

## Academic Learning Compacts: 2012 – 2013

*“... to ensure student achievement in undergraduate and graduate degree programs ...”*



### Academic Learning Compacts BIOLOGY

2012 – 2013  
Due: May, 2013

#### Academic Program-linked College Mission-based Goals/Objectives

In the matrix on the following page, please place an X in the grid that identifies the degree program goals and objectives that align with the institutional mission-based goals/objectives and the College based goals/objectives. These goals/objectives need to be documented in your ALC data.

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UNIVERSITY OF SOUTH FLORIDA ST. PETERSBURG GOALS & OBJECTIVES		COLLEGE OF ARTS & SCIENCES GOALS & OBJECTIVES		UNDERGRADUATE PROGRAMS													
				Anthropology	Biology	Criminology	Literature & Writing	Environmental Science (BA)	Graphic Design	Political Science	Psychology	History	I.S.S.	Journalism (BA)			
<b>Academic Performance</b>	Use sustained evidence of SLO's and student achievement for continuous improvement	Initiate and expand graduate programs and develop formal academic ties to other graduate programs within the USF system		X													
	Offer certificate, undergraduate and graduate programs that meet regional needs																
	Implement and support information and instructional technologies that facilitate effective pedagogies			X													
	Enhance programs that specifically support academic excellence			X													
	Increase student awareness of participating in a global society			X													
<b>Student Engagement</b>	Create a freshman experience that enables students to thrive and move successfully through to graduation	Our students will have critical skills and a broad outlook that will make them engaged and productive citizens  Incorporate civic engagement, service learning, and experiential learning into their classes, when appropriate															
	Foster institutional pride and strengthen connections within the campus community			X													
	Enhance opportunities for increased student involvement in curricular and co-curricular activities			X													
<b>Diversity &amp; Inclusion</b>	Insure an inclusive community where differences are respected and valued	Cultivate a vigorous liberal arts culture by recruiting talented diverse students, maintaining small class sizes, and mentoring those students we have.  Encourage free discussion, foster critical thinking, demand that our students write, and work across disciplines		X													
	Attract and retain a diverse student population			X													
	Increase the diversity of faculty and staff			X													
<b>Research &amp; Creative Activities</b>	Create a vibrant culture of faculty research and creative scholarship	Make significant and meaningful contributions to ongoing dialogues in our academic fields.  We expect our undergraduate and graduate students to engage in research in collaboration with faculty		X													
	Promote and support undergraduate research as a meaningful aspect of campus life			X													
	Enhance and support research and scholarly collaborations with community partners			X													

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### *Signature Page for Academic Program*

Academic Program: BIOLOGY

Chair/Coordinator:   Melanie Riedinger-Whitmore   Date:           6/10/13          

### Summary Statement – Academic Program Performance in 2012-13

Provide a summary statement about academic program performance over the previous year including high points and low points.

In the first year of the Biology program, we have grown quietly rapidly, and we now support ~ 500 Biology majors. Projections for Summer/Fall 2013 indicate that we will gain ~150-200 new majors, a mix of FTIC and transfer students. Our program is also expanding, as we began offering more elective courses during the spring semester to satisfy the degree requirements for our students. Starting in last fall, we expanded our schedule for core courses, offering multiple laboratory sections for Cell Biology, Genetics, and Ecology. One challenge that we will need to address is how to ensure consistency in content and ALC application when we have multiple laboratory and lecture sections, and when many of these courses are taught by part-time faculty, or graduate teaching assistants. In our first year, the Department of Biological Sciences used the ALC's to set a baseline to guide future program development. For most ALC's, students met or exceeded our ALC expectations. One area that needs attention in the future is the service ALC section. We have discovered that it's unrealistic at this point to expect half of the Biology students to be working in an internship, on research project or participate in a program club. With ~500 majors, our small department can not provide the mentoring and oversight needed for this. Additionally, we lack sufficient research space to allow a large number of students to participate in laboratory research in a given semester. We are adjusting the expectation for this section for 2013-2014, examining core or elective courses that might provide opportunities for service activities, with hopes that this is a more realistic expectation.

