / Internship Experience)

**COAS BS Liberal Arts Requirements** (approximately 14 credits – must earn C- or higher in all courses)

Second Semester Writing (3 credits) (ENG W140 or ENG W223)

Speaking Requirement (3 credits) (COM 11400)

Language Sequence (8 credits) (credit/placement required for 2 semesters of foreign language, one course at second semester level required)

**Summer Internships** It is recommended that all students participate in a summer internship. These are offered on a competitive basis and are **not** guaranteed. Good internships tend to pay well and provide valuable experience that future employers look for in a good job candidate. Completion of at least one actuarial exam is helpful in acquiring a summer internship.

**Minor/Electives** (to reach 120 credits).

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<sup>2</sup> Provides background for SOA Exam FM.

<sup>3</sup> Provides background for SOA Exam MFE.

<sup>4</sup> Provides background for SOA Exam P.

### Sample Curriculum: Bachelor of Science in Actuarial Science

Taking a typical load of 15 credit hours per semester, a calculus-ready student is able to complete the requirements in four years. A sample plan for the fall and spring semesters of each of the four years is provided below.

1 <sup>st</sup> Year Fall Semester				1 <sup>st</sup> Year Spring Semester			
Course No.	Course Title	Pre-Reqs	Crs.	Course No.	Course Title	Pre-Reqs	Crs.
MA 165000 (GA3)	Analytic Geometry & Calculus I	MA 15900 or MA 15400 (C- or above); or placement	4	MA 16600	Analytic Geometry & Calculus II	MA 16500 (C- or above)	4
ENG W131 or (GA1)	Reading, Writing, & Inquiry I	Self-Place or ENG W129 (C- or above)	3	COM 11400 <u>or</u> HIST H125 (GA2/A&S)	Fundamentals of Speech <u>or</u> Great Debates		3
GB4 (See GB4 and department options)	Gen Ed Science/Lab (Approved course)	*See lab requirement	4	Science/with Lab (See GB4 options)	Approved Science/Lab	*See lab requirement	4
FL 1 <sup>st</sup> semester (See GB7 options)	Foreign Language 1		4	FL 2nd (See GB7 options)	Foreign Language 2	FL 1/ placement	4
<b>Total Semester Credit Hours</b>			<b>15</b>	<b>Total Semester Credit Hours</b>			<b>15</b>

2nd Year Fall Semester				2nd Year Spring Semester			
Course No.	Course Title	Pre-Reqs	Crs.	Course No.	Course Title	Pre-Reqs	Crs.
MA 26300 or MA 26100	Multivariate & Vector Calculus <u>or</u> Multivariate Calculus	MA 16600 (C- or above)	4	MA 35100	Elementary Linear Algebra	2 sem calc (C- or above grades)	3
MA 27300	Financial Mathematics	MA 16600 (C- or above)	3	CS 11400	Introduction to Visual Basic	MA 15300	3
BUS A201	Principles of Financial Accounting	Sophomore or permission	3	STAT 51100	Statistical Methods	2 sem calc (C- or above grades)	3
ECON E201	Intro to Microeconomic	Sophomore; MA 153 or beyond	3	ECON E202	Intro to Macroeconomic	ECON E201	3
ENG W233 (Gen Ed A/B)	Intermediate Expository Writing	ENG W131 (C- or above)	3	BUS A202	Intro to Managerial Accounting	BUS A201	3
				MA 49000-04	Financial Mathematics Practicum		1
<b>Total Semester Credit Hours</b>			<b>16</b>	<b>Total Semester Credit Hours</b>			<b>16</b>

3rd Year Fall Semester				3rd Year Spring Semester			
Course No.	Course Title	Pre-Reqs	Crs.	Course No.	Course Title	Pre-Reqs	Crs.
MA 36300	Differential Equations	MA 26100 or 26300; MA 35100 (C- or above for all)	3	MA 49000-02	Models for Financial Economics	√	4
BUS F301	Financial Management	√	3	STAT 51700	Statistical Inference	STAT 51600 (C- or above)	3
GB5	Gen Ed Social/Behavior		3	BUS F305 (Recommended)	Intermediate Corporate Finance	√	3

STAT 51600	Basic Probability and Applications	MA 26100 or MA 26300 (C- or above)	3	GB7/71 (if needed) or Elective	Gen Ed Creative or Interdisciplinary <u>or</u> Free Elective		3
Elective or Gen Ed A or B	Free elective course or Gen Ed A or B (if needed)		3	GB6	Gen Ed Hum/Artistic		3
<b>Total Semester Credit Hours</b>			<b>15</b>	<b>Total Semester Credit Hours</b>			<b>16</b>

4th Year Fall Semester				4th Year Spring Semester			
Course No.	Course Title	Pre-Reqs	Crs.	Course No.	Course Title	Pre-Reqs	Crs.
BUS F303 (Recommended)	Intermediate Finance	BUS F301	3	STAT 52000	Time Series and Applications	STAT 512 or permission	3
STAT 51200	Applied Regression Analysis	STAT 511, 517, or 528 (C- or above)	3	BUS F420 (Recommended)	Equity & Fixed Income Investments	BUS F303 or BUS F305	3
GCAP (C8)	Gen Ed Capstone	√	3	Elective or Gen Ed A or B	Free elective course <u>or</u> Gen Ed A or B (if needed)		3
Elective or Gen Ed A or B	Free elective course <u>or</u> Gen Ed A or B (if needed)		3	Elective or Gen Ed A or B	Free elective course <u>or</u> Gen Ed A or B (if needed)		3
Elective or Gen Ed A or B	Free elective course <u>or</u> Gen Ed A or B (if needed)		3				
<b>Total Semester Credit Hours</b>			<b>15</b>	<b>Total Semester Credit Hours</b>			<b>12</b>

√ = See IPFW Bulletin or myBLUEprint for additional course prerequisites

**120 credits required for Bachelor of Science degree**

**2.0 GPA required for Bachelor of Science degree/major**

### Existing courses in the proposed curriculum

Course descriptions for the 2016-2017 can be found at <http://bulletin.ipfw.edu/index.php>.

MA 16500	Analytic Geometry and Calculus I
MA 16600	Analytic Geometry and Calculus II
MA 26300	Multivariate & Vector Calculus
MA 26100	Multivariate Calculus
MA 27300	Financial Mathematics
MA 35100	Elementary Linear Algebra
MA 36300	Differential Equations
MA 49000-02	Models for Financial Economics (syllabus provided below)
MA 49000-04	Financial Mathematics Practicum (information sheet provided below)
CS 11400	Introduction to Visual Basic
STAT 51100	Statistical Methods
STAT 51600	Basic Probability and Applications
STAT 51700	Statistical Inference
STAT 51200	Applied Regression Analysis
STAT 52000	Time Series and Applications
ENG W131	Reading, Writing, and Inquiry I
ENG W233	Intermediate Expository Writing
COM 11400	Fundamentals of Speech Communication
HIST H125	Great Debates
BUS A201	Principles of Financial Accounting
BUS A202	Principles of Managerial Accounting
ECON E201	Introduction to Microeconomics
ECON E202	Introduction to Macroeconomics
BUS F301	Financial Management
BUS F303	Intermediate Investments
BUS F305	Intermediate Corporate Finance
BUS F420	Equity and Fixed Income Investments

In addition, courses meeting General Education Requirements GA1 – GA3 and GB4 – GB7 already exist (see [General Education Courses](#) for a complete list).

### Courses to be added

The following courses have been offered as special topics courses under the variable title course number MA 49000. These courses will be added to the bulletin with appropriate course numbers. A syllabus/information sheet for each course is provided below.

MA 49000-02	Models for Financial Economics
MA 49000-04	Financial Mathematics Practicum



## **Models for Financial Economics – MA 49000-02 Syllabus - Spring 2016**

**Description:** This 4 credit, online course in actuarial science and finance:

- covers stock price models, the valuation of derivative securities, Monte Carlo simulation, and interest rate models; and
- covers the Society of Actuaries' learning objectives/outcomes for SOA Exam MFE (CAS Exam 3F).

**Objectives:** Students will understand how no-arbitrage models can be used to price financial instruments. Students will learn how to derive the Black-Scholes Formula, which is used to price European call and put options. Students will understand the following:

- A discrete binomial model for stock prices, when properly set up, becomes a model with normally distributed, continuously compounded returns as the time periods become small.
- A stock price model with normally distributed, continuously compounded returns has log-normally distributed prices, and those prices follow geometric Brownian motion.

**Instructor:** Joe Francis, FSA, CFA

KT 287, (260) 481-6230 or (260) 255-6331, franjp01@ipfw.edu

**Office Hours:** T 2:30 – 4:00 pm, W 1:30 – 3:30 pm, and by appointment

Kettler G21 (Tutoring Center): T 2:00 – 2:30

**Prerequisites:** MA 273, BUSF 301, STAT 516

**Textbooks:**

- *Actuarial Models, Financial Economics Segment*, by Joe Francis and Chris Ruckman, ©ActuarialBrew.com.
- *Actuarial Models: Questions for the Financial Economics Segment*, by Joe Francis and Chris Ruckman, ©ActuarialBrew.com.

**Topics:**

Stock Price Models

Put-Call Parity

Replication of Derivatives

Comparing Options

Binomial Stock Price Trees

General, forward tree, Cox-Ross-Rubinstein, and Jarrow-Rudd

Risk-Neutral Valuation

Realistic Valuation

- Greek Measures and Elasticity
- Lognormally Distributed Prices
  - Prediction Intervals
- The Black-Scholes Formula for European Calls and Puts
  - General form, Options on dividend-paying stocks, Options on Futures
- Delta-Hedging
- Exotic Options
  - Asian, Barrier, Compound, Gap, Exchange, Chooser, Forward Start,
- Digital
  - Volatility
  - Monte Carlo Simulation
  - Sharpe Ratio and the Market Price of Risk
  - The Black-Scholes Equation
- Brownian Motion
  - Standard, Arithmetic, Ornstein-Uhlenbeck, and Geometric
  - Multiplication Rules
  - Itô's Lemma
- Interest Rate Models
  - The Black Model for Options on Bonds
  - Binomial Short-Rate Models
    - General and Black-Derman-Toy
  - Continuous-Time Models
    - General, Vasicek, and Cox-Ingersoll-Ross
    - Sharpe Ratio

**Grading:**

2 Exams	40%	
Quizzes/Graded homework	35%	Expect frequent quizzes.
<u>Final Exam</u>	<u>25%</u>	
Total	100%	

Scale: A - 90% or above  
 B - 80% or above  
 C - 70% or above  
 D - 60% or above

To reschedule a test or quiz, you must provide an acceptable excuse at least 24 hours before the test or quiz. In the event of a demonstrable emergency, exceptions to the 24 hour notice policy may be permitted, provided that the emergency is reported and explained within 24 hours after the test or quiz.

## **Proctored Exams**

This online course requires that your tests be proctored.\* If you live near IPFW, you will be taking your proctored exams in Testing Services, located in Kettler Hall, room 232 on the IPFW campus. Call ahead to schedule a testing appointment 260-481-6600.

If you live out of the IPFW area, contact Tanner Clarke at 260-481-6111 or e-mail [clarte02@ipfw.edu](mailto:clarte02@ipfw.edu) or [online@ipfw.edu](mailto:online@ipfw.edu) with your name, course(s), and the name of a local college/university or public library, and the contact person's name and phone number. Some proctor sites may charge you a fee. If you need assistance finding a testing site call or email Tanner.

During the tests, only calculators approved by the Society of Actuaries will be permitted. I recommend the TI-30XS MultiView (which costs around \$20). Other approved calculators are listed here: <https://www.soa.org/Education/Exam-Req/Exam-Day-Info/edu-id-calculators.aspx>

*\*A **proctored exam** is an exam that is administered by an individual who supervises the student while they are taking the exam. The proctor's function is to ensure the integrity and security of the exam in a secure environment.*

## **Disabilities Statement:**

If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Director of Services for Students with Disabilities (Walb Union, Room 113, phone number (260) 481-6658, web site: [www.ipfw.edu/ssd](http://www.ipfw.edu/ssd)) as soon as possible to work out the details. Once the Director has provided you with a letter attesting to your needs for modification, bring the letter to me.

## **Financial Math Practicum – MA 49000-04 Information Sheet - Spring 2016**

**Description:** This 1 credit course is a preparation course for the Actuarial Exam FM. Class time will be spent working problems. Students will be expected to work on problems outside of class time as well as during class time, and students should come to class prepared to explain how they have solved the assigned problems.

**Objective:** Students will become proficient in the Financial Mathematics concepts and techniques that are tested by the Society of Actuaries.

**Grading:** This class will be offered on a Pass/Fail basis. Attendance and participation will be important to receive a passing grade.

**Co-requisite:** MA 166 (may be waived with permission of instructor)

**Course Materials:** ASM Manual (11<sup>th</sup> edition preferred, but 9<sup>th</sup> edition or later accepted). See <http://www.studymanuals.com/Product/Show/453062368>

**Instructor:** Joe Francis, FSA, CFA  
KT 287, 481-6230, franjp01@ipfw.edu

**Class Times:** Class will meet weekly from January 13 through February 17, for a total of 6 classes. Class will meet on Wednesdays from 3:30 – 5:30 pm.

**Class Location:** Kettler 218.

### **Disabilities Statement:**

If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Director of Services for Students with Disabilities (Walb Union, Room 113, phone number (260) 481-6658, web site: [www.ipfw.edu/ssd](http://www.ipfw.edu/ssd)) as soon as possible to work out the details. Once the Director has provided you with a letter attesting to your needs for modification, bring the letter to me.

## ***Appendix 11: Exceeding the Standard Expectation of Credit Hours, Detail***

The proposed Bachelor of Science in Actuarial Science does not exceed the standard 120 credit hour limit.

## ***Appendix 12: Enrollment Trends***

The numbers of majors in the Bachelor of Science in Mathematics program for the Actuarial Science option for the fall semesters from 1999 to 2015 are provided below.

### **Mathematical Sciences - Historical Enrollment Trends**

Program	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Math BS-Actuarial Sci.	10	8	12	16	16	16	17	10	7	14	24	21	19	21	26	31	49



## Liaison Librarian Memo

Date: 7/27/16  
From: David Dunham  
To: Yvonne Zubovic  
Re: Library Resources for Actuarial Science Program

Describe availability of library resources to support proposed new program:

I have conducted a thorough investigation of the resources currently held by the Helmke Library relating to Actuarial Science. A search in IUCAT, our online catalog, for books and e-books published in the last 10 years on the subject of "actuarial science" shows our current collection to be relatively minimal. However, I have obtained a recent list of recommended texts from the Society of Actuaries and checked it against the Helmke Library holdings. This should serve as a helpful springboard for beginning to build an adequate Actuarial Science collection.

### Comments:

Additional one-time purchases may also be made via a Helmke Library Special Needs Grant (<http://library.ipfw.edu/about/policies/special-needs-grants.html>). Priority in collection development will be given to test preparation materials for actuarial credentialing and exams. I thus believe that, through a focused collection development initiative in collaboration with the Department of Mathematical Sciences, the resources provided by and accessible to the Helmke Library can be brought up to the appropriate level to support this program within a reasonable time frame.

