

University of Hawai'i  
Code Request Form

I. REQUESTOR CONTACT INFORMATION

Name: Jean A. Pezzoli

Title: Institutional Researcher

Phone Number: (808) 984-3234

Email Address: Pezzoli@hawaii.edu

Campus/Office/Department/Address: MauiCC, Pilina 201

Action Requested:

NEW Program code (*new major/concentration, etc*)

NEW Subject Code

Change of existing code

Type (*subject, program, etc*):

Old:

New:

Other:

II. CODE REQUEST Academic program code preferences for consideration:

**NEW Program Code** Effective Term (*semester/year*): Fall 2010

Major: AS-NSCI Major Description: Associate in Science Degree in Natural Sciences

Is Major financial aid eligible?  Yes  No

Is major code being used the same way at other UH campuses?  Yes  No Comment: Kapiolani CC

Does same or similar major code exist in Banner?  Yes  No If yes, list code:

Concentration (*if applicable*): yes Concentration description: Biological Science and Physical Science

Is concentration code being used the same way at other UH campuses?  Yes  No

Does the same or similar concentration code exist in Banner?  Yes  No If yes, list code: KapCC does have AS-NSCI-PSC for Physical Sci, and a Life Science concentration with the code AS-NSCI-LFSC in lieu of Biological Science. UHMC is requesting AS-NSCI-BSC for our Biological Science.

Attach concentration to program code?  Yes  No

Level:  Undergraduate  Graduate  First-Professional  Other:

Degree/Certificate: A.S.

College: Instructional Department: Liberal Arts - STEM Department

If requesting a program name change, will current students be grandfathered in under the old program name?  Yes  No

If requesting a program name change, will the old code be available for:

Recruitment  Yes  No List the end term of old code:

Admissions  Yes  No List the end term of old code:

General Student  Yes  No List the end term of old code:

Academic History  Yes  No List the end term of old code:

**NEW Subject/Alpha Code** Effective Term (*effective semester/year*):

Code: Description:

College: Department:

Does the same or similar subject code exist in Banner?  Yes  No If yes, please list code:

Is the subject code being used the same way at other UH campuses?  Yes  No

University of Hawai'i  
Code Request Form

Other:

Briefly describe your request and explain why you are requesting the codes:

**III. SUPPORTING DOCUMENTATION**

Attach required supporting documentation. See *Guide to Academic Program Actions & Approval* at [http://www.Hawaii.edu/vpaa.cms/guide\\_to\\_academic\\_prog\\_121006.pdf](http://www.Hawaii.edu/vpaa.cms/guide_to_academic_prog_121006.pdf)

- BOR minutes, with supporting documentation provided to BOR, from meeting date: September 16, 2010  
 Memo from campus Chancellor.  
 Signed memo from UH President.  
 None required, according to the *Guide for Academic Program Actions & Approval*, seen at [http://www.hawaii.edu/vpaa/cms/guide\\_to\\_acad\\_prog\\_121006.pdf](http://www.hawaii.edu/vpaa/cms/guide_to_acad_prog_121006.pdf)

**IV. CAMPUS VERIFICATION**

The appropriate parties (faculty, administrators, registrar) have been consulted.

Jean A. Pezzoli

29 Mar 2011

*Name of requestor (print or type)*

*Signature*

*Date*

Send completed form with supporting documentation to:

Institutional Research Office (Attn: Lynn Inoshita or Christine Shaw) • 1633 Bachman Place • Sinclair Annex 2, Room 4 • Honolulu, HI 86822  
Fax: 808-956-9870 Phone: 808-956-7532

**University of Hawai'i  
Code Request Form**

For Internal use only

Appropriate documentation received:  Yes  No

Approval Status:

Notes:

Major code:  Yes  No

Concentr. code:  Yes  No

Program code:  Yes  No

Subject code:  Yes  No

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Entered into SMAPRLE/SOACURR:

Entered into STVMAJR:

Entered into STVSUBJ:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Code processing completion date:

Copies sent to:

\_\_\_\_\_

\_\_\_\_\_

Regent Baxa moved and Regent Gee seconded the motion for the Approval of Establishment of an Advanced Professional Certificate in Information Technology, which was met with unanimous approval.

### **University of Hawai'i-Maui College**

#### **Approval of a New Associate in Science Degree in Natural Science with a Concentration in Biological Science or Physical Science (AS Degree in Natural Sciences)**

UH Maui College Vice Chancellor, John McKee, said one component of the recent Pre-Engineering Collaborative grant from the National Science Foundation is to develop engineering courses for smaller and neighbor island campuses to provide an opportunity for its students to complete the pre-engineering track. There are no additional costs or classes. The proposed degree establishes a clear pathway for students who want to pursue a STEM degree at UH Mānoa or UH Hilo.

Regent Gee said the proposal states that the degree will be offered in the Fall 2010, and thus asked if it's already being offered. McKee said the courses are already in place and the instructors are teaching the classes. By approving the proposal, if students completed all the coursework by the end of this semester, they would be able to receive the degree. Regent Rasmussen asked about the articulation to UH Mānoa. McKee said the proposal has already been approved by the Chief Academic Officer's office, and UH Maui College faculty worked with faculty on other campuses on the proposal, including articulation to UH Mānoa.