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### Summary Statement – Impact of Changes Made in 2012-13

Provide a summary statement about changes that were made in your program as a result of ongoing assessment in 2012-13 and the positive/negative impact of the changes that were made.

This was the first year for our program, and some of the changes we made were the result of ongoing implementation of major program changes that had been approved just prior to the start of our new degree. In most cases, it is too soon to assess the impact of some of these changes because they involve courses that might have only been taught once or twice. We will now be offering multiple sections of our core courses, and many of our elective courses. Full-time and part-time faculty teaching the same course are now more strongly encouraged to coordinate schedules and expectations with each other, to ensure that there is consistency in content and outcomes. We now provide TA workshops at the beginning of each semester, to more clearly set course expectations, and to make sure that TAs understand teaching responsibilities and course objectives. We are now only hiring TAs who have a B.S. in Biology, and who are working toward graduate degrees in a biological field. We are doing this so that our laboratory TAs have a sufficient biology background to address content and questions within their lab courses, and so that they can help serve as peer-mentors for our advanced undergraduate students. We are working more closely with advising to try to understand our student population in terms of their backgrounds and needs. Many of our students completed some core and elective courses prior to the start of our Biology degree in Fall 2012, because they were aware that the degree would be available to them. In our first year, a large number of FTIC and transfer students declared Biology as a major, and the major challenges we face right now are trying to sort out how to create schedules that fit the current needs of these students, how to guide them into an appropriate sequence of courses that give them the best opportunity to develop the skills they will need to successfully complete upper-level courses, and how to track their individual success, particularly when they might have taken some of their core or elective courses from other campuses within the UFS system or from local community colleges. One thing that has worked quite well is that our department maintains a running dialogue between our part-time and full-time faculty about student success and course expectations, and this openness is allowing us to pinpoint potential issues early. Starting this fall, we will host a department meeting prior to the start of classes that is dedicated to discussing the implementation and modification of our ALCs. At that time, we will clarify expectations with our part-time and full-time faculty, and we will use this as an opportunity to discuss changes that need to be implemented to support greater student success in our program, and to better track the ALCs.

## Academic Learning Compacts: 2012 – 2013

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**Person Responsible: Melanie Riedinger-Whitmore, Chairperson, Department of Biological Sciences**

### **Mission of Academic Program (include URL):**

The Biology curriculum is designed to introduce students to research methods in the Biological Sciences, and to help them develop critical thinking skills as well as competency in scientific writing and quantitative analysis. A Biology degree prepares students for professional schools (medicine, dentistry, veterinary medicine, pharmacology, physical therapy), graduate programs in the life sciences (botany, animal behavior, cell biology, ecology, zoology, microbiology, marine biology, molecular biology, biomedicine, biotechnology), and other STEM-related fields. Students majoring in Biology complete core course work in cell biology, ecology, evolution, genetics and physiology, and can select elective courses from three areas of emphasis: a) Biomedical Sciences, b) Marine Biology, and c) Ecology and Evolution. Our students can also tailor their elective course choices to satisfy their own academic or research interests. Undergraduate research experience is a capstone requirement for this degree, and students are provided many opportunities to work closely with Biology faculty on field or laboratory-based research projects. Internship opportunities are available for Biology majors through local state and federal government agencies, nonprofit groups, and at biomedical facilities adjacent to the USFSP campus.

<http://www1.usfsp.edu/catalog-undergrad/biology-bio.htm>

### **List Program Goal(s) / Objective(s):**

#### **Program Goals / Objectives must be mapped to College Goals / Objectives – use consistent nomenclature.**

[Please note impact of any changes that were made as a result of 2009-10 assessment]

The Biology program began in Fall 2012, and within the first semester attracted over 550 Biology majors. This tremendous growth and student response has prompted the faculty of the Department of Biological Sciences to re-evaluate our initial goals and assessment outcomes in response to this great demand. Since we are truly establishing the foundation for this degree, we have decided to base our goals/objectives on the recent American Association for the Advancement of Science “Vision and Change in Undergraduate Biology Education: A Call to Action - Final Report 2011 (<http://visionandchange.org/files/2011/03/Revised-Vision-and-Change-Final-Report.pdf>; <http://visionandchange.org/>); The goals/objectives recommended by AAAS are:

#### **1. Integrate core concepts and competencies throughout the curriculum**

Introduce the scientific process to students early, and integrate it into all undergraduate biology courses. Define learning goals so that they focus on teaching students the core concepts, and align assessments so that they assess the students’ understanding of these concepts. Relate abstract concepts in biology to real-world examples on a regular basis, and make biology concepts relevant by presenting problems in a real-life context. Develop lifelong science-learning competencies. Introduce fewer concepts, but present them in greater depth. Stimulate the curiosity students have for learning about the natural world. Demonstrate both the passion scientists have for their discipline and their delight in sharing their understanding of the world with students.