8/9/16

*Liaison Librarian Signature*

*Date*

## Program Description

**Bachelor of Science in Applied Statistics  
To Be Offered by the College of Arts and Sciences  
Indiana University Purdue University Fort Wayne**

**1. Characteristics of the Program**

- a. **Campus:** Indiana University Purdue University Fort Wayne
- b. **Type of delivery:** On-campus only
- c. **Mode of Delivery:** Classroom/lab
- d. **Other delivery aspects:** Co-ops, Internships
- e. **Academic unit offering program:** Department of Mathematical Sciences in the College of Arts and Sciences

**2. Rationale for the Program****a. Institutional Rationale (Alignment with the Institutional Mission and Strengths)**

- **Why is the institution proposing this program?**

The objective is to establish a Bachelor of Science in Applied Statistics (BSS) at Indiana University Purdue University Fort Wayne (IPFW). According to the Bureau of Labor Statistics ([Bureau web site](#), June 22, 2016), careers in statistics rank 9<sup>th</sup> on the list of the national fastest growing occupations, with a projected change from approximately 30,000 jobs in 2014 to 40,000 in 2024 (i.e., a 34% increase). Graduates educated in statistical methodology and data analysis are needed in the health industry, education, government, business and industry, and the sciences.

For the Northeast Indiana region, the IPFW Community Research Institute *Regional Intel Report* forecasts that “Approximately 17% (nearly 3,600) of regional openings over the next decade will be in analytical fields, with potential connections to growth areas like Big Data, fraud prevention, market research, etc.” A common thread for these analytical fields is the need for a strong quantitative background and data analysis skills, which a program in statistics provides.

A consideration of degrees conferred in Mathematics and Statistics indicates that Northeast Indiana is lagging behind the rest of the state in terms of degree completions in these fields of study. The region’s degree completions in Mathematics and Statistics have remained relatively flat since 2003 while there has been a near doubling of completions at the state and national levels; Region: 31 vs. 35 (13% increase from 2003 to 2014); State: 514 vs. 991 (93% increase); Nation: 19,657 vs. 36,259 (85% increase). Note that IPFW conferred 61% of all the awards in Mathematics and Statistics in the region since 2003 (268 of 441).



Actuarial science majors will be encouraged to earn a secondary major in statistics. The proposed applied statistics and actuarial science curricula have been developed to provide students with a broader array of analytical skills which are desirable in today's society of intensive data analysis and modeling.

The Department of Mathematical Sciences at IPFW currently offers a Bachelor of Science in Mathematics with a Statistics option which includes a core set of courses that are foundational in mathematics, as well as a set of courses introducing students to probability and to statistical methods primarily in the areas of experimental design and regression analysis. The proposed program in Applied Statistics, while maintaining a strong mathematical foundation, places emphasis on statistical methodology, providing breadth and depth that is crucial for students wishing to pursue a career path involving data analysis and statistical modeling. Students in this program will acquire knowledge, skills, and experience in topics such as statistical modeling, a variety of statistical methodologies, and data analysis.

- **How is it consistent with the mission of the institution?**

IPFW's mission is to provide "local access to globally recognized baccalaureate and graduate programs that drive the intellectual, social, economic, and cultural advancement of our students and our region." The vision of the institution is to be known for "respected signature programs, and graduates prepared to improve the quality of life in their communities as well as compete locally, regionally, and globally." Offering a BSS would be consistent with both the mission and vision statements. The demand for people with analytical talent is expected to grow in the next decade, establishing a need for this program to support the industry in the region. This program would provide graduates with data analysis and modeling skills to meet this demand.

- **How does the program fit into the institution's strategic and/or academic plan?**

The first goal of the IPFW strategic plan is to "Foster Student Success" with the associated process goal to "Develop signature programs." One of the key strategies associated with this process goal is to "Identify and develop signature programs that respond to regional needs, build on faculty expertise, and uniquely distinguish IPFW from other institutions." The Bachelor of Science in Applied Statistics program could be a signature program to address the need for graduates with analytical skills. No other four-year institution in Northeast Indiana offers such a degree.

A second strategy is to "Build and strengthen relationships with regional partners to increase research and scholarly collaborations in signature programs." Since January 2015, IPFW's Center for Applied Math and Statistics has undertaken

several projects with clients external to the university demonstrating the need for analytical assistance, as well as the expertise for providing it. Development of the proposed program would enhance the scholarly resources available for collaborations involving data analysis and modeling.

Another key strategy is to “Promote majors and programs with strong job placement opportunities in the region and beyond.” Given the demand for graduates with a background in applied statistics, described in more detail in part c. below, offering a BSS would meet this objective.

- **How does this program build upon the strengths of the institution?**

Over the past few decades, IPFW has established a foundation for an applied statistics program through the Statistics option of the Bachelor of Science in Mathematics as well as the Graduate Certificate in Applied Statistics. The undergraduate program is gaining in popularity with an increase from 2 majors in 2010 to 7 in 2015. The proposed BSS degree would build on the curriculum already in place for this program. Currently there are four faculty members, representing 3.5 FTE, with a Ph.D. in Statistics or Biostatistics. There are two additional faculty members with a Master’s degree in Statistics, one of whom also worked in industry as an applied statistician. Thus the necessary faculty expertise to offer the required coursework exists within the Department. In addition, since January 2015 the Center for Applied Math and Statistics has undertaken two Technical Assistance Agreements, four Technical Assistance Projects, and two Research Projects with clients external to the university. These activities demonstrate the need, as well as the expertise available, for providing this mathematical and statistical assistance in the region.

**b. State Rationale**

- **How does this program address state priorities as reflected in *Reaching Higher, Achieving More*?**

The proposed BSS program addresses several goals described in *Reaching Higher, Achieving More*. One goal is to “align the state’s higher education system to meet Indiana’s economic and workforce needs.” As will be discussed in part c. below, there is a growing need for statisticians in the state, and more specifically, in the Northeast Indiana region. The BSS program will align strongly with this goal by graduating students with analytical skills.

“I keep saying that the sexy job in the next 10 years will be statistician,” said Hal Varian, chief economist at Google. “And I’m not kidding.” (New York Times, August 5, 2009, [see article](#)). The annual report by CareerCast.com ranked Statistician as the 4<sup>th</sup> best job of 2015 and 2<sup>nd</sup> best job in 2016. This demonstrates the desirability of the career by employees and employers alike.

The program will meet the goal of “Producing quality college degrees and certificates that are valued by students and employers” specified in *Reaching Higher, Achieving More*.

*Reaching Higher, Achieving More* also identifies the need to “emphasize high quality instruction.” The program will address this goal since the curriculum will be taught by faculty members committed to teaching, many of whom have won local and state teaching awards.

Finally, since the proposed program was developed following the American Statistical Association’s Curriculum Guidelines for Undergraduate Programs in Statistical Science, it aligns with the goal to “attain a standard of academic quality that ensures Indiana’s college credentials are universally recognized for their rigor and value.”

**c. Evidence of Labor Market Need**

**i. National, State or Regional Need**

• **Is the program serving a national, state, or regional labor market need?**

According to the Bureau of Labor Statistics ([Bureau web site](#), June 22, 2016), careers in statistics rank 9<sup>th</sup> on the list of the national fastest growing occupations, with a projected change from approximately 30,000 jobs in 2014 to 40,000 in 2024 (i.e., a 34% increase). Graduates educated in statistical methodology and data analysis are needed in the health industry (e.g., clinical trials, genetics, public health, medical device industry and the pharmaceutical industry), education, government (e.g., the Bureau of Justice Statistics, Census, and Forestry), business and industry (such as finance, insurance, research and development, defense industry, manufacturing, marketing, and quality improvement), and the sciences (including agriculture, chemistry, and engineering fields).

The Northeast Indiana Regional Partnership identifies business development strategies for several target industries (e.g., Medical Devices and Technology, Specialty Insurance, and Vehicles) that include data analytics, modeling, and product research and development (*Target Industries 2.0: Post-Recession Review and Business Development Strategies*, <http://www.neindiana.com/target-industries>.) Statisticians play a critical role in implementing these strategies.

Similarly, the IPFW Community Research Institute Regional Intel Report forecasts that “Approximately 17% (nearly 3,600) of regional openings over the next decade will be in analytical fields, with potential connections to growth areas like Big Data, fraud prevention, market research, etc.” A common thread for these analytical fields is the need for a data analysis and modeling skills, which a program in statistics provides.

As mentioned previously, a consideration of degrees conferred indicates that the Northeast Indiana region is lagging behind the rest of the state in degree completions in Mathematics and Statistics. The region's degree completions in these fields have remained relatively flat since 2003 while there has been a near doubling of completions at the state and national levels; Region: 31 vs. 35 (13% increase from 2003 to 2014); State: 514 vs. 991 (93% increase); Nation: 19,657 vs. 36,259 (85% increase). Note that IPFW conferred 61% of all the awards in the region since 2003 (268 of 441).

**ii. Preparation for Graduate Programs or Other Benefits**

- **Does the program prepare students for Graduate Programs or provide Other Benefits to students besides preparation for entry into the labor-market?**

The proposed BSS program will prepare students for graduate study, including Master of Science degrees in Theoretical Statistics and in Applied Statistics.

Statistics is an academic subject for scientific study and research within the liberal arts tradition. As such, the program will enrich the educational experience of students beyond job preparation.

**iii. Summary of Indiana DWD and/or U.S. Department of Labor Data**

- **Summarize the evidence of labor market demand for graduates of the program as gleaned from employment projections made by the Indiana Department of Workforce Development and/or the U.S. Department of Labor.**

As mentioned in i. above, the Bureau of Labor Statistics projects a 34% increase in jobs (approximately 10,000) in statistics nationally from 2014 to 2024. The employment outlook for statisticians is substantially more favorable than the national growth of 7% for all occupations.

For individuals with a Bachelor's degree, the Indiana Department of Workforce Development estimates a 26.4% job growth for statisticians nationally for 2022. The demand for statisticians with a Bachelor's degree in the Northeast Indiana Economic Growth Region #3 (EGR3) is growing at over three times the rate (33.3%) when compared to the state as a whole (10.8%).

More specific details on short-term projections and projections across all industries can be found in Appendix 2.

**iv. National, State, or Regional Studies**

- **Summarize any national, state, or regional studies that address the labor market need for the program.**

As society becomes increasingly data-rich and data-dependent, the demand for professionals with expertise in statistical methods continues to grow. According

to the June 2011 report by the McKinsey Global Institute, the supply of people with deep analytical talent, i.e., expertise in statistics and machine learning, is projected to be 300,000 by 2018. The demand for such individuals is expected to fall between 440,000 and 490,000 jobs, creating a situation in which the demand could exceed the supply by 140,000 to 190,000 positions ([see study](#)).

The IPFW Community Research Institute *Regional Intel Report* predicts that nearly 3,600 of regional openings over the next decade will be in analytical fields.

Results from additional studies can be found in Appendix 3.

**v. Surveys of Employers or Students and Analyses of Job Postings**

**• Summarize the results of any surveys of employers or students and analyses of job postings relevant to the program.**

Job postings for a variety of sites were analyzed in July 2016 for statisticians and related occupations.

- A search of CareerCast.com listed 2,194 job postings for statisticians. Of these postings, 26 were in Indiana and 157 were in one of the contiguous states: Illinois 63, Michigan 41, and Ohio 53.
- A search of Monster.com listed 609 jobs for statisticians. Twenty-two jobs were in Indiana, and 40 were in one of the contiguous states: 23 in Illinois, 10 in Michigan, and 7 in Ohio.
- A search of the CareerOneStop.com Job Finder found 407 jobs for statisticians in the United States. Nine of these jobs were in Indiana, 19 in Illinois, 6 in Michigan, and 7 in Ohio. A search for job postings for biostatisticians found 22 U.S. jobs, of which 3 were in Indiana, 11 in Illinois, 6 in Michigan, and 2 in Ohio. A search for job postings for clinical data managers found 36,923 U.S. jobs, of which 380 were in Indiana, 1,072 in Illinois, 1,395 in Michigan, and 826 in Ohio.
- A search of [www.usajobs.gov](http://www.usajobs.gov) yielded 391 government job postings in statistics, of which 7 were in Indiana. Seventeen of these listings were in Illinois, 16 in Ohio, and 7 in Michigan.
- A search of ASA JobWeb, the job listings website for the American Statistical Association, listed 49 positions, 10 of which required a Bachelor's degree as the highest attained educational level.

Links to the aforementioned sites as well as a list of statistics and biostatistics job postings by CareerOneStop in the states of Indiana, Illinois, Michigan, and

Ohio can be found in Appendix 4.

vi. **Letters of support**

- **Summarize, by source, the letters received in support of the program.**

3. **Cost of and Support for the Program**

a. **Costs**

i. **Faculty and Staff**

- **Of the faculty and staff required to offer this program, how many are in place now and how many will need to be added?**

The current Statistics option of the Bachelor of Science in Mathematics is taught by a number of faculty members in mathematical sciences. A roster of the current faculty can be found in Appendix 6. Note that there are four faculty members, representing 3.5 FTE, with a Ph.D. in Statistics or Biostatistics and two additional faculty members with a Master's degree in Statistics or Applied Statistics, one of whom also worked in industry as an applied statistician.

It is expected that the offering of a BSS degree will lead to an increased enrollment at IPFW and in Mathematical Sciences. Lines for 1.5 FTE tenured/tenure-track faculty members in statistics will be required to teach additional courses for the program. An additional 1.5 FTE lines will be needed for the proposed Actuarial Science degree, for a total of 3 FTE lines needed for both degrees. Faculty would be teaching courses utilized in both degrees. As both programs grow, additional faculty may be required in mathematics for support courses.

No additional staff support will be required beyond what currently exists in the Department of Mathematical Sciences.

ii. **Facilities**

- **Summarize any impact offering this program will have on renovations of existing facilities, requests for new capital projects, or leasing of new space.**

IPFW and the Department of Mathematical Sciences have made substantial investments in classroom and research facilities to support programs in the mathematical sciences. To meet curricular needs, four classrooms equipped with computing facilities for instructors and students are dedicated for use by the Department. Two of these rooms, Kettler 123 and Kettler 218, have been renovated recently to update available technology and to provide learning environments which encourage student collaboration. Details on costs of these renovations are provided in Appendix 7. In addition, the Department has six dedicated classrooms in which technology is available for instructor use, but which are not equipped with laptops for student use.

Given the hands-on applications required in the program, the Department will need to renovate the two additional computer-equipped classrooms, Kettler 216 and Kettler 220 to update technology and to encourage student collaboration, as was done in Kettler 218. The renovations could be done in different years and the cost of these renovations is approximately \$150,000 for each classroom. Since students in the actuarial science program take many of these same courses, both programs are facilitated with these renovations. Three to four years in the future, an additional dedicated classroom with technology for instructors and students may be required to meet the increased course offerings in statistics described in the proposal. Additional details are provided in Appendix 7.

One-two equipped faculty offices (including office furniture, telephones, and computers) will be needed for the additional statistics faculty. (Between the requests for the applied statistics and actuarial science, three faculty offices will be needed.)