Regent Baxa moved and Regent Rasmussen seconded the motion for the Approval of a New Associate in Science Degree in Natural Science with a Concentration in Biological Science or Physical Science, which was unanimously approved.

#### **Approval of a New Bachelor of Applied Science in Sustainable Science and Management**

Deferred to a future meeting.

### **IX. ANNOUNCEMENT**

Chair Karr announced the next meeting is scheduled for Thursday, October 28, 2010, at the John A. Burns School of Medicine, and a groundbreaking event for the Cancer Research Center is scheduled for that afternoon.

Chair Karr received a draft of the Pacific Bioscience Research Center closure action memo and will be assigning it to Regent Fukunaga, the Chair of the Standing Committee on Academic Affairs. Chair Karr anticipates a recommendation for action by the Committee for the upcoming Board meeting.

A list of Board standing committees and task groups was distributed to the Board. Any questions should be directed to Secretary Amemiya.



UNIVERSITY of HAWAI'I  
**MAUI COLLEGE**

UNIVERSITY OF HAWAII  
 BOARD OF REGENTS

August 13, 2010

10 SEP -7 P 3:00

**BOR APPROVED 9/16/10**

**e: J.Itano  
 S.Furuto  
 D.Mongold**

**MEMORANDUM**

**TO:** Howard H. Karr  
 Chairperson, University of Hawai'i Board of Regents

**VIA:** MRC Greenwood  
 President, University of Hawai'i

**VIA:** John Morton  
 Vice President for Community Colleges

**FROM:** Clyde M. Sakamoto  
 Chancellor, University of Hawai'i Maui College

**SUBJECT:** Approval of a new Associate in Science Degree in Natural Science with a concentration in Biological Science or Physical Science at University of Hawai'i Maui College (UH Maui College).

**SPECIFIC ACTION REQUESTED:**

It is requested that the University of Hawai'i Board of Regents approve the program proposal as submitted and grant Provisional Status for the Associate in Science Degree in Natural Science with a Concentration in Biological Science or Physical Science at University of Hawai'i Maui College.

**RECOMMENDATION EFFECTIVE DATE:**

Upon approval of the University of Hawai'i Board of Regents.

**BACKGROUND:**

Pursuant to the Board of Regents Policy 5-1, the Board of Regents has the authority to approve new degree programs upon recommendation of the President.

University of Hawai'i Maui College (UHMC) proposes an Associate in Science Degree in Natural Science (ASNS) with a concentration in Biological Science or Physical Science. This degree will provide a strong background for science, mathematics, engineering, and technology (STEM)



2002-2003  
 MetLife  
 Foundation  
 Best-Practice  
 College  
 Award Recipient



2008  
 Bellwether  
 Award  
 Recipient



2009  
 President's Higher  
 Education  
 Community  
 Service Honor Roll

310 W. Ka'ahumanu Avenue  
 Kahului, HI 96732-1617  
 Telephone: 808 984-3636  
 Fax: 808 244-3546  
 Website: [www.maui.hawaii.edu](http://www.maui.hawaii.edu)  
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students who intend to transfer to baccalaureate degree programs and offer a credential program that has not previously been available to students in STEM areas.

The number of students registering in STEM courses at UH Maui College has been increasing over the past few years. Currently there are over 2,000 students enrolled annually in STEM courses, with 188 STEM related majors projected by Fall 2011. The projected opening of UH Maui College's new Science facility in 2012 with state-of-the-art scientific equipment and classrooms will further enhance the preparation of students interested in pursuing degrees in the STEM related fields. Even though the UH Maui College Associate of Arts (AA) degree was recently revised to meet the needs of the lower-division general education requirements, the AA degree, as designed, is not specifically intended to prepare students for the intensive course work required in upper-division STEM degree programs.

The AAS in Natural Science program has been designed in close collaboration with community advisors and University researchers to ensure that the curriculum provides students with the strong educational foundation necessary to succeed at the baccalaureate level. As an inter-disciplinary program, the AAS in Natural Science includes topics in math, both the biological and physical sciences, as well as a strong liberal arts curriculum.

The UH Maui College's ASNS degree program is very similar to the AAS degree in Natural Science with a Concentration in Life Science or Physical Science instituted at Kapiolani Community College in Fall 2007. During spring 2010 semester 180 students were enrolled in the Kapiolani ASNS degree program. Approval of UH Maui College's program will bring the same educational opportunities to the students of Maui County.

The ASNS degree has been designed and reviewed in accordance with all existing University of Hawai'i System and UH Maui College policies and procedures. The program proposal has been reviewed and is supported by the UH Maui College Science, Technology, Engineering, and Math (STEM) department, the college Curriculum Committee, Academic Senate, UH Maui College administration, and the University of Hawai'i Council of Academic Officers.

A complete program proposal for the ASNS degree accompanies this action memo for review and consideration.