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**2. Focus on student-centered learning**

Engage students as active participants, not passive recipients, in all undergraduate biology courses. Use multiple modes of instruction in addition to the traditional lecture. Ensure that undergraduate biology courses are active, outcome oriented, inquiry driven, and relevant. Facilitate student learning within a cooperative context. Introduce research experiences as an integral component of biology education for all students, regardless of major. Integrate multiple forms of assessment to track student learning. Give students ongoing, frequent, and multiple forms of feedback on their progress. View the assessment of course success as similar to scientific research, centered on the students involved, and apply the assessment data to improve and enhance the learning environment.

**3. Promote a campus-wide commitment to change**

Mobilize all stakeholders, from students to administrators, to commit to improving the quality of undergraduate biology education. Support the development of a true community of scholars dedicated to advancing the life sciences and the science of teaching. Advocate for increased status, recognition, and rewards for innovation in teaching, student success, and other educational outcomes. Require graduate students in the biological sciences to participate in training in how to teach biology. Provide teaching support and training for all faculty, but especially postdoctoral fellows and early-career faculty, who are in their formative years as teachers.

**4. Engage the Biology community in the implementation of change**

Promote more concept-oriented undergraduate biology courses, and help all students learn how to integrate facts into conceptual contexts. Ensure that all undergraduates have authentic opportunities to experience the processes, nature, and limits of science. Create active-learning environments for all students, even those in first-year biology courses. Encourage all biologists to move beyond the “depth versus breadth” debate. Less really is more.

## Academic Learning Compacts: 2012 – 2013

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Person Responsible: Melanie Riedinger-Whitmore, Chairperson, Department of Biological Sciences

1. Content/Discipline Skills				
Goals/Objectives	Means of Assessment/ Corroborating Evidence*	Criteria for Success	Findings	Plan for Use of Findings in 2013-14
Demonstrate ability to communicate evolutionary processes	PCB 4674 - Organic Evolution: Complete research project on at least 10 evolutionary processes with at least 10 primary references	90% of students complete a research project on at least 10 evolutionary processes with a minimum grade 75%.	>90% of students completed a PowerPoint presentation that touched on 12 evolutionary processes with grades exceeding 75%.	Change to PP presentation.
Demonstrate ability to communicate the structure and Function of cell processes and organismal diversity.	Biology I, BSC 2010/2010L, Cell Processes: Complete lab reports on at least 3 topics of cell structure and function.  Biology II, BSC 2011. Organismal Diversity: - Complete 5 lab reports on at least 8 topics of organismal diversity.	80% of students complete at least 3 lab reports on essential cell processes with a minimum grade of 75%  Bio II: 80% of students complete at least 3 of 5 lab reports with a minimum grade of 75%.	Bio I: >80% (164/197) students scored 75% or better on all three written lab reports  Bio II: >80% of the students completed 5 of 5 labs reports with 75% or higher.	Bio I: the assessment will be same but criteria will be 80% of students have an <b>average</b> of at least 75% on the three reports to reflect overall performance and improvement.  Bio II: Continue the same process and determine with TA's whether to add one more lab report into the semester.
Demonstrate ability to analyze genetic sequences and infer evolutionary relationships.	PCB 3063L – Genetics Lab	80% of students complete a lab experiment report on the use of DNA sequence data in phylogenetic reconstruction with a minimum grade of 75%	Exactly 80% of students scored 75% or better on the written paper assignment.	The same metric will be used, with improved discussion of expectations and science writing techniques earlier in the semester.
Demonstrate ability to communicate the function of cell processes.	PCB 3023 – Cell Biology,	80% of students complete a summary/synthesis paper of a primary or secondary literature article on energy transformation with a minimum grade of 75%	>90% completed the assignment with a score of 75% or better	The same metric will be used.
Demonstrate the ability to apply concepts	PCB 3043 – Principles of Ecology,	80% of students complete presentation with a minimum	100% of the students completed a presentation	The same metric will be used.