**iii. Other Capital Costs (e.g. Equipment) \***

- **Summarize any impact offering this program will have on other capital costs, including purchase of equipment needed for the program.**

Licenses for specialized software not already provided by the university may need to be purchased to support curricular and research programs.

Depending on their areas of expertise, additional equipment may need to be purchased for supporting the research programs of new faculty members.

**b. Support**

**i. Nature of Support (New, Existing, or Reallocated)**

- **Summarize what reallocation of resources has taken place to support this program.**

The proposed Applied Statistics degree program uses many courses currently taught in existing programs within the University. To meet the growing need for additional course offerings in statistics, the Department of Mathematical Sciences hired a faculty member with a Ph.D. in statistics to begin in August 2016. The anticipated increase in enrollments and new course offerings will require an additional 1.5 FTE full-time tenured/tenure-track statistics faculty lines.

- **What programs, if any, have been eliminated or downsized in order to provide resources for this program?**

No programs have been eliminated to provide resources for this program. We anticipate that the proposed program will replace the Statistics option of the Bachelor of Science in Mathematics.

**ii. Special Fees above Baseline Tuition**

No special fees above the baseline tuition are required for this program.

#### 4. Similar and Related Programs

##### a. List of Programs and Degrees Conferred

##### i. Similar Programs at Other Institutions

- **Campuses offering programs that are similar:**

The following institutions in Indiana offer undergraduate degrees in statistics:

Public four-year institutions

- Indiana University, Bloomington (B.S. in Statistics as of 2015-2016)
- Purdue University, West Lafayette (B.S. in Statistics with options in either applied statistics or mathematical statistics)

Private four-year institutions

- Saint Mary's College, Notre Dame (B.S. with a major in Statistics and Actuarial Mathematics)
- University of Evansville, Evansville (B.S. in Statistics and Data Science, to begin Fall 2016)
- Valparaiso University, Valparaiso (B.A. in Statistics)

No other four-year institution in Northeast Indiana offers a Bachelor of Science degree in Applied Statistics.

##### ii. Related Programs at the Proposing Institution

Bachelor of Science in Mathematics with an option in Statistics

##### b. List of Similar Programs Outside Indiana

- **If relevant, institutions outside of Indiana offering programs that are similar:**

The following four-year public institutions in Michigan and Ohio offer undergraduate degrees in statistics:

- Central Michigan University, Mount Pleasant, MI (B.A. and B.S. in Statistics)
- Grand Valley State University, Grand Rapids, MI (B.A. and B.S. in Statistics)
- Michigan State University, Lansing, MI (B.A. and B.S. in Statistics)
- Michigan Technological University, Houghton, MI (B.S. in Statistics)
- Oakland University, Rochester Hills, MI (B.S. in Applied Statistics)
- The University of Michigan, Ann Arbor, MI (B.S. in Statistics)
- The University of Michigan, Dearborn, MI (B.A. and B.S. in Applied Statistics)
- Western Michigan University, Kalamazoo, MI (B.S. in Statistics)
- University of Akron, Akron, OH (B.A. and B.S. in Statistics)
- Bowling Green State University, Bowling Green, OH (B.A. and B.S. in Statistics)
- Miami University, Oxford, OH (B.S. in Statistics)
- Ohio University, Athens, OH (B.S. in Mathematical Statistics)
- Wright State University, Dayton, OH (B.S. in Statistics)



c. **Articulation of Associate/Baccalaureate Programs**

- **For each articulation agreement, indicate how many of the associate degree credits will transfer and apply toward the baccalaureate degree.**

As of June 2016, the Indiana Commission on Higher Education website does not list any Transfer Single Articulation Pathways in progress for statistics or applied statistics (<http://www.in.gov/che/3138.htm>).

d. **Collaboration with Similar or Related Programs on Other Campuses**

- **Indicate any collaborative arrangements in place to support the program.**

No plans are currently in place to collaborate with similar or related program on other campuses.

5. **Quality and Other Aspects of the Program**

a. **Credit Hours Required/Time To Completion**

- **Credit hours required for the program and how long a full-time student will need to complete the program.**

The BSS will require 120 credit hours for students who are ready to enter Calculus in their first semester. A full-time student averaging 15 credits per semester can complete the program in eight academic semesters over four years. A sample four-year plan is provided in Appendix 10.

b. **Exceeding the Standard Expectation of Credit Hours**

- **If the baccalaureate degree program exceeds 120 credit hours, summarize the reason for exceeding the standard expectation.**

The BSS does not exceed the standard 120 credit hour limit.

c. **Program Competencies or Learning Outcomes**

- **List the significant competencies or learning outcomes that students completing this program are expected to master.**

Students should be able to demonstrate knowledge of basic mathematical skills needed for a deep understanding of statistics.

- Students will demonstrate an understanding of differential and integral calculus of one and multiple variables and the application of calculus concepts in probability and statistics. [MA 26300/26100]
- Students will demonstrate an understanding of elementary linear algebra and matrices and the application of linear algebra concepts in theoretical and applied statistics. [MA 35100]

Students should be able to demonstrate understanding of the fundamentals concepts of probability and statistics and to apply these concepts appropriately.

- Students will demonstrate theoretical understanding of probability and various inferential procedures, their applications, and the scope of the conclusions. [STAT 51600, 51700]
- Students will demonstrate the understanding of the principles of statistical designs and be able to design, analyze and interpret simple experiments/surveys. [STAT 51400]
- Students will be able to build, assess, apply, and understand the theory of the statistical models. [STAT 51200]
- Students will demonstrate the ability to choose, apply, and adapt appropriate strategies to analyze data. [STAT 51100, STAT 49000]

Students should be able to communicate individually as well as a team, (both written and oral) statistical results and inference in basic language to non-statistical audience.

- Students will demonstrate the ability to translate real-world or discipline-specific problems into mathematical language, and the solutions of statistical problems into ordinary language. [STAT 51100]
- Students will demonstrate proficiency in writing detailed and concise report by constructing effective visual displays, explaining statistical ideas, methods, and results. [STAT 49000]
- Students will demonstrate knowledge of statistical soft wares and other technological tools to enhance data exploration and statistical report. [CS 11400/16000, STAT 51200, STAT 52000]
- Students will demonstrate proficiency in applying statistical methods in a variety of disciplines. [STAT 49000].

#### d. Assessment

- **Summarize how the institution intends to assess students with respect to mastery of program competencies or learning outcomes.**

The Department of Mathematical Sciences has a common assessment procedure for evaluating its various programs. For each outcome, a criterion for success is defined and courses are identified where the outcome is addressed. Assessment items are embedded on assignments, examinations, and/or projects for the identified courses and student data on these items are collected by the instructor each time the course is offered. The courses used for the assessments are offered on a regular basis since they are part of the program. The data are tabulated by an assessment committee and used longitudinally to measure progress toward achievement of the program goal. Each fall semester the results from the previous

year are discussed by the department with the intention of implementing recommended changes during the following year.

Assessment of the BSS will follow this same procedure. Courses indicated in brackets in part c. will be used to assess the associated outcomes.

Data will be collected in designated courses each time the course is offered. The first longitudinal review of the program will be made in the third year of the program.

**e. Licensure and Certification**

- **State License:**

No state licenses apply to this program.

- **National Professional Certifications (including the bodies issuing the certification):**

No professional certifications apply to this program.

- **Third-Party Industry Certifications (including the bodies issuing the certification):**

No third-party industry certifications apply to this program.

**f. Placement of Graduates**

- **Describe the principle occupations and industries, in which the majority of graduates are expected to find employment.**

Most of the graduates of the program are expected to work in the health industry (e.g., clinical trials, genetics, public health, and the pharmaceutical industry), education, government (e.g., the Bureau of Justice Statistics, Census, and Forestry), business and industry (such as finance, insurance, research and development, manufacturing, marketing, and quality improvement), and the sciences (including agriculture, chemistry, and engineering fields).

- **If the program is primarily a feeder for graduate programs, describe the principle kinds of graduate programs, in which the majority of graduates are expected to be admitted.**

Alumni of the program may also pursue admission into graduate programs in Theoretical Statistics, Applied Statistics, and Data Science.

**g. Accreditation**

- **Accrediting body from which accreditation will be sought and the timetable for achieving accreditation.**

None

- **Reason for seeking accreditation.**

None

**6. Projected Headcount and FTE Enrollment and Degrees Conferred**

- **Report headcount and FTE enrollment and degrees conferred data in a manner consistent with the Commission’s Student Information System.**

<b>Enrollment Projections</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Full-time	10	12	14	17	20
Part-time	5	5	5	6	7
<b>Enrollment Projections (FTE)</b>	15	17	19	23	27
Full-time	10	12	14	17	20
Part-time	3	3	3	3	4
<b>Degrees Conferred Projections</b>	2	4	6	7	8

(See Appendix 12 for the enrollment history in the related mathematics program.)

- **Report a table for each campus or off-campus location at which the program will be offered.**  
All BSS courses will be offered on the IPFW campus.
- **If a program is offered at more than one campus or off-campus location, a summary table, which reports the total headcount and FTE enrollments and degrees conferred across all locations, should be provided.**  
Not applicable.
- **Report the FTE enrollments to the nearest whole number.**  
See above table.
- **If the program will take more than five years to be fully implemented and to reach steady state, report additional years of projections.**  
Not applicable.

## ***Appendix 1: Institutional Rationale Detail***

### ***IPFW Plan 2020: 2014-2020 Strategic Plan***

Link to the strategic plan: <https://www.ipfw.edu/about/strategic-plan/>

#### **MISSION**

Indiana University-Purdue University Fort Wayne is a comprehensive university that provides local access to globally recognized baccalaureate and graduate programs that drive the intellectual, social, economic, and cultural advancement of our students and our region.

#### **VISION**

IPFW will be the university of choice for the citizens of northeast Indiana and beyond. It will be recognized for a transformative learning environment characterized by intensive mentoring, excellence in faculty scholarship and knowledge creation, integration of life and work experiences, and community engagement. IPFW will be known for exceptional retention, persistence, and graduation rates, respected signature programs, and graduates prepared to improve the quality of life in their communities as well as compete locally, regionally, and globally.

#### **VALUES**

IPFW values:

- Access to affordable and high-quality programs and services.
- The integrity, significance, and value of the Indiana University and Purdue University degrees.
- An environment of open intellectual inquiry, mutual respect, shared governance, and civility.
- An environment that enhances learning by recognizing the inherent worth of all individuals and celebrating differences of culture, background, and experience among all individuals and groups.
- The highest ethical standards of equity, fairness, transparency, and academic integrity.
- A multifaceted and mutually beneficial collaboration with Fort Wayne and the greater northeast Indiana region.

#### **GOALS**

### ***Foster Student Success***

#### **A. Process Goal: Improve measurement of student learning.**

1. Improve quality and fidelity of assessment processes of degree/certificate programs, General Education program, and Baccalaureate Framework with dedicated resources.
2. Use assessment data to improve student learning.

**B. Process Goal: Increase student engagement.**

1. Increase opportunities for engaged and experiential learning including service learning and internship programs.
2. Expand impact and profile of Honors Program.
3. Expand number of degree programs that have gateway courses.
4. Expand use of high-impact instructional and advising interventions.
5. Transform the concept of the college classroom and the delivery of education.

**C. Process Goals: Increase interdisciplinary and graduate programs and internationalization of the curriculum.**

1. Develop and promote interdisciplinary programs where there are sufficient university assets available and anticipated employment needs.
2. Review, prioritize, and expand international agreements.
3. Promote academic programs for international market.
4. Expand support for international students.
5. Invest in academic programs with international curricula.
6. Increase support programs for international study for domestic students.
7. Establish links between baccalaureate and post-baccalaureate programs.
8. Respond to regional demand with appropriate post-baccalaureate credentials.

**D. Process Goal: Increase the diversity of the IPFW community.**

1. Develop activities and experiences that promote multiculturalism as a value.
2. Embrace a definition of diversity that includes a broader array of human differences.
3. Build and strengthen relationships as well as proactive programs and services designed to encourage enrollment of students from historically under-represented groups.
4. Recruit and retain a diverse faculty and staff at all institutional levels.

**E. Process Goal: Develop signature programs.**

1. Identify and develop signature programs that respond to regional needs, build on faculty expertise, and uniquely distinguish IPFW from other institutions.
2. Develop activities and experiences that promote success in student achievement through programs with strong student learning outcomes, high graduation rates, and strong job placement prospects.

3. Build and strengthen relationships with regional partners to increase research and scholarly collaborations in signature programs.
4. Promote majors and programs with strong job placement opportunities in the region and beyond.

### ***Promote the Creation, Integration, and Application of Knowledge***

#### **Process Goals:**

- A. Project future regional, national, and international demand for research and collaboration.
- B. Promote mentoring relationships between faculty and students engaged in creation, integration, and application of knowledge.
- C. Promote development of opportunities for faculty and student engagement with the community for the application and integration of knowledge.

### ***Serve as a Regional Intellectual, Cultural, and Economic Hub for Global Competitiveness***

#### **Process Goals:**

- A. Expand meaningful collaborations and research opportunities with regional, national, and global partners.
- B. Provide access to outstanding intellectual programming.
- C. Produce and sponsor outstanding cultural and artistic programming.
- D. Provide non-credit enrichment experiences for the community.
- E. Provide leadership in regional economic development.
- F. Serve as an exemplar of free and open discourse.

### ***Create a Stronger University through Improving the Support of Stakeholders and the Quality and Efficiency of the Organization***

#### **A. Process Goals: Measurement and metrics**

1. Prioritize and establish a set of appropriate performance metrics for all academic and non-academic units.
2. Establish an integrated system of program reporting, review, assessment, and accreditation that is aligned to performance metrics.

**B. Process Goal: Efficiency**

1. Allocate resources to priorities informed by performance metrics.
2. Decentralize resource distribution and control to lowest level, mission-focused administrative units.
3. Eliminate process barriers in enrollment management that impact student achievement.
4. Identify gaps in academic and program offerings and prioritize programs for creation, expansion, merging, or cessation.
5. Continue increasing transparency in resource allocation budget formation, administration, and personnel decisions.

**C. Process Goal: Philanthropic support**

1. Build infrastructure to support advancement goals and functions.
2. Implement a strategy for sustainable external funding of strategic priorities.
3. Re-envision Foundation Board as fundraising leadership board.
4. Enhance volunteer engagement in support of strategic goals and fundraising.



## Appendix 2: Summary of Indiana DWD and/or U.S. Department of Labor Data, Detail

The following tables were downloaded from the United States Bureau of Labor Statistics on July 7, 2016 (<http://www.bls.gov/ooh/math/statisticians.htm>). They provide employment data for statisticians as of May 2015 nationally, for Indiana and surrounding states, and for metropolitan area in these same states. Approximately 2,650 statisticians were employed in Indiana, Illinois, Michigan, and Ohio in May 2015. The location quotient for Indiana indicates a slightly lower than average concentration of statisticians compared to the nation as a whole. Although the listed states have location quotients below 1.0, several metropolitan areas within these states, e.g., Indianapolis-Carmel-Anderson, have location quotients of 1.5 or higher. Note that data for the Fort Wayne metropolitan area was not available.