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from othersciences to interpretbiological phenomena.	Present seminar describing the historical development of an ecological hypothesis, and methods used to examine hypothesis.	grade of 75%	with a minimum grade of 75%	
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\*Please include multiple assessments. For example: students perform well on classroom assignments, norm-referenced tests/surveys, and they get accepted to graduate school or are employed.

2. Communication Skills				
Goals/Objectives	Means of Assessment/ Corroborating Evidence*	Criteria for Success	Findings	Plan for Use of Findings in 2013-14
Demonstrate ability to accurately, clearly and succinctly communicate scientific concepts, interpretations and conclusions to scientific peers.	1. Complete comprehensive “clarity audit” of scientific paper: assess sentence structure, word choice, grammar and style.	Marine Biology Seminar and Biology Senior Seminar: 80% of students complete “clarity audit” with a minimum grade of 75%	N/A	Will start Fall 2013

3. Critical Thinking Skills				
Goals/Objectives	Means of Assessment/ Corroborating Evidence*	Criteria for Success	Findings	Plan for Use of Findings in 2013-14
Ability to apply the process of science: Design scientific process to understand living systems	BSC 2010-Biology I, BSC 2011 – Biology II, PCB 3063-Genetics, PCB 3023-Cell Biology, PCB 3043- Principles of Ecology BSC 4910 – Undergraduate Research Laboratory experiments, and lab reports	BSC 2010L: 80% of students complete 3 lab reports which apply scientific principles of hypothesis testing and model primary science literature format and style with a minimum grade of 75%	Bio II: 5 lab reports were completed with 85% of the students completing all of them with a 75% or higher.	Bio II: Same process as 2012-13
Ability to use quantitative reasoning: Apply quantitative analysis to interpret biological data	BSC 2010-Biology I, BSC 2011 – Biology II, PCB 3063-Genetics, PCB 3023-Cell Biology, PCB 3043- Principles of Ecology, BSC 4910 – Undergraduate	80% of students complete assignments with a minimum grade of 75%	>85% of students completed a research project and presented a poster with a grade of at least 75%. For PCB 3043, > 95% of the students completed essays	Expand goal to include lab research project in PCB 3043L.

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	Research Laboratory experiments, and lab reports		requiring quantitative analysis with grades > 75%	
Ability to use modeling and simulation: Use mathematical modeling and simulation tools to describe living systems	PCB 3043-Principles of Ecology Use ecological simulations to model predator/prey and competition experiments, and Interpret data collected.	80% of students complete assignments with a minimum grade of 75%	This was an ungraded lab exercise. 100% of the students used simulation models and interpreted data generated by their lab group during the exercise.	Use simulations in lecture as a tool to introduce topic to students prior to lab exercise.
Ability to understand the relationship between science and society: Identify social and historical dimensions of biology practice	MMC 2110 Science Communication, BSC 2010 – Biology I, BSC 2011-Biology II, PCB 4674 – Organic Evolution Completion of examination questions, lab exercises, and homework assignments	Bio II: 90% of students will turn in reaction paper regarding biological conservation and receive at least an 80%.	>90% of students completed a total of 12 research homework assignments with a grade that exceeded 75%. Bio II: 95% of the students turned in the assignment and received over an 80%.	Bio II: will review appropriate topics for next class.