Occupation: Statisticians (SOC code 152041)				
Period: May 2015				
Area name	Employment (1)	Employment percent relative standard error (3)	Annual mean wage (2)	Annual median wage (2)
National	29,870	1.9	84,440	80,110

Area name	Employment (1)	Employment percent relative standard error (3)	Annual mean wage (2)	Annual median wage (2)	Employment per 1,000 jobs	Location Quotient
Indiana	600	23.6	61,310	52,880	0.202	0.93
Illinois	830	9.7	81,910	76,930	0.142	0.66
Michigan	500	12.9	85,220	84,560	0.120	0.55
Ohio	720	11.8	86,470	79,690	0.136	0.63

Area name	Employment (1)	Employment percent relative standard error (3)	Annual mean wage (2)	Annual median wage (2)	Employment per 1,000 jobs	Location Quotient
Chicago-Naperville-Arlington Heights, IL Metropolitan Division	550	12.9	78,430	73,590	0.153	0.71
Chicago-Naperville-Elgin IL-IN-WI	680	11.2	81,500	76,160	0.151	0.7

<b>Area name</b>	<b>Employment (1)</b>	<b>Employment percent relative standard error (3)</b>	<b>Annual mean wage (2)</b>	<b>Annual median wage (2)</b>	<b>Employment per 1,000 jobs</b>	<b>Location Quotient</b>
<b>Lake County-Kenosha County IL-WI Metropolitan Division</b>	120	22.5	97,470	95,540	0.303	1.4
<b>Indianapolis-Carmel-Anderson IN</b>	390	35.5	54,040	47,840	0.39	1.8
<b>Southern Indiana nonmetropolitan area</b>	30	39.7	67,720	53,740	0.17	0.78
<b>Louisville/Jefferson County KY-IN</b>	130	1.4	80,310	79,560	0.208	0.96
<b>Ann Arbor MI</b>	130	23.5	88,670	83,890	0.62	2.86
<b>Detroit-Dearborn-Livonia MI Metropolitan Division</b>	60	13.7	69,460	60,310	0.081	0.37
<b>Detroit-Warren-Dearborn MI</b>	140	16.5	77,460	81,010	0.072	0.33
<b>Kalamazoo-Portage MI</b>	60	30.8	104,830	101,820	0.451	2.08
<b>Lansing-East Lansing MI</b>	70	3.1	71,410	71,550	0.336	1.55
<b>Warren-Troy-Farmington Hills MI Metropolitan Division</b>	80	26.9	83,430	84,940	0.067	0.31
<b>Akron OH</b>	100	36.6	102,630	65,080	0.308	1.42
<b>Cincinnati OH-KY-IN</b>	260	24.3	82,330	82,880	0.251	1.16
<b>Cleveland-Elyria OH</b>	90	35.6	81,640	78,580	0.09	0.42
<b>Columbus OH</b>	200	13.5	90,920	85,290	0.194	0.9

<b>Area name</b>	<b>Employment (1)</b>	<b>Employment percent relative standard error (3)</b>	<b>Annual mean wage (2)</b>	<b>Annual median wage (2)</b>	<b>Employment per 1,000 jobs</b>	<b>Location Quotient</b>
<b>Dayton OH</b>	30	31.8	78,250	82,060	0.083	0.38

Footnotes:

(1) Estimates for detailed occupations do not sum to the totals because the totals include occupations not shown separately. Estimates do not include self-employed workers.

(2) Annual wages have been calculated by multiplying the hourly mean wage by 2080 hours.

(3) The relative standard error (RSE) is a measure of the reliability of a survey statistic. The smaller the relative standard error the more precise the estimate.

SOC code: Standard Occupational Classification code -- see <http://www.bls.gov/soc/home.htm>

Data extracted on July 7 2016

While the percent change in employment for 2014-2024 is projected to be 7% for all occupations in the U.S. economy, the outlook is substantially more favorable for statisticians. The 2014-2024 projections of the Bureau of Labor Statistics are displayed in the following table, downloaded on July 7, 2016 from <http://www.bls.gov/ooh/math/statisticians.htm>. As can be seen, the employment for statisticians is projected to grow 33.8%, from 30,000 jobs in 2014 to 40,100 jobs in 2024, indicating an increase of 10,100 jobs over the ten-year period. An increase in percent employment above the national average of 7% in all occupations is predicted in all industries, with the exception of Code 511100: Newspaper, periodical, book, and directory publishers.

### Employment by industry, occupation, and percent distribution, 2014 and projected 2024 15-2041 Statisticians

(Employment in thousands)

Industries with fewer than 50 jobs, confidential data, or poor quality data are not displayed

Industry		2014			2024			% change	Employment change
Code	Title	Employment	% of industry	% of occupation	Employment	% of industry	% of occupation		
TE1000	Total employment	30.0	0.0	100.0	40.1	0.0	100.0	33.8	10.1
TE1100	Total self-employed workers	0.9	0.0	3.1	1.0	0.0	2.6	10.9	0.1
TE1200	Total wage and salary employment	29.0	0.0	96.9	39.1	0.0	97.4	34.6	10.0
220000	Utilities	0.1	0.0	0.2	0.1	0.0	0.2	11.9	0.0
221000	Utilities	0.1	0.0	0.2	0.1	0.0	0.2	11.9	0.0
31-330	Manufacturing	1.0	0.0	3.3	1.2	0.0	3.0	22.3	0.2
325000	Chemical manufacturing	0.7	0.1	2.4	0.9	0.1	2.2	24.2	0.2
334000	Computer and electronic product manufacturing	0.1	0.0	0.4	0.1	0.0	0.3	10.9	0.0
339000	Miscellaneous manufacturing	0.1	0.0	0.3	0.1	0.0	0.2	25.1	0.0
420000	Wholesale trade	0.3	0.0	0.8	0.3	0.0	0.8	25.2	0.1
424000	Merchant wholesalers, nondurable goods	0.1	0.0	0.5	0.2	0.0	0.4	13.8	0.0
44-450	Retail trade	0.1	0.0	0.2	0.1	0.0	0.2	82.4	0.0
4445R0	Retail trade, except motor vehicle and parts dealers, food and beverage stores, and general merchandise stores	0.1	0.0	0.2	0.1	0.0	0.2	82.4	0.0
510000	Information	1.4	0.0	4.5	1.8	0.1	4.6	36.6	0.5
511000	Publishing industries (except Internet)	0.3	0.0	1.1	0.4	0.1	1.1	34.5	0.1

511100	Newspaper, periodical, book, and directory publishers	0.1	0.0	0.5	0.1	0.0	0.4	3.8	0.0
520000	Finance and insurance	3.8	0.1	12.7	5.5	0.1	13.8	45.2	1.7
521-20	Monetary authorities, credit intermediation, and related activities	0.5	0.0	1.7	0.7	0.0	1.7	30.6	0.2
522000	Credit intermediation and related activities	0.3	0.0	0.9	0.4	0.0	0.9	32.3	0.1
522200	Nondepository credit intermediation	0.2	0.0	0.5	0.2	0.0	0.5	21.0	0.0
524000	Insurance carriers and related activities	2.8	0.1	9.4	4.1	0.2	10.2	43.9	1.2
524100	Insurance carriers	2.3	0.2	7.8	3.3	0.2	8.3	42.7	1.0
524200	Agencies, brokerages, and other insurance related activities	0.5	0.0	1.7	0.7	0.1	1.9	49.2	0.2
540000	Professional, scientific, and technical services	8.2	0.1	27.3	11.7	0.1	29.0	42.4	3.5
541000	Professional, scientific, and technical services	8.2	0.1	27.3	11.7	0.1	29.0	42.4	3.5
541300	Architectural, engineering, and related services	0.3	0.0	0.9	0.4	0.0	0.9	35.9	0.1
541700	Scientific research and development services	4.1	0.6	13.7	5.4	0.8	13.3	30.0	1.2
541900	Other professional, scientific, and technical services	0.5	0.1	1.8	0.9	0.1	2.1	55.2	0.3
550000	Management of companies and enterprises	1.3	0.1	4.2	1.6	0.1	4.1	31.2	0.4
560000	Administrative and support and waste management and remediation services	0.4	0.0	1.3	0.5	0.0	1.3	41.9	0.2
561000	Administrative and support services	0.4	0.0	1.3	0.5	0.0	1.3	41.9	0.2
561300	Employment services	0.2	0.0	0.6	0.3	0.0	0.7	43.0	0.1
610000	Educational services; state, local, and private	3.1	0.0	10.2	4.2	0.0	10.4	36.8	1.1
611000	Educational services; state, local, and private	3.1	0.0	10.2	4.2	0.0	10.4	36.8	1.1
611100	Elementary and secondary schools; state, local, and private	0.1	0.0	0.3	0.1	0.0	0.3	32.4	0.0
6112-3	Junior colleges, colleges, universities, and professional schools; state, local, and private	2.7	0.1	9.1	3.7	0.1	9.3	36.3	1.0
611200	Junior colleges; state, local, and private	0.1	0.0	0.3	0.1	0.0	0.3	41.2	0.0
611300	Colleges, universities, and professional schools; state, local, and private	2.7	0.1	8.8	3.6	0.1	9.0	36.2	1.0
6114-7	Other educational services; state, local, and private	0.2	0.0	0.7	0.3	0.0	0.8	44.7	0.1
611700	Educational support services; state, local, and private	0.2	0.1	0.7	0.3	0.2	0.8	50.8	0.1
620000	Healthcare and social assistance	1.9	0.0	6.4	2.8	0.0	6.9	45.3	0.9
621000	Ambulatory healthcare services	0.5	0.0	1.7	0.9	0.0	2.2	73.6	0.4
621400	Outpatient care centers	0.2	0.0	0.7	0.4	0.0	1.0	81.2	0.2
622000	Hospitals; state, local, and private	1.3	0.0	4.4	1.8	0.0	4.5	35.0	0.5

622100	General medical and surgical hospitals; state, local, and private	1.1	0.0	3.6	1.5	0.0	3.6	33.7	0.4
624000	Social assistance	0.1	0.0	0.2	0.1	0.0	0.2	27.8	0.0
810000	Other services (except public administration)	0.6	0.0	1.9	0.8	0.0	1.9	29.1	0.2
813000	Religious, grantmaking, civic, professional, and similar organizations	0.4	0.0	1.2	0.5	0.0	1.2	29.8	0.1
8132-3	Grantmaking and giving services and social advocacy organizations	0.1	0.0	0.3	0.1	0.0	0.3	35.4	0.0
8134-9	Civic, social, professional, and similar organizations	0.3	0.0	0.9	0.3	0.0	0.8	27.9	0.1
813900	Business, professional, labor, political, and similar organizations	0.3	0.1	0.9	0.3	0.1	0.8	27.9	0.1
900000	Government	7.1	0.1	23.5	8.3	0.1	20.8	18.0	1.3
910000	Federal government	4.6	0.2	15.3	5.2	0.2	12.9	12.7	0.6
9992-3	State and local government, excluding education and hospitals	2.5	0.0	8.2	3.1	0.0	7.8	28.1	0.7

Note: Red indicates a decline in employment between 2014 and 2024

Source: Employment Projections program, U.S. Department of Labor, U.S. Bureau of Labor Statistics

Short-term and long-term projections for jobs for statisticians were obtained from Projections Central (downloaded July 8, 2016 from the website <http://www.projectionscentral.com/>) for Indiana and surrounding states. The short-term projections from 2015-2017 for the state of Indiana indicate 30 annual openings, on average, with a projected increase in jobs of 8.5%. In the short-term, 110 average annual openings in statistics are estimated for Illinois, Michigan, and Ohio.

Area Name	Occupation Code	Occupation Name	Base Year	Base	Projection Year	Projection	Change	Percent Change	Average Annual Openings
Indiana	15-2041	Statisticians	2015	580	2017	630	50	8.5	30
Illinois	15-2041	Statisticians	2015	580	2017	630	50	7.6	30
Michigan	15-2041	Statisticians	2015	580	2017	630	50	8.6	40
Ohio	15-2041	Statisticians	2015	740	2017	770	30	4.1	40

Long-term projections from 2014-2024 show a 33.7% increase nationally, and a 39.4% increase in jobs for statisticians in Indiana. Similar increases are projected for Michigan and Ohio. In the long-term, an average of 120 openings annually is projected for Indiana, Illinois, Michigan, and Ohio overall.

Area Name	Occupation Code	Occupation Name	Base Year	Base	Projection Year	Projection	Change	Percent Change	Average Annual Openings
United States	15-2041	Statisticians	2014	30000	2024	40100	10100	33.7	1540
Indiana	15-2041	Statisticians	2014	570	2024	800	230	39.4	30
Illinois	15-2041	Statisticians	2014	560	2024	660	100	18.2	20
Michigan	15-2041	Statisticians	2014	560	2024	790	230	41.1	30
Ohio	15-2041	Statisticians	2014	880	2024	1160	280	31.8	40

The following table shows the projected future demand for statisticians in the state of Indiana in 2022, provided by the Indiana Department of Workforce Development, downloaded on July 8, 2016. A demand of 639 jobs for statisticians in Indiana is projected by 2022, with 24 average annual openings.

## Future Demand for Indiana

Code	Title	Projected Demand -2022	Avg. Annual Openings	Avg. Annual New Openings	Percent of Total Openings	Avg. Annual Replacement Openings	Percent of Total Openings	Avg. Annual Wage in (2015)	Current Demand: Online Job Ads (2-mo. avg)
152041	Statisticians	639	24	6	25.00%	18	75.00%	\$61,310	39

Source: Indiana Department of Workforce Development, Research & Analysis, Long-term Projections



The following tables were downloaded from the Indiana Department of Workforce Development on July 8, 2016. They contain the employment and job outlook for statisticians in 2022 for the United States, the state of Indiana, and EGR 3, the Economic Growth Region for Northeast Indiana containing Fort Wayne. Specifically, for those individuals with a Bachelor's degree, the Indiana Department of Workforce Development shows a 26.4% job growth for statisticians nationally. A more favorable outlook exists for statisticians with a Bachelor's degree in Northeast Indiana. The demand for these individuals in EGR 3 is growing at more than three times the rate (33.3%) when compared to the state of Indiana (10.5%).

## Side-by-Side Comparison - Statisticians in 2022

	U.S. 2022	Indiana 2022	EGR 3
<b>Employment and Openings</b>			
Projected Occupational Employment	34,900	639	57
Average Annual Openings	1,610	24	3
Openings to Fill by 2022	16,100	240	30
Growth Rate	26.4 %	10.6 %	35.7 %
<b>Job Growth by Educational Requirement</b>			
Less Than a H.S. Diploma	0.0 %	0.0 %	0.0 %
H.S. Diploma	0.0 %	0.0 %	0.0 %
Post Secondary Certificate or Some College	0.0 %	0.0 %	0.0 %
Associate Degree	0.0 %	0.0 %	0.0 %
Bachelor's Degree	26.4 %	10.5 %	33.3 %
Advanced Degrees	26.4 %	10.8 %	33.3 %
<b>Job Distribution by Educational Requirement</b>			
Less Than a H.S. Diploma	0.0 %	0.0 %	0.0 %
H.S. Diploma	0.0 %	0.0 %	0.0 %
Post Secondary Certificate or Some College	0.0 %	0.0 %	0.0 %

Associate Degree	0.0 %	0.0 %	0.0 %
Bachelor's Degree	28.0 %	28.0 %	28.1 %
Advanced Degrees	72.0 %	72.1 %	70.2 %

**Source:** Indiana Department of Workforce Development, Research & Analysis, Long-term Projections

### ***Appendix 3: National, State, or Regional Studies, Detail***

<http://www.ipfw.edu/microsites/usap/employment-outlook/index.html>.

The McKinsey Global Institute published a study in May 2011 analyzing the supply and demand of data analytical talent and the implications of the availability and use of big data.

(<http://www.mckinsey.com/business-functions/business-technology/our-insights/big-data-the-next-frontier-for-innovation> )

Their study argues for the need for individuals who can analyze and manage data:

- “Data have swept into every industry and business function and are now an important factor of production, alongside labor and capital.”
- “Leading companies are using data collection and analysis to conduct controlled experiments to make better management decisions; others are using data for basic low-frequency forecasting to high-frequency nowcasting to adjust their business levers just in time.”
- “...sophisticated analytics can substantially improve decision-making. Finally, big data can be used to improve the development of the next generation of products and services.”

Their findings indicate a disparity between the supply and demand of individuals with deep analytical skills:

- “There will be a shortage of talent necessary for organizations to take advantage of big data. By 2018, the United States alone could face a shortage of 140,000 to 190,000 people with deep analytical skills as well as 1.5 million managers and analysts with the know-how to use the analysis of big data to make effective decisions.”

The IPFW Community Research Institute has published several regional studies, including employment projections and training needs. Some relevant findings of these studies are provided below.

*Regional Intel Report* by the IPFW Community Research Institute, 2015-2016

([https://ind657-my.sharepoint.com/personal/oxtobyj\\_ipfw\\_edu/Documents/USAP%20-%202015-16/Regional%20Intel%20Report.pdf](https://ind657-my.sharepoint.com/personal/oxtobyj_ipfw_edu/Documents/USAP%20-%202015-16/Regional%20Intel%20Report.pdf))

- “Approximately 17% (nearly 3,600) of regional openings over the next decade will be in analytical fields – potential connections to growth areas like Big Data, fraud prevention, market research, etc.”
- IPFW conferred 61% of all awards in the Northeast Indiana region since 2003 (268 of 441)

- Since 2003 the region’s completions in mathematics and statistics have remained flat; during this same period there has been a near doubling of completions at the state and national levels.

Region	Completions		Percent Change
	2003	2014	
Northeast Indiana Region	31	35	12.9%
State	514	991	92.8%
Nation	19,657	36,259	84.5%

*Occupational Projections and Training Needs for Northeast Indiana to 2018*, February 2011  
<http://www.neindiana.com/docs/workforce/occupational-projections-training-needs-for-northeast-indiana-to-2018.pdf?sfvrsn=41>)

- “The forecast suggests that the percent of openings for workers with a college or advanced degree will increase while openings for high school graduates or workers with less than a high school diploma will drop. The forecast suggests that 30% of the training requirement will be at the Bachelor’s or higher degree level and another 7% will require a post-secondary degree or certificate.”
- “The category of Bachelor’s degree plus work experience includes many of the middle and upper management jobs in the regional economy. This is an important category in the competitiveness of the region since it represents jobs that are filled through regional or national searches in the absence of local talent. Local talent and advanced degrees in these fields are a competitive advantage while a lack of local talent is a competitive disadvantage for the region.”

## ***Appendix 4: Surveys of Employers or Students and Analyses of Job Postings, Detail***

A search of CareerCast.com listed 2,194 job postings for statisticians. Of these postings, 26 were in Indiana and 157 were in one of the contiguous states: Illinois 63, Michigan 41, and Ohio 53. One hundred seventeen of the postings were within a 150 mile radius of Fort Wayne. Career Cast indicates that four of the top ten ranked professions for 2016 are math-intensive: #1 Data Scientist, #2 Statistician, #6 Mathematician, and #10 Actuary.

**Link:** <http://www.careercast.com/jobs/results/keyword/statistician>

A search of Monster.com listed 609 jobs for statisticians. Twenty-two jobs were in Indiana, and 40 were in one of the contiguous states: 23 in Illinois, 10 in Michigan, and 7 in Ohio.

**Link:** <http://www.monster.com/jobs/search/?q=Statistician>

A search of USA Jobs, an official website of the United States Government yielded 391 government job postings in statistics, of which 7 were in Indiana. Seventeen of these listings were in Illinois, 16 in Ohio, and 7 in Michigan.

**Link:**

<https://www.usajobs.gov/Search/?Keyword=Statistician&Location=&homeRadPublic=public&search=Search&AutoCompleteSelected=False&CanSeekStatusJobs=False>

A search of ASA JobWeb, the job listings website for the American Statistical Association, listed 49 positions, 10 of which required a Bachelor's degree as the highest attained educational level.

**Link:** <http://jobs.amstat.org/jobs/>

A search of the CareerOneStop.com Job Finder found 407 jobs for statisticians in the United States. Nine of these jobs were in Indiana, 19 in Illinois, 6 in Michigan, and 7 in Ohio. A search for job postings for biostatisticians found 22 U.S. jobs, of which 3 were in Indiana, 11 in Illinois, 6 in Michigan, and 2 in Ohio. A search for job postings for clinical data managers found 36,923 U.S. jobs, of which 380 were in Indiana, 1,072 in Illinois, 1,395 in Michigan, and 826 in Ohio.

**Link:** <http://www.careeronestop.org/toolkit/jobs/find-jobs.aspx?keyword=15-2041.00&location=US&occtitle=Statisticians&source=DEA>

## CareerOneStop Job Finder

### Jobs for Statisticians in Indiana, Michigan, Ohio and Illinois.

Job Title	Company	Location	Date Posted
Statistical Fellow	Covance	Indianapolis, Indiana	07/08/2016
Statistical Fellow	Covance	Greenfield, Indiana	07/08/2016
Statistician-Comput Bus Analytics-FDE	Lilly	Indianapolis, Indiana	07/01/2016
Travel Demand Modeler	Resource Systems Group	Evansville, Indiana	06/29/2016
Research Scientist-Clinical Project Statistician-FDE	Lilly	Indianapolis, Indiana	06/28/2016
Statistician	Cook Medical	West Lafayette, Indiana	06/14/2016
Research Scientist-Clinical Project Statistician	Lilly	Indianapolis, Indiana	06/08/2016
Statistician-Clinical Programmer	Lilly	Indianapolis, Indiana	05/20/2016
Industrial Statistician	Lilly	Indianapolis, Indiana	05/19/2016
Analyst Biostatistics	McKinsey and Company	Detroit, Michigan	07/13/2016
Associate Machine Learning	McKinsey and Company	Detroit, Michigan	07/13/2016
UBC Principal Statistician	Express Scripts	Ann Arbor, Michigan	07/08/2016
Data Miner Sr	Truven Health Analytics	Ann Arbor, Michigan	06/29/2016
Statistician Senior	University of Michigan	Ann Arbor, Michigan	06/21/2016
Biostatistician	Spectrum Health	Grand Rapids, Michigan	06/03/2016
Predictive Modeler	CyberCoders	Akron, Ohio	07/07/2016
Research Statistician	Battelle Memorial Institute	Columbus, Ohio	07/06/2016
Data Analyst - Statistician	Total Quality Logistics	Cincinnati, Ohio	06/18/2016
R&D Statistical Analyst	Progressive	Mayfield Village, Ohio	06/14/2016
Senior Research Biostatistician	Battelle Memorial Institute	Columbus, Ohio	05/20/2016
Biostatistician	Cleveland Clinic	Cleveland, Ohio	04/21/2016
Sr. Statistical Modeler	JPMorgan Chase	Columbus, Ohio	04/20/2016
Principal Statistician, Biosimilar Pharmaceutical Sciences	Pfizer	Lake Forest, Illinois	07/12/2016

<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Staff VP Advanced Analytics - 119019	Anthem, Inc	Chicago, Illinois	07/10/2016
Statistical Fellow	Covance	Chicago, Illinois	07/08/2016
Principal Statistician	General Dynamics Information Technology	Chicago, Illinois	07/07/2016
Biostatistician III	Covance	Chicago, Illinois	07/06/2016
Biostatistician	CSL Behring	Kankakee, Illinois	07/05/2016
Staff VP Advanced Analytics	Anthem, Inc.	Chicago, Illinois	07/02/2016
Senior Statistician	University of Chicago	Chicago, Illinois	07/01/2016
Sr Statistical Modeler	RELX Group	Chicago, Illinois	07/01/2016
Sr Statistical Modeler	RELX Group	Chicago, Illinois	06/30/2016
Travel Demand Modeler	RSG	Chicago, Illinois	06/26/2016
Statistician	Abbott	Lake Forest, Illinois	06/23/2016
Statistician	CBRE	Chicago, Illinois	06/22/2016
Statistician	St. Anthony's Health Center	Peoria, Illinois	05/29/2016
Senior Research Statistician	AbbVie	Lake County, Illinois	05/26/2016
Biostatistician II	Covance	Chicago, Illinois	05/26/2016
Statistician	NORC	Chicago, Illinois	05/19/2016
Statistician	Rose International INC	Abbott Park, Illinois	05/13/2016
Statistical Modeler	RELX Group	Chicago, Illinois	04/19/2016

Job postings here were provided by Direct Employers Association ([www.us.jobs](http://www.us.jobs)).

<http://www.careeronestop.org/credentials/toolkit/find-jobs.aspx>

This information was retrieved on 7/13/2016 at 4:25 PM from Job Finder at CareerOneStop ([www.careeronestop.org](http://www.careeronestop.org)), sponsored by the U.S. Department of Labor, Employment, and Training Administration.

## CareerOneStop Job Finder

### Jobs for Biostatisticians in Indiana, Michigan, Ohio and Illinois.

Job Title	Company	Location	Date Posted
Biostatistician / St Vincent Indpls Acute / FT Days	Ascension Health	Indianapolis, Indiana	06/28/2016
Statistical Fellow	Covance	Indianapolis, Indiana	07/08/2016
Statistical Fellow	Covance	Greenfield, Indiana	07/08/2016
Biostatistician	Spectrum Health	Grand Rapids, Michigan	06/03/2016
Biostatistician SR. - Meijer Heart & Vascular Institute Cardiovascular Research Team	Spectrum Health	Grand Rapids, Michigan	06/22/2016
Administrative Assistant Assoc	University of Michigan	Ann Arbor, Michigan	06/23/2016
Project Manager	Arbor Research Collaborative For Health	Ann Arbor, Michigan	06/22/2016
Information Services Project Manager	Arbor Research Collaborative For Health	Ann Arbor, Michigan	06/17/2016
Research Area Specialist Inter	University of Michigan	Ann Arbor, Michigan	06/17/2016
Biostatistician	Cleveland Clinic	Cleveland, Ohio	04/21/2016
Senior Research Biostatistician	Battelle Memorial Institute	Columbus, Ohio	05/20/2016
Biostatistician	CSL Behring	Kankakee, Illinois	07/05/2016
Biostatistician II	Covance	Chicago, Illinois	05/26/2016
Sr. Biostatistician	University of Chicago	Chicago, Illinois	06/15/2016
Biostatistician III	Covance	Chicago, Illinois	07/06/2016
Programmer I	Covance	Chicago, Illinois	05/07/2016
Statistical Analyst	Northwestern University	Chicago, Illinois	06/25/2016
Clinical Research Analyst - Chicago, IL	UnitedHealth Group	Chicago, Illinois	06/16/2016



<b>Job Title</b>	<b>Company</b>	<b>Location</b>	<b>Date Posted</b>
Statistical Fellow	Covance	Chicago, Illinois	07/08/2016
Senior Bioinformatician	University of Chicago	Chicago, Illinois	04/27/2016
Health Economics & Clinical Outcomes Research (HECOR) Director (Oncology)	Astellas Pharma	Northbrook, Illinois	06/02/2016
Associate Director, RWI Statistical Methodologist	Astellas Pharma	Northbrook, Illinois	05/04/2016

This information was retrieved on 7/13/2016 at 5:23 PM from Job Finder at CareerOneStop ([www.careeronestop.org](http://www.careeronestop.org)), sponsored by the U.S. Department of Labor, Employment, and Training Administration.

Job postings here were provided by Direct Employers Association ([www.us.jobs](http://www.us.jobs)).

<http://www.careeronestop.org/credentials/toolkit/find-jobs.aspx>

*Appendix 5: Letters of Support, Detail*

## Appendix 6: Faculty and Staff, Detail

Last name	First name	Academic Title	CIP code	Diploma Information	Area of Specialization
Akkari	Safwan	Associate Professor of Mathematical Sciences	27.01	Ph.D., Louisiana State University, 1988	Matroid theory, graph theory
Alexander	Deana	Continuing Lecturer in Mathematical Sciences	27.01	M.S., Purdue University, 2006	Online teaching, applied mathematics
Anderson	Jeffrey	Professor of Mathematics	27.01	Ph.D., Iowa State University, 1989	Partial differential equations, applied mathematics
Beineke	Lowell	Jack W. Schrey Professor of Mathematical Sciences	27.01	Ph.D., University of Michigan, 1965	Graph theory, combinatorics
Berry	Sandra	Associate Professor of Mathematics Education	27.01	Ph.D., Purdue University, 2007	Mathematics education
Chauhan	Chand	Associate Professor of Mathematics	27.01	Ph.D., The Ohio State University, 1983	Applied statistics, design of experiments
Coffman***	Adam	Professor of Mathematics	27.01	Ph.D., University of Chicago, 1997	Geometry, complex analysis, topology
Coroian	I. Dan	Associate Professor of Mathematics	27.01	Ph.D., University of Iowa, 1997	Numerical analysis, applied mathematics, mathematical modeling
Deng	Yihao	Associate Professor of Statistics	27.05	Ph.D., Old Dominion University, 2006	Regression analysis, generalized linear models, time series analysis
Dragnev*	Peter	Professor of Mathematics	27.01	Ph.D., University of South Florida, 1997	Analysis, potential theory, approximation theory
Francis	Joe	Professional Actuary in Residence/ Continuing Lecturer in Mathematical Sciences	27.01	B.S., DePauw University, 1987	Actuarial science