4. Civic Engagement				
Goals/Objectives	Means of Assessment/ Corroborating Evidence*	Criteria for Success	Findings	Plan for Use of Findings in 2013-14
Participate in group activities, community outreach	BSC XXX – Biology Internship, active membership in Computational Biology Club, USFSP Student Chapter of the Botanical Society of America, Premed Club or other Biology student organizations	50% of Biology majors either complete an internship project, or participate in a formal Biology student organization	This is unrealistic to expect at this point in the early stages of the program.	Readdress a more realistic goal, means of assessment and criteria for success for 2013-14.
5. Multiculturalism / Diversity				
Goals/Objectives	Means of Assessment/ Corroborating Evidence*	Criteria for Success	Findings	Plan for Use of Findings in 2013-14
Promote and support diversity within the Biology Program through Biology	BSC xxxx: Bioethics course	80% of the students will lead a discussion related to diversity through a biological	This was offered as a special topics course for the first time in spring. Enrollment	Continue with same metric. We will be offering Senior Seminar in Biology as a

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courses.		topic discussion paper that they present.	was ~ 6 students – too low for collecting meaningful data.	capstone option, and this might be one of the themes for this course.

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## ALC GOALS ESTABLISHED FOR DATA COLLECTION:2013 – 2014

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**Academic Program: Biology**

**Person Responsible: Melanie Riedinger-Whitmore**

1. Content/Discipline Skills				
Goals/Objectives	Means of Assessment/ Corroborating Evidence*	Criteria for Success	Findings	Plan for Use of Findings in 2013-14
Demonstrate ability to communicate evolutionary processes	PCB 4674 - Organic Evolution: Complete powerpoint presentation on at least 10 evolutionary processes with at least 10 primary references	90% of students complete a ppt project on at least 10 evolutionary processes with a minimum grade 75%.		
Demonstrate ability to communicate the structure	Biology I, BSC 2010/2010L, Cell Processes:	80% of students complete at least 3 lab reports on		

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and Function of cell processes and organismal diversity.	Complete lab reports on at least 3 topics of cell structure and function.  Biology II, BSC 2011. Organismal Diversity: - Complete 5 lab reports on at least 8 topics of organismal diversity.	essential cell processes with a minimum grade of 75% overall.  Bio II: 80% of students complete at least 3 of 5 lab reports with a minimum grade of 75%.		
Demonstrate ability to analyze genetic sequences and infer evolutionary relationships.	PCB 3063L – Genetics Lab	80% of students complete a lab experiment report on the use of DNA sequence data in phylogenetic reconstruction with a minimum grade of 75%		
Demonstrate ability to communicate the function of cell processes.	PCB 3023 – Cell Biology,	80% of students complete a summary/synthesis paper of a primary or secondary literature article on energy transformation with a minimum grade of 75%		
Demonstrate the ability to apply concepts from other sciences to interpret biological phenomena.	PCB 3043 – Principles of Ecology,  Present seminar describing the historical development of an ecological hypothesis, and methods used to examine hypothesis.	80% of students complete presentation with a minimum grade of 75%		

\*Please include multiple assessments. For example: students perform well on classroom assignments, norm-referenced tests/surveys, and they get accepted to graduate school or are employed.

2. Communication Skills				
Goals/Objectives	Means of Assessment/ Corroborating Evidence*	Criteria for Success	Findings	Plan for Use of Findings in 2013-14
Demonstrate ability to accurately, clearly and succinctly communicate	1. Complete comprehensive “clarity audit” of scientific paper: assess sentence	Marine Biology Seminar and Biology Senior Seminar: 80% of students complete “clarity		

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scientific concepts, interpretations and conclusions to scientific peers.	structure, word choice, grammar and style.	audit” with a minimum grade of 75%		
<b>3. Critical Thinking Skills</b>				
<b>Goals/Objectives</b>	<b>Means of Assessment/ Corroborating Evidence*</b>	<b>Criteria for Success</b>	<b>Findings</b>	<b>Plan for Use of Findings in 2013-14</b>
Ability to apply the process of science: Design scientific process to understand living systems	BSC 2010-Biology I, BSC 2011 – Biology II, PCB 3063-Genetics, PCB 3023-Cell Biology, PCB 3043- Principles of Ecology BSC 4910 – Undergraduate Research Laboratory experiments, and lab reports	BSC 2010L: 80% of students complete 3 lab reports which apply scientific principles of hypothesis testing and model primary science literature format and style with a minimum grade of 75%		
Ability to use quantitative reasoning: Apply quantitative analysis to interpret biological data	BSC 2010-Biology I, BSC 2011 – Biology II, PCB 3063-Genetics, PCB 3023-Cell Biology, PCB 3043- Principles of Ecology, BSC 4910 – Undergraduate Research Laboratory experiments, and lab reports	80% of students complete assignments with a minimum grade of 75%.  PCB 3043L: 80% of students will complete a ecological research project with a 75% or above.		
Ability to use modeling and simulation: Use mathematical modeling and simulation tools to describe living systems	PCB 3043-Principles of Ecology Use ecological simulations to model predator/prey and competition experiments, and Interpret data collected.	80% of students complete assignments with a minimum grade of 75%		
Ability to understand the relationship between science and society: Identify social and	MMC 2110 Science Communication, BSC 2010 – Biology I, BSC 2011-Biology II, PCB 4674 – Organic Evolution	Bio II: 90% of students will turn in reaction paper regarding biological conservation and receive at		