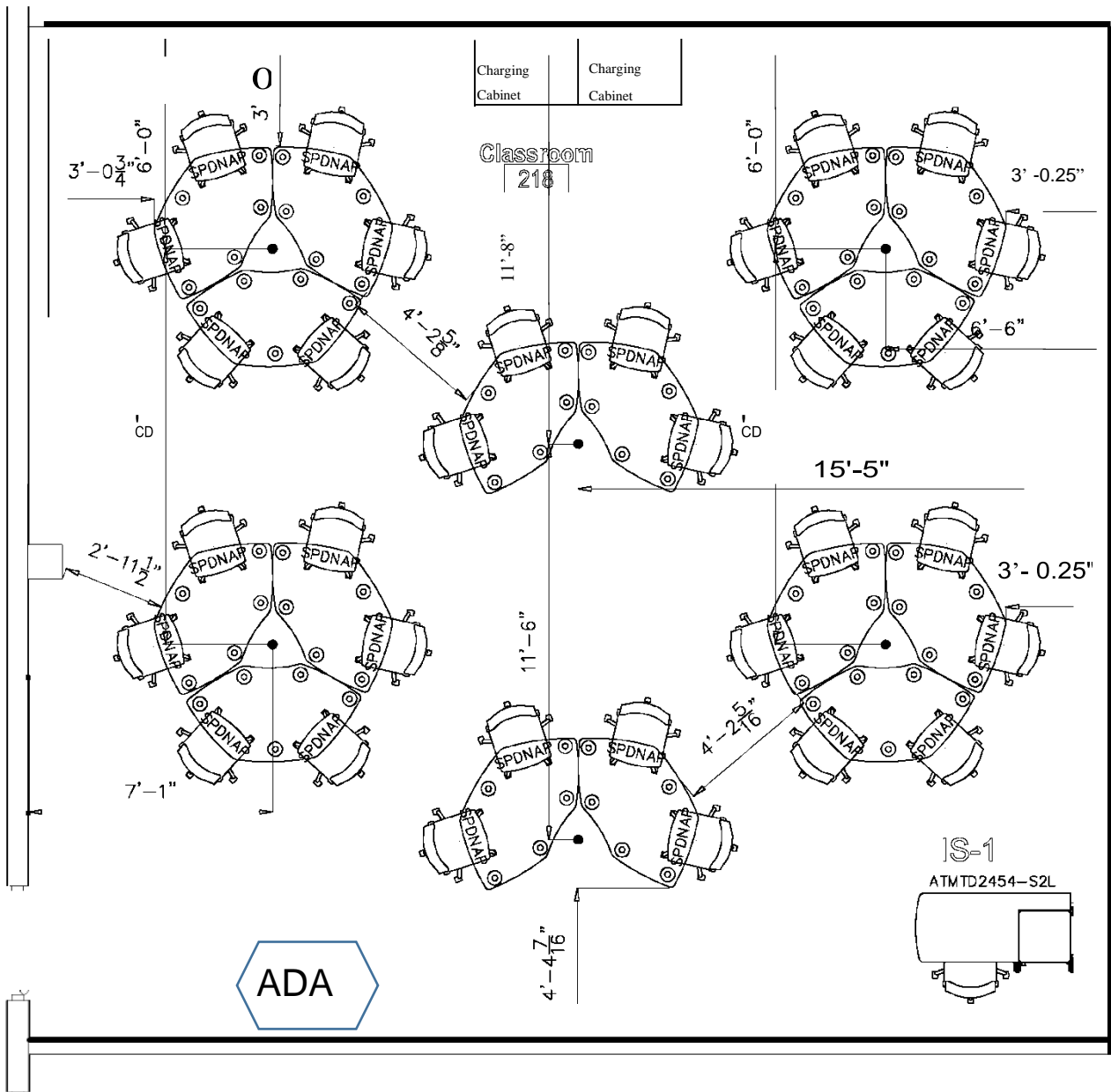
Last name	First name	Academic Title	CIP code	Diploma Information	Area of Specialization
Hersberger**	James	Professor of Mathematics	27.01	Ph.D., Purdue University, 1983	Problem solving, mathematical giftedness, school mathematics curriculum
LaMaster	John	Senior Instructor in Mathematics	27.01	M.S., Purdue University, 1992	Teaching with technology, math anxiety reduction, school mathematics curriculum
Legg	Alan	Visiting Assistant Professor of Mathematics	27.01	Ph.D., Purdue 2016	Complex Analysis
Lipman	Marc	Professor of Mathematical Sciences	27.01	Ph.D., Dartmouth College, 1976	Graph theory, discrete mathematics
Mau	Sue	Associate Professor of Math Education	27.01	Ph.D., Indiana University, 1992	Teachers' and students' mathematical understanding, teachers' professional growth
Osowski	John	Continuing Lecturer in Mathematics	27.01	M.A.S., The Ohio State Univ., 1985	Teaching of statistics, applied statistics
Pan	Yifei	Professor of Mathematical Sciences	27.01	Ph.D., University of Michigan, 1990	Complex analysis, partial differential equations, complex analytic dynamics
Townsend	Douglas	Professor of Mathematical Sciences	27.0101	Ph.D., University of Illinois, Ph.D., 1976	Approximation theory, applied statistics
Vandell	Robert	Associate Professor of Mathematics	27.01	Ph.D., Western Michigan University, 1996	Graph theory, graph connectivity, secondary math education
Vanderlaan	Cynthia	Continuing Lecturer in Mathematics	27.01	M.S., Indiana University, 1999	Precalculus curriculum development, teaching with technology
Wagner	Linda	Continuing Lecturer in Mathematics	27.01	M.S., Univ. of Illinois - Urbana/Champaign, 1978	Mathematics education, precalculus curriculum
Weakley	W. Douglas	Professor of Mathematics	27.01	Ph.D., Northwestern University, 1980	Graph theory, algebra covering codes, combinatorics
Weakley	Cecilia	Assistant Professor of Mathematics	27.01	Ph.D., University of North Carolina, 1978	Real analysis, topology

Last name	First name	Academic Title	CIP code	Diploma Information	Area of Specialization
Yorgov	Daniel	Visiting Assistant Professor in Applied Statistics	27.01	Ph.D., University of Colorado, 2016	Statistical genetics, high performance computing
Zhang	Yuan	Associate Professor of Mathematics	27.01	Ph.D., Rutgers University, 2009	Several complex variables, CR geometry, partial differential equations
Zook	Dianna	Instructor in Mathematics	27.01	M.A., Kent State University, 1979	Calculus and precalculus curriculum development, technology
Zubovic	Yvonne	Associate Professor of Mathematical Sciences	27.01	Ph.D., The Ohio State University, 1988	Biostatistics, survival analysis, applied statistics

**\* Chair of Department; \*\* Associate Chair of Department; \*\*\* Acting Chair of Department (July 1, 2016 – December 31, 2016)**

## Appendix 7: Facilities, Detail

During the summer of 2016, the classrooms Kettler 123 and Kettler 218 were under renovation. The renovation included upgrades to the available technology as well as reconfigurations of the layout to allow for students to collaborate in teams (see figure below). The estimated cost of these renovations is \$150,000 each, for a total of \$300,000.



Similar upgrades are required for Kettler 216 and Kettler 220 at an estimated cost of \$150,000 apiece.

## ***Appendix 8: Other Capital Costs, Detail***

Salaries and Wages	Recurring	\$112,500 (for 1.5 FTE)
Supplies and Expenses	Recurring	\$5,000
Other		\$5,000
		<ul style="list-style-type: none"><li>• e.g., office furniture, computer, software</li></ul>
Professional Development		\$7,500 (1.5 @ \$5,000)

## ***Appendix 9: Articulation of Associate/Baccalaureate Programs, Detail***

As of June 2016, the Indiana Commission on Higher Education website does not list any Transfer Single Articulation Pathways in progress for applied statistics.

**Link:** <http://www.in.gov/che/3138.htm>



## Appendix 10: Credit hours Required/Time to Completion, Detail

### Curriculum and Requirements

#### Admission Requirements

For a beginning regular admit, the admission requirements are:

- (1) High School G.P.A. of 2.5 or higher;
- (2) One of the following SAT/ACT Score requirements:
  - SAT Score (new scale) of 840 or above and Math SAT Score (new) of 420 or above;
  - SAT Score (old scale) of 1120 or above and Math SAT Score (old) of 380 or above;
  - ACT Score of 16 or above overall and ACT Score of 15 or higher in Math.

#### Curriculum Requirements

The Bachelor of Science in Applied Statistics consists of 120 credit hours distributed according to the following:

#### Basic Mathematics and Computing Core (18-19 credits)

MA 16500 Analytic Geometry and Calculus I (4 credits)

MA 16600 Analytic Geometry and Calculus II (4 credits)

Choice of:

MA 26300 Multivariate & Vector Calculus (4 credits)

MA 26100 Multivariate Calculus

MA 35100 Elementary Linear Algebra (3 credits)

Choice of:

CS 11400 Introduction to Visual Basic (3-4 credits)

CS 16000 Introduction to Computer Science I

#### Basic Statistics Core (15 credits)

STAT 51100 Statistical Methods (3 credits)

STAT 51600 Basic Probability and Applications (3 credits)

STAT 51700 Statistical Inference (3 credits)

STAT 51200 Applied Regression Analysis (3 credits)

STAT 51400 Design of Experiments (3 credits)

#### Statistics Electives (9 credits)

Select 3 courses from:

STAT 42100 Modern Statistical Modeling Using R and SAS (3 credits)

STAT 43200	Introduction to Stochastic Processes	(3 credits)
STAT 43300	Introduction to Nonparametric Statistics	(3 credits)
STAT 51300	Statistical Quality Control	(3 credits)
STAT 52000	Time Series and Applications	(3 credits)

Capstone (3 credits)

STAT 49000	Data Analysis	(3 credits)
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-Students should complete a data analysis project. In addition to emphasizing the application of statistical methods, the course should provide students ample opportunity to collaborate as part of a team and to communicate their findings through written reports and oral presentation.

General Education Requirements (33 credits)

- GA1 Written Communication
- GA2 Speaking and Listening
- GA3 Quantitative Reasoning (MA 16500 can be used)
- GB4 Scientific Ways of Knowing
- GB5 Social and Behavioral Ways of Knowing
- GB6 Humanistic and Artistic Ways of knowing
- GB7 Interdisciplinary or Creative Ways of Knowing (for example, foreign language courses 112)

Additional Credits from Category A or B (for example, foreign language courses, ENG W233, 2<sup>nd</sup> science course) to meet the 30 credit hour requirement for GA1-GA3, GB4-GB7.

GCAP Capstone Experience (STAT 49000 Data Analysis)

COAS B.S. Liberal Arts Requirements (14 credits)

Second Semester Writing	ENG W140 or ENG W233	(3 credits)
Speaking Requirement	COM 11400	(3 credits)
Foreign Language Requirement	(2 <sup>nd</sup> semester of a foreign language)	(8 credits)

Departmental Science Requirements (11 credits)

3 Approved Science Courses, two of which include a lab (see Mathematical Sciences Department approved list)

Minor/Additional Electives to Reach 120 credits needed for graduation

## Sample Curriculum: Bachelor of Science in Statistics

Taking a typical load of 15 credit hours per semester, a calculus-ready student is able to complete the requirements in four years. A sample plan for the fall and spring semesters of each of the four years is provided below.

1 <sup>st</sup> Year Fall Semester				1 <sup>st</sup> Year Spring Semester			
Course No.	Course Title	Pre-Reqs	Crs.	Course No.	Course Title	Pre-Reqs	Crs.
MA 165000 (GA3)	Analytic Geometry & Calculus I	MA 15900 or MA 15400 (C- or above); or placement	4	MA 16600	Analytic Geometry & Calculus II	MA 16500 (C- or above)	4
ENG W131 (GA1)	Reading, Writing, & Inquiry	Self-Place or ENG W129 (C- or above)	3	GB5	Gen Ed Social/Behavior		3
GB4 (see Math. Dept. options)	Gen Ed Science/Lab (Approved course)	*See lab requirement	4	Science/with Lab (see GB4 and Math. Dept. options)	Approved Science/Lab	*See lab requirement	4
FL 1 <sup>st</sup> semester (see GB7 or Gen Ed A/B options)	Foreign Language 1		4	FL 2nd (GB7 or Gen Ed A/B options)	Foreign Language 2	FL 1/ placement	4
<b>Total Semester Credit Hours</b>			<b>15</b>	<b>Total Semester Credit Hours</b>			<b>15</b>

2 <sup>nd</sup> Year Fall Semester				2 <sup>nd</sup> Year Spring Semester			
Course No.	Course Title	Pre-Reqs	Crs.	Course No.	Course Title	Pre-Reqs	Crs.
MA 26300 or MA 261	Multivariate & Vector Calculus <u>or</u> Multivariate Calculus	MA 16600 (C- or above)	4	MA 35100	Elem Linear Algebra	2 sem calc (C- or above grades)	3
Science (no lab) (see GB4 options and Math. Dept. options)	Approved Science		3	STAT 51100	Statistical Methods	2 sem calc (C- or above grades)	3
COM 11400 (GA2/A&S)	Fundamentals of Speech Communication		3	ENG W233 (Gen Ed A/B)	Intermediate Expository Writing	ENG W131 (C- or above)	3
GB7 (if needed)	Gen Ed Creative or Interdisciplinary		3	CS 11400 or CS 16000	Introduction to Visual Basic <u>or</u> Introduction to Computer Science I	√	3-4
GB6	Gen Ed Humanistic and Artistic		3	Elective	Free Elective		3
<b>Total Semester Credit Hours</b>			<b>16</b>	<b>Total Semester Credit Hours</b>			<b>15-16</b>

3 <sup>rd</sup> Year Fall Semester				3 <sup>rd</sup> Year Spring Semester			
Course No.	Course Title	Pre-Reqs	Crs.	Course No.	Course Title	Pre-Reqs	Crs.
STAT 51200	Applied Regression Analysis	STAT 511, 517, or 528 (C- or above grades)	3	STAT 51400	Design of Experiments	STAT 51200 (C- or above)	3
STAT 51600	Basic Probability and Applications	MA 261 or MA 263 (C- or above)	3	STAT 51700	Statistical Inference	STAT 51600 (C- or above)	3
Elective or Gen Ed A or B	Free elective course <u>or</u> Gen Ed A or B (if needed)		3	Elective or Gen Ed A or B	Free elective course <u>or</u> Gen Ed A or B (if needed)		3
Elective	Free elective		3	Elective	Free elective		3

Elective	Free elective		3	Elective	Free elective		3
<b>Total Semester Credit Hours</b>			<b>15</b>	<b>Total Semester Credit Hours</b>			<b>15</b>

<b>4th Year Fall Semester</b>				<b>4th Year Spring Semester</b>			
<b>Course No.</b>	<b>Course Title</b>	<b>Pre-Reqs</b>	<b>Crs.</b>	<b>Course No.</b>	<b>Course Title</b>	<b>Pre-Reqs</b>	<b>Crs.</b>
Statistics Elective:	Approved Statistics elective	√	3	Statistics Elective	Approved Statistics elective	√	3
Statistics Elective or Free Elective:	Approved Statistics elective <u>or</u> Free elective course	√	3	Statistics Elective or Free Elective	Approved Statistics elective (if needed) <u>or</u> Free elective course	√	3
Elective or Gen Ed A or B	Free elective course <u>or</u> Gen Ed A or B (if needed)		3	STAT 49000 (GCAP C8)	Data Analysis	STAT 511 (C- or above)	3
Elective or Gen Ed A or B	Free elective course <u>or</u> Gen Ed A or B (if needed)		3	MA 49000 or Elective	VT-Topics in Mathematics for Undergraduates <u>or</u> Free Elective		1-2
Elective	Free elective course		3	Elective	Free elective course		3
<b>Total Semester Credit Hours</b>			<b>15</b>	<b>Total Semester Credit Hours</b>			<b>13-14</b>

√ = See IPFW Bulletin or myBLUEprint for additional course prerequisites

**Approved Statistics Electives: STAT 42100, STAT 43200, STAT 43300, STAT 51300, or STAT 52000**

**120 credits required for Bachelor of Science degree**

**2.0 GPA required for Bachelor of Science degree/major**

### Existing courses in the proposed curriculum

Course descriptions for the 2016-2017 can be found at <http://bulletin.ipfw.edu/index.php>.

MA 16500	Analytic Geometry and Calculus I
MA 16600	Analytic Geometry and Calculus II
MA 26300	Multivariate & Vector Calculus
MA 26100	Multivariate Calculus
MA 35100	Elementary Linear Algebra
CS 11400	Introduction to Visual Basic
CS 16000	Introduction to Computer Science I
STAT 51100	Statistical Methods
STAT 51600	Basic Probability and Applications
STAT 51700	Statistical Inference
STAT 51200	Applied Regression Analysis
STAT 51400	Design of Experiments
STAT 52000	Time Series and Applications
ENG W140	Elementary Composition Honors
ENG W233	Intermediate Expository Writing
COM 11400	Fundamentals of Speech Communication

In addition, courses meeting General Education Requirements GA1 – GA3 and GB4 – GB7 already exist (see [General Education Courses](#) for a complete list).

### Courses to be added

Several new courses will be added to the curriculum. An asterisk \* indicates the course is in the bulletin for either the West Lafayette or Indianapolis campus of Purdue. Syllabi for these courses are in the pages that follow.

STAT 49000	Data Analysis
STAT 42100*	Modern Statistical Modeling Using R and SAS
STAT 43200*	Introduction to Stochastic Processes
STAT 43300*	Introduction to Nonparametric Statistics
STAT 51300*	Statistical Quality Control

# STAT 42100 Modern Statistical Modeling Using R and SAS

**COURSE DESCRIPTION:** An introductory course on statistical computation. The primary goals of this course are (i) to introduce popular statistical software SAS and R and to develop basic data analysis skills, and (ii) to introduce basic statistical computation methods used in applications.

**CREDIT HOURS:** 3 credits

**PREREQUISITE:** STAT 517 Statistical Inference.

**TEXT:** *Statistical Computing with R* by Maria Rizzo, Chapman and Hall, 1st Edition, 2007.

## COURSE OBJECTIVES:

This course provides a broad overview of computational methods in various statistical analyses.

Upon completion of this course, students will be able to

- Understand and apply the theory underlying various statistical computing approaches.
- Implement statistical computing approaches in the R and SAS environments.
- Apply statistical computing methods to efficiently execute statistical analyses in a wide range of situations.

## TOPICS:

Tentatively, you will explore the following topics throughout the semester. The pace and content covered will be adjusted according to the interest and needs of the class, at the discretion of the instructor.

Introduction to R	Chapter 1	1 week
Review of Probability and Statistics Basics	Chapter 2	1 week
Generating Random Variables	Chapter 3	2 weeks
Visualization of Multivariate Data	Chapter 4	1 week
Basics of Monte Carlo	Chapter 5	2 weeks
Inference using Monte Carlo Methods	Chapter 6	2 weeks
Bootstrap and Jackknife	Chapter 7	2 weeks
Permutation Tests	Chapter 8	1 week
Probability Density Estimation	Chapter 10	1 week
Optimization	Chapter 11	2 weeks

## **HOMEWORK:**

Regular homework assignments are planned for the course, worth 250 total points. The homework assignments will be a combination of theoretical derivations and applications to real data sets. Due dates will be provided for each assignment. Late assignments will be accepted but may be assessed a penalty of up to 10% per calendar day that the assignment is late.

## **TESTS:**

You will take one midterm test (**100 points**) and a comprehensive final exam (**150 points**) to assess your understanding of the course content. These tests will cover the material presented in class, assigned reading, and homework problems.

**GRADING:** Midterm (100 pts.) + Homework (250 pts.) + Final Exam (150 pts.) = Total (500 pts.)

<b>Grading Scale:</b>	A	450 - 500 pts.
	B	400 - 449
	C	350 - 399
	D	300 - 349
	F	below 300

## **COURSE POLICIES:**

You are expected to follow the information in the current IPFW Student Handbook and Planner. In particular, be familiar with the *IPFW Code of Student Rights, Responsibilities, and Conduct* found at <http://bulletin.ipfw.edu/content.php?catoid=38&navoid=1019#Disciplinary>.

**Academic Integrity:** Academic integrity is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. Policies regarding academic integrity as described in the *IPFW Code of Student Rights, Responsibilities, and Conduct* apply to this course. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of homework solutions or examinations, submitting work of another person, and tampering with the academic work of other students.

**Attendance:** Class attendance and participation is essential for success. It is your responsibility to clarify missed work with classmates or with me prior to the next class.

**Missed tests:** To be eligible for a make-up test, students who cannot take a test must contact me **within 24 hours after the test is given** with a valid excuse. I judge the validity of the excuse in determining whether a make-up will be given. Individual arrangements will be made for a make-up test for those who are eligible.

**Civility:** I am committed to creating a climate for learning characterized by respect for one another and the contributions each person makes to class. I ask that you make a similar commitment.

#### **ADDITIONAL RESOURCES:**

**Students with Disabilities.** If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Director of Services for Students with Disabilities (Walb Union, Room 113, telephone number (260) 481-6658), as soon as possible to work out the details. The SSD office will provide you with a Disability Accommodation Verification Card attesting to your needs for modification that you need to bring to me. For more information, please visit the web site for <http://www.ipfw.edu/disabilities/>.

**Center for Academic Support and Advancement (CASA): Tutoring Center.** Tutoring for a variety of courses is available at the Tutoring Center in Kettler G19 or in the Math Assistance Learning Lab (MALL) in Kettler G38. For more information see the websites <http://www.ipfw.edu/offices/casa/> and <http://www.ipfw.edu/departments/coas/depts/math/mall/> .

**Information Technology Services Help Desk.** If you have questions concerning the use of computers at IPFW, hardware and software support, or student email accounts, please contact the Help Desk in KT 206, telephone (260) 481-6030 or visit the website <http://www.ipfw.edu/its/> .



# STAT 43200 Introduction to Stochastic Process and Probability Modeling

**COURSE DESCRIPTION:** The course builds on elementary probability theory and introduces stochastic processes applied to the study of phenomena in fields such as engineering, computer science, management science, the life, physical and social sciences, and operations research. The approach is heuristic and non-rigorous. It develops students' intuitive feel for the subject and enables them to think probabilistically. Computation is emphasized and requires use of software such as Excel, MINITAB, and R.

**CREDIT HOURS:** 3 credits

**PREREQUISITE:** STAT 516 Basic Probability and Applications with C- or higher.

**TEXT:** *Introduction to Probability Models* by Sheldon Ross, Academic Press, 11th Edition, 2014.

## COURSE OBJECTIVES:

Below are learning objectives organized by course topic. For each item listed, expect to gain experience working with, computing, and interpreting said item.

1. It is assumed that you have familiarity with the concept of probability and many common probabilistic models. Therefore, only a brief overview will be given to refresh the following concepts: discrete and continuous probability distributions; compute and interpret expected values and variances; joint distributions.
2. While you are expected to have some familiarity with conditional probability, a longer overview will be presented due to the importance it plays in later chapters. In particular, students will gain an understanding of what conditional probability and expected value mean, and how to work with and compute conditional probabilities and expectations.
3. You will be introduced to Markov chains, starting with discrete space and time models. You will learn about the transition probability matrix and Chapman---Kolmogorov equations. You will also learn to compute multi-step probabilities, and limiting and stationary behavior of Markov chains.
4. You will expand on the previous chapter by learning about a continuous---time/discrete space Markov chain called the Poisson point process. You will learn about the connection between the Poisson process and exponential waiting times, and explore generalizations of the Poisson process.
5. You will then examine a more general framework for continuous time stochastic processes. You will consider different examples, define the transition probability function, the generalization of the Chapman---Kolmogorov equations, and limiting

and stationary behavior.

6. The course concludes with a discussion of continuous time and continuous state stochastic processes, and, in particular, Brownian motion. You will define Brownian motion, discuss its construction, and its various properties. As time permits, you will learn about variations of Brownian motion, followed by a very basic introduction to stochastic integration, Gaussian processes, and harmonic analysis of stationary processes

### TOPICS:

To model a process using stochastic models you will need to understand some basic concepts such as variability, uncertainty, probability, randomness, and independence. These ideas are the basis for the probability and statistical methodology that comprise the content of the course. Tentatively, we will explore the following topics throughout the semester. The pace and content covered will be adjusted according to the interest and needs of the class, at the discretion of the instructor.

1. Probability Models	Chapter 1	1 week
2. Random Variables	Chapter 2	1 week
3. Conditional Probability	Chapter 3	2 weeks
4. Discrete Time/State Markov Chains	Chapter 4	3 weeks
5. The Poisson Process	Chapter 5	2 weeks
6. Continuous Time Markov Chains	Chapter 6	3 weeks
7. Brownian Motion	Chapter 10	3 weeks

### HOMEWORK:

Five homework assignments are planned for the course, each worth 30 points. The homework assignments will be a combination of theoretical derivations and applications to real data sets. Due dates will be provided for each assignment. Late assignments will be accepted but may be assessed a penalty of up to 10% per calendar day that the assignment is late.

### TESTS:

You will take two tests (**100 points each**) and a comprehensive final exam (**150 points**) to assess your understanding of the course content. These tests will cover the material presented in class, assigned reading, and homework problems. The tests will consist of a combination of computational problems (evaluating “how to” perform the methods) and short-answer questions (assessing the interpretation and understanding of these methods).

**GRADING:** Tests (200 pts.) + Homework (150 pts.) + Final Exam (150 pts.) = Total (500 pts.)

<b>Grading Scale:</b>	A	450 - 500 pts.
	B	400 - 449
	C	350 - 399

D 300 - 349  
F below 300

## **COURSE POLICIES:**

You are expected to follow the information in the current IPFW Student Handbook and Planner. In particular, be familiar with the *IPFW Code of Student Rights, Responsibilities, and Conduct* found at <http://bulletin.ipfw.edu/content.php?catoid=38&navoid=1019#Disciplinary>.

**Academic Integrity:** Academic integrity is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. Policies regarding academic integrity as described in the *IPFW Code of Student Rights, Responsibilities, and Conduct* apply to this course. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of homework solutions or examinations, submitting work of another person, and tampering with the academic work of other students.

**Attendance:** Class attendance and participation is essential for success. It is your responsibility to clarify missed work with classmates or with me prior to the next class.

**Missed tests:** To be eligible for a make-up test, students who cannot take a test must contact me **within 24 hours after the test is given** with a valid excuse. I judge the validity of the excuse in determining whether a make-up will be given. Individual arrangements will be made for a make-up test for those who are eligible.

**Civility:** I am committed to creating a climate for learning characterized by respect for one another and the contributions each person makes to class. I ask that you make a similar commitment.

## **ADDITIONAL RESOURCES:**

**Students with Disabilities.** If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Director of Services for Students with Disabilities (Walb Union, Room 113, telephone number (260) 481-6658), as soon as possible to work out the details. The SSD office will provide you with a Disability Accommodation Verification Card attesting to your needs for modification that you need to bring to me. For more information, please visit the web site for <http://www.ipfw.edu/disabilities/>.

**Center for Academic Support and Advancement (CASA): Tutoring Center.** Tutoring for a variety of courses is available at the Tutoring Center in Kettler G19 or in the Math Assistance Learning Lab (MALL) in Kettler G38. For more information see the websites <http://www.ipfw.edu/offices/casa/> and <http://www.ipfw.edu/departments/coas/depts/math/mall/> .

**Information Technology Services Help Desk.** If you have questions concerning the use of computers at IPFW, hardware and software support, or student email accounts, please contact the Help Desk in KT 206, telephone (260) 481-6030 or visit the website <http://www.ipfw.edu/its/> .

## STAT 43300 Introduction to Nonparametric Statistics

**COURSE DESCRIPTION:** The course acquaints students with rank-based, permutation-based and resampling-based methods of statistical analysis used in widely applicable settings where the data do not follow parametric models. It extends techniques taught in STAT 51100, where the normal theory is assumed, to situations where the normal theory does not hold. It includes computer projects which use statistical software such as R and SAS.

**CREDIT HOURS:** 3 credits

**PREREQUISITE:** STAT 517 Statistical Inference.

**TEXT:** *Introduction to Modern Nonparametric Statistics* by James Higgins, Duxbury Press, 1st Edition, 2004.

### COURSE OBJECTIVES:

This course provides a broad overview of nonparametric statistics. The goal is for you to be introduced to the wide range of interesting nonparametric ideas in statistics, including ideas that are theoretical, computational and methodological. Theory will be introduced when it is relevant, but the emphasis will be on applications.

Upon completion of this course, students will be able to

- Ascertain whether the assumptions for parametric and nonparametric statistical tests are reasonably met for a set of data.
- Identify which nonparametric method to apply for a given setting.
- Understand, implement, and interpret various nonparametric procedures.
- Use statistical software to analyze data using nonparametric methods.

### TOPICS:

Tentatively, you will explore the following topics throughout the semester. The pace and content covered will be adjusted according to the interest and needs of the class, at the discretion of the instructor.

Introduction		
One Sample Tests	Chapter 1	2 weeks
Two Sample Tests	Chapter 2	2 weeks
Tests for Variances	Chapter 2	1 week
One-Way Layout (k-sample)	Chapter 3	2 weeks
Paired Comparisons and Block Designs	Chapter 4	1 week
Two-Way Layout	Chapter 4	2 weeks
Repeated Measures	Chapter 9	1 week

Trends and Correlation	Chapter 5	2 weeks
Bootstrapping	Chapter 8	1 week
Robust Model Fitting	Chapter 10	1 week

### **HOMEWORK:**

Five homework assignments are planned for the course, each worth 30 points. The homework assignments will be a combination of theoretical derivations and applications to real data sets. Due dates will be provided for each assignment. Late assignments will be accepted but may be assessed a penalty of up to 10% per calendar day that the assignment is late.

### **TESTS:**

You will take two tests (**100 points each**) and a comprehensive final exam (**150 points**) to assess your understanding of the course content. These tests will cover the material presented in class, assigned reading, and homework problems. The tests will consist of a combination of computational problems (evaluating “how to” perform the methods) and short-answer questions (assessing the interpretation and understanding of these methods).

**GRADING:** Tests (200 pts.) + Homework (150 pts.) + Final Exam (150 pts.) = Total (500 pts.)

<b>Grading Scale:</b>	A	450 - 500 pts.
	B	400 - 449
	C	350 - 399
	D	300 - 349
	F	below 300

### **COURSE POLICIES:**

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**Academic Integrity:** Academic integrity is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. Policies regarding academic integrity as described in the *IPFW Code of Student Rights, Responsibilities, and Conduct* apply to this course. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of homework solutions or examinations, submitting work of another person, and tampering with the academic work of other students.

**Attendance:** Class attendance and participation is essential for success. It is your responsibility to clarify missed work with classmates or with me prior to the next class.