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historical dimensions of biology practice	Completion of examination questions, lab exercises, and homework assignments	least an 80%.		
<b>4. Civic Engagement</b>				
Goals/Objectives	Means of Assessment/ Corroborating Evidence*	Criteria for Success	Findings	Plan for Use of Findings in 2013-14
Participate in group activities, community outreach	Active membership in Computational Biology Club, USFSP Student Chapter of the Botanical Society of America, Premed Club, Marine Adventures Club and other Biology-based student organizations.	50% of Biology majors will participate in a formal Biology student organization and complete at least one service/outreach event per year. Dept will create a list of acceptable projects.		

<b>5. Multiculturalism / Diversity</b>				
Goals/Objectives	Means of Assessment/ Corroborating Evidence*	Criteria for Success	Findings	Plan for Use of Findings in 2014-15
Promote and support diversity within the Biology Program through Biology courses.	BSC xxxx: Bioethics course	80% of the students will lead a discussion related to diversity through a biological topic discussion paper that they present.		

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## Attachment 1 USF St. Petersburg Strategic Goals and Objectives, 2009-2013

### 1 – Academic Performance

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Support and enhance programs that prepare students to be knowledgeable, reflective and engaged citizen scholars

- 1.1 Use sustained evidence of student learning outcomes and student achievement for continuous improvement
- 1.2 Offer certificate, undergraduate, and graduate programs that meet regional needs
- 1.3 Implement and support information and instructional technologies that facilitate effective pedagogies
- 1.4 Enhance programs that specifically support academic excellence
- 1.5 Increase student awareness of participating in a global society

### 2 – Student Engagement

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Enhance learning and achievement and promote retention through active engagement in curricular and co-curricular programs

- 2.1 Create a freshman experience that enables students to thrive and move successfully through to graduation
- 2.2 Foster institutional pride and strengthen connections within the campus community
- 2.3 Enhance opportunities for increased student involvement in curricular and co-curricular activities

### 3 – Diversity and Inclusion

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Create a vibrant, inviting, and enriching university community that values and respects all individuals and whose students, faculty, and staff represent the diversity of its region

- 3.1 Ensure an inclusive community where differences are respected and valued
- 3.2 Attract and retain a diverse student population
- 3.3 Increase the diversity of faculty and staff

### 4 – Research and Creative Activities

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Encourage faculty research and creative activities, and engage students in local, national and international scholarship

- 4.1 Create a vibrant culture of faculty research and creative scholarship
- 4.2 Promote and support undergraduate research as a meaningful aspect of campus life
- 4.3 Enhance and support research and scholarly collaborations with community partners

### 5 – Environmental Stewardship

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Foster stewardship of the environment and embody the values of sustainability

- 5.1 Enhance sustainability through energy conservation and recycling
- 5.2 Create a community that champions environmental awareness and sustainable living

### 6 – Administrative and Financial Stewardship

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Enhance revenue, provide effective and efficient financial management, and ensure institutional sustainability

- 6.1 Create and obtain funding streams to support short and long term initiatives
- 6.2 Increase private and corporate funding
- 6.3 Strengthen academic infrastructure of the university to ensure the proper alignment of instruction, services, and student life
- 6.4 Strengthen institutional infrastructure for the recruitment and retention of faculty and staff
- 6.5 Evaluate and improve facilities and processes that foster services to faculty, students, staff, and the community