**Missed tests:** To be eligible for a make-up test, students who cannot take a test must contact me **within 24 hours after the test is given** with a valid excuse. I judge the validity of the excuse in determining whether a make-up will be given. Individual arrangements will be made for a make-up test for those who are eligible.

**Civility:** I am committed to creating a climate for learning characterized by respect for one another and the contributions each person makes to class. I ask that you make a similar commitment.

### **ADDITIONAL RESOURCES:**

**Students with Disabilities.** If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Director of Services for Students with Disabilities (Walb Union, Room 113, telephone number (260) 481-6658), as soon as possible to work out the details. The SSD office will provide you with a Disability Accommodation Verification Card attesting to your needs for modification that you need to bring to me. For more information, please visit the web site for <http://www.ipfw.edu/disabilities/>.

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## STAT 49000 Data Analysis

**COURSE DESCRIPTION:** Students will learn a systematic approach to statistical consulting, how to communicate with nonmathematical audiences, and develop the ability to apply appropriate statistical techniques to answer research questions. Students will complete a data analysis project.

**CREDIT HOURS:** 3 credits

**PREREQUISITE:** STAT 511 Statistical Methods

**TEXTS:** *The Statistical Sleuth: A Course in Methods of data Analysis*, by Fred Ramsey and Daniel Schafer, Brooks Cole, 3rd Edition, 2012.  
*Statistical Consulting* by Javier Cabrera and Andrew McDougall, Springer, 2002.

### COURSE OBJECTIVES:

Students who have taken various courses in statistical methodology are familiar with a variety of procedures, including chi-square tests, t-tests, regression, ANOVA, nonparametric tests and some multivariate techniques. However, the statistical consulting experience goes beyond conducting the data analysis. The course has four components: professional practice, data analysis, communication, and technical tools. Professional practice deals with for example: ethics in statistical consulting, working with clients, defining problems, and interpersonal skills. Data analysis involves applying the appropriate statistical methodology to address the problem and research questions. Communication deals with effective writing, oral presentation, the presentation of data via tables and graphs, and publication. Technical tools include some techniques, but mostly thinking about and learning about new ideas, approaches, and techniques.

The course objectives include providing the students with an opportunity to gain experience in:

- statistical consulting,
- manipulating data using statistical software,
- applying the appropriate statistical technique for a given situation,
- correctly interpreting the results, and
- communicating the findings in clear, non-mathematical terms.

### TOPICS:

The course is built around case studies for various types of statistical analyses. Tentative course topics may include:

About Consulting



- Communication
- Asking Questions
- Managing a Session
- Dealing with Difficult Clients
- Consulting from Start to Finish

#### Technical Aspects of Consulting

- Designed Experiments and Sampling
- Observational Studies
- Survey Studies
- Mixed Models with SAS Proc Mixed
- Categorical Data Analysis
- Power Analysis
- Nonparametric Statistics
- Missing data
- Sampling

#### **HOMEWORK:**

Regular homework assignments are planned for the course, worth 300 total points. The homework assignments will involve analyzing case studies and reporting on the results. Due dates will be provided for each assignment. Late assignments will be accepted but may be assessed a penalty of up to 10% per calendar day that the assignment is late.

#### **PROJECT:**

Students will pick a topic that is scientifically interesting and statistically challenging, write a proposal for the topic to get approved, write a capstone report, review peers' reports, and present the project to the rest of the class. The format of the capstone report usually depends on the nature of the project. If the project is more like a consulting project, then the report should read like a consulting report. If the project is more like independent research, the report should read like a research paper. The capstone report will undergo a peer-review process where each student will read two other reports and provide comments. The capstone report and presentation are each worth 100 points.

#### **GRADING:**

Homework (300 pts.) + Project Report (100 pts.) + Presentation (100 pts.) = Total (500 pts.)

<b>Grading Scale:</b>	A	450 - 500 pts.
	B	400 - 449
	C	350 - 399
	D	300 - 349
	F	below 300

## **COURSE POLICIES:**

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**Attendance:** Class attendance and participation is essential for success. It is your responsibility to clarify missed work with classmates or with me prior to the next class.

## **ADDITIONAL RESOURCES:**

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# STAT 51300 Statistical Quality Control

**COURSE DESCRIPTION:** Techniques of modern Quality Control and Management. Topics include Statistical and graphical data summaries, basic tools (pareto charts, fishbone diagrams, flowcharts), Control Charts for Measurement and Attribute data, proper use of Control Charts, Capability Studies, Continuous Improvement, ISO 9000:2008 Requirements, Six Sigma and Taguchi Methodology

**CREDIT HOURS:** 3 credits

**PREREQUISITE:** One semester of post-calculus statistics such as IE 230, MGMT 305, or STAT 511.

**TEXT:** *Introduction to statistical quality control*, 7<sup>th</sup> edition, Montgomery, D.C. Wiley 2013

## COURSE OBJECTIVES:

Upon completion of this course, students will be able to acquire fluency in the language and techniques of modern quality control and its applications in the areas of manufacturing, health care, service industry, etc.

- Conceptually understand the utility of statistics for quality control.
- Apply control charts to solve real-life quality control problems.
- Utilize statistical software to perform statistical computation, visualization, control chart construction.

## TOPICS:

Tentatively, you will explore the following topics throughout the semester. The pace and content covered will be adjusted according to the interest and needs of the class, at the discretion of the instructor.

Introduction to Quality Control Process	Chapter 1, 2	1 week
Review of Probability and Statistics Basics	Chapter 3, 4	1 week
Control Charts for Variables	Chapter 5, 6	2 weeks
Control Charts for Attributes	Chapter 7	2 weeks
Capability Analysis	Chapter 8	2 weeks
CUSUM Charts	Chapter 9	1 week
Weighted Moving Average Charts	Chapter 9	1 week
Univariate Monitoring and Control	Chapter 10	1 week
Multivariate Monitoring and Control	Chapter 11	1 week
Acceptance Sampling Techniques	Chapter 15	2 weeks
Discussion about ISO Requirements		1 week

## **HOMEWORK:**

Regular homework assignments are planned for the course, worth 250 total points. The homework assignments will be a combination of theoretical derivations and applications to real data sets. Due dates will be provided for each assignment. Late assignments will be accepted but may be assessed a penalty of up to 10% per calendar day that the assignment is late.

## **TESTS:**

You will take one midterm test (**100 points**) and a comprehensive final exam (**150 points**) to assess your understanding of the course content. These tests will cover the material presented in class, assigned reading, and homework problems.

**GRADING:** Midterm (100 pts.) + Homework (250 pts.) + Final Exam (150 pts.) = Total (500 pts.)

<b>Grading Scale:</b>	A	450 - 500 pts.
	B	400 - 449
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## **COURSE POLICIES:**

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## ***Appendix 11: Exceeding the Standard Expectation of Credit Hours, Detail***

The proposed Bachelor of Science in Applied Statistics does not exceed the standard 120 credit hour limit.

## ***Appendix 12: Enrollment Trends***

The numbers of majors in the Bachelor of Science in Mathematics program for the Statistics and Actuarial Science options for the fall semesters from 1999 to 2015 are provided below. Note that students in the actuarial program will be encouraged to earn a statistics degree as a secondary major.

### **Mathematical Sciences - Historical Enrollment Trends**

Program	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Math BS-Statistics	1	2	1	1	1	1	1	0	5	6	3	2	3	3	6	8	7
Math BS-Actuarial Sci.	10	8	12	16	16	16	17	10	7	14	24	21	19	21	26	31	49



## Liaison Librarian Memo

Date: 7/27/16  
From: David Dunham  
To: Yvonne Zubovic  
Re: Library Resources for Applied Statistics Program

Describe availability of library resources to support proposed new program:

Through our various online databases, such as MathSciNet and Scopus, we currently have access to at least 514 journals within the category of "Physical Sciences & Mathematics: Mathematics: Mathematical Statistics." A search in IUCAT, our online catalog, for books and e-books published in the last 10 years on the subject of "statistics" currently brings up 3,656 results. I thus believe that the resources provided by and accessible to the Helmke Library are more than adequate for supporting a new degree program.

### Comments:

Books and journal articles to which the Helmke Library does not currently have direct access may be easily requested by students and faculty from other universities via our Document Delivery Service (DDS). In addition, every department has a yearly allocation for the purchase of new library materials, so new resources may be purchased as needed.

*Liaison Librarian Signature*

8/9/16

*Date*



TO: The Senate  
FROM: Executive Committee  
DATE: 14 November 2016  
SUBJ: Items under Consideration by Senate Committees and Subcommittees

The Executive Committee has asked Senate committee and subcommittee chairs to report items under discussion in the various committees. The following is a compilation of what was submitted.

### **Educational Policy Committee**

Daren Kaiser, Chair

1. Discussed the Purdue WL plan to put disciplinary action on transcripts. After further evaluation it was found that Purdue WL had already implemented this policy.
2. Discussed whether midterm grades should be required by all 100 and 200 level classes. Recommended that Registrar add language to midterm grade email that draws attention to two things - Faculty are encourage to give midterm grades to students who are at risk for failure (particularly if you are not using Blackboard). This will generate a letter sent to the student's permanent address. Faculty can give grades to a portion of the class. Marcia Dixson sent to chairs and deans.
3. Discussed whether there should be an "FN" grade for those students who fail a class because they stop attending? This would allow us to better track causes for student failure. This was passed and was sent to Senate for information only.
4. Discussed what the appeal process should be for students who are academically put on probation or dismissed from the university? The committee agreed there should be an option for review and explanation of the calculations but no appeal process given the number of warnings students receive. Patrick McLaughlin wrote up formal language to revise the policy and the bulletin. This was passed unanimously and sent as a resolution to the Senate.
5. Discussed the following AP 41 items assigned to us be the executive committee: A report was finalized and sent to the Senate.
  - a. 1.4 Bullet point 1: Incorporate predictive Analytics process across departments in order to inform active management decisions
  - b. 2.5 Bullet point 1. Create linkage between myBlueprint demand with course offerings
  - c. 2.5 Bullet point 2: Restructuring of programs/elimination of degree offerings will result in optimization
  - d. 2.5 Bullet point 3: Separate academic F (earned F) from F for not showing up
  - e. 3.2 Bullet point 1: Develop pathway majors (completed)
  - f. 3.2 Bullet point 2: Re-charge Advisory Council to be more impactful
  - g. 3.2 Bullet point 3: Expand role of primary advising in years 1 and 2
  - h. 3.2 Bullet point 4: Regularize from via myBlueprint from 1st year to degree
  - i. 3.6 Bullet point 1: Develop additional online/hybrid programs, flipped instruction in professional and technical programs
  - j. 3.6 Bullet point 2: Target adult learners for online/hybrid programs

**Subcommittees of the Educational Policy Committee:**

***Curriculum Review Subcommittee***

Kate White, Chair

1. Submitted proposals for Bachelor of Science in Actuarial Science and Bachelor of Science in Applied Statistics to IPFW Senate for information only.

***General Education Subcommittee***

Andrew Downs, Chair

1. The General Education Subcommittee (GES) has affirmed the due dates for this year, had discussions about the performance of the General Education Program (GEP), and discussed possible changes to the GEP.
2. Information regarding the general education program can be found in the General Education Document and Information System (GEDIS) in Vibe.

***Graduate Subcommittee***

David Cochran, Chair

1. No report received.

***Honors Program Council***

Suzanne LaVere, Chair

1. Call has gone out for new Honors Director
2. Reviewing scholarship applications

***International Education Advisory Subcommittee***

1. No report received.

**Faculty Affairs Committee**

Lesa Vartanian, Chair

1. Submitted Action Plan 41 report to Fort Wayne Senate.

**Subcommittee of the Faculty Affairs Committee:**

***Professional Development Subcommittee***

Andrew Downs, Chair

1. The Professional Development Subcommittee (PDS) has begun to review summer grant proposals. It is anticipated that the recommendations for funding will be forwarded to the Vice Chancellor for Academic Affairs (VCAA) through the Office of Sponsored Programs before the Thanksgiving break. After PDS has made its recommendations regarding summer grants, it will review the sabbatical requests. It is anticipated that PDS will make recommendations to the VCAA regarding sabbaticals before the end of the fall semester.
2. During the spring semester, the PDS will be providing feedback to those summer grant applicants who request it.

3. PDS will be working with the Institute of Research, Scholarship, and Creative Endeavors (IRSC) in the spring on the various opportunities IRSC will have to offer.

**Indiana University Committee on Institutional Affairs**

Andrew Downs, Chair

1. Nothing to report.

**Nominations and Elections Committee**

Lesa Vartanian, Chair

1. Nothing to report.

**Purdue University Committee on Institutional Affairs**

Mark Masters, Chair

1. Nothing to report.

**Student Affairs Committee**

Kathy Pollock, Chair

1. No report received.

**Subcommittee of the Student Affairs Committee:**

***Athletics, Subcommittee on***

Jens Clegg, Chair

1. Reviewed IPFW FAR Position Description
2. Reviewed athletics budget and annual report

**University Resources Policy Committee**

Mark Jordan, Chair

1. Submitted Action Plan 41 report to Fort Wayne Senate.

**Subcommittees of the University Resources Policy Committee:**

***Academic Computing and Information Technology Advisory Subcommittee***

Karen Van Gorder, Chair

1. Submitted Action Plan 41 report to Fort Wayne Senate.

***Budgetary Affairs Subcommittee***

Jeffrey Malanson, Chair

1. No report received

***Library Subcommittee***

Suzanne LaVere, Chair

1. Submitted Action Plan 41 report to Fort Wayne Senate.
2. Search nearing conclusion for new library dean
3. Deliberated library renovation

***Revenue Subcommittee***

Myeong Hwan Kim, Chair

1. Held first meeting to discuss committee charge.

***University Advancement Advisory Subcommittee***

1. Submitted Action Plan 41 report to Fort Wayne Senate

TO: The Senate

FROM: Executive Committee  
Fort Wayne Senate

DATE: August 24, 2016

SUBJ: Report on Designated Items

Listed below is a list of designated items that Executive Committee has charged other committee/subcommittees with. Executive Committee is distributing this for information only.

1. EPC – Tip sheet on childcare arrangements
2. SAC – Review policy on Graduate Assistantships in Athletics
3. Portions of Action Plan 41 to various committees and subcommittees (numbers in parentheses are individual bullet points for the Action Plan item):
  - EC—2.8
  - EPC—1.4 (1), 2.5, 3.2, 3.6
    - GES—4.7
    - HPC—3.6 (4)
  - FAC—2.4, 4.3
    - PDS—1.4 (2), 1.6 (1)
  - SAC—1.1 (2), 2.6, 2.12 (1), 4.4, 4.8, 4.9
    - SCOA—2.11
  - URPC—1.6 (2), 2.1a, 2.10, 2.11 (1), 2.12, 3.4, 3.10, 3.11, 3.12
    - ACITAS—1.2, 2.9, 3.8
    - LS—3.9
    - UAAS—2.9, 3.7, 3.8
4. URPC – Proposal submitted by faculty members as part of Action Plan 41 feedback to move from NCAA D1 Athletics to NAIA
5. PDS – Proposal submitted by Lidian Lin that Featured Faculty Awards and Excellence in Research Award be consistently reviewed, and also Featured Faculty Award be increased from \$1000 to \$2000.