**ACTION RECOMMENDED:**

It is recommended that the University of Hawai'i Board of Regents approve the program proposal as submitted and grant Provisional Status for the Associate in Science Degree in Natural Science with a concentration in Biological Science or Physical Science at University of Hawai'i Maui College.

Attachment: New Program Proposal

c: Secretary to the Board of Regents



UNIVERSITY *of* HAWAII®  
**MAUI COLLEGE**

**New Program Proposal**

**Associate in Science (A.S.) Degree  
in Natural Science  
with a concentration in  
Biological Science  
or  
Physical Science**

**Date of Proposal: Spring 2010  
Proposed Date of Implementation: Fall 2010**

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## **Objectives of the Program**

University of Hawai'i – Maui College (UHMC) proposes to develop an Associate in Science in Natural Science (AS-NS) Degree with concentrations in Biological Science or Physical Science. This degree is designed specifically for students who are planning to transfer to baccalaureate degree programs in science, technology, engineering, or mathematics (STEM). The new AS-NS Degree will

- \* provide a comprehensive background in science and math courses;
- \* provide a practical and appropriate associate's degree option for STEM students; and
- \* facilitate development of articulation and transfer agreements between UHMC and four-year STEM programs at UH-Manoa (UHM), UH-Hilo (UHH), and to U.S. mainland institutions.

The number of students registering in STEM courses at UHMC is increasing, particularly in calculus and calculus-based physics (see Appendix A, Table 1. Enrollment in selected STEM Courses at UHMC from Spring 2005 to Spring 2010). Many of the UHMC students interested in pursuing a STEM major within the UH System transfer without receiving a credential. In the past five years, 25-30% of the UHMC students transferring within the UH System and declaring STEM majors did not complete a degree and entered as unclassified or with early admission (see Appendix A, Tables 2 and 3. Numbers and Percentages of UHMC Transfer Students Declaring STEM Majors at UH-Manoa and UH-Hilo Entering With and Without Degrees from 2005 to 2010). Of the remaining UHMC students who transferred within the UH System and declared as upper-division STEM majors, 56% received an AA degree in Liberal Arts and 16% received either an AS or an AAS degree (see Appendix A, Table 4. Number of Students Transferring from UHMC to STEM Majors at UH-Manoa and UH-Hilo from 2005 to 2010). Even though the UHMC AA degree in Liberal Arts was recently revised to meet the needs of the lower-division students in Maui County, this AA degree is not intended to prepare students for intensive, upper-division work in STEM courses.

This program will allow counselors and STEM Department academic advisors to identify potential STEM majors early in their academic careers, encourage them to enroll in appropriate courses as soon as possible, follow their progress more closely, and assure success for transfer to baccalaureate programs.

This proposed degree will prepare students with strong science backgrounds to enter baccalaureate degree programs that focus on areas of increasing demand including biotechnology, aquaculture, marine and environmental sciences, renewable energy, sustainable technologies, and secondary education in science and math (see Appendix B, Tables 1 and 2 for supporting SOC and Occupation Projection data). Note that the estimated annual salaries are well above the county average of \$38,000. There is an urgent need for teacher candidates to fill local secondary-school teaching positions (see Appendix B, Table 3. Education Industry Job

Projections for Hawaii and Maui County). Traditionally, the Hawai'i State Department of Education has needed to go outside the state to recruit additional science and math teachers and unfortunately, there are still many under qualified people teaching science and math courses in the state's public schools.

UHMC students have demonstrated strong community involvement in STEM areas serving as tutors, research assistants, interns, as well as qualifying for service-learning credit through their course work. They are active in a wide variety of local STEM-related institutions, governmental agencies, non-profit organizations, and businesses. Many students have been hired by these organizations both before and after graduation (see Appendix C. Local science-related institutions, agencies, non-profit organizations, and businesses, that utilize and/or hire Maui College research assistants, interns, or service-learning students).

This will be the second degree of this kind in the University of Hawai'i System. In 2005, the faculty at Kapiolani Community College (KapCC) noted that the AA degree in Liberal Arts was not meeting the needs of transfer students in STEM areas and that there should be a specialized AS degree the STEM area. They indicated that, "The absence of a STEM AS degree impacts the growth of coherent, strong, and diverse STEM offerings and the success of our students in STEM." The STEM faculty justified the development of a two-year academic program, which does not directly fulfill a critical and immediate need in the job market, by demonstrating the lack of depth in the math and science courses in the AA in Liberal Arts. KapCC instituted the AS-NS Degree Program in Fall 2007. The proposed AS-NS degree for UHMC will be similar to the degree at KapCC (see Appendix D. Kapiolani Community College Advising & Planning Sheet – Associate in Science Natural Science 2009 and Catalog Information Sheet).

### **Relationship of the Program to the Functions of the College and the University**

The proposed degree directly supports the University of Hawai'i – Maui College's Mission, Vision, and Strategic Plan which are guided by the Native Hawaiian reverence for the *ahupua`a*, a practice of sustaining and sharing diverse but finite resources for the benefit of all.

The mission statement is

*"The College is a learning-centered institution that provides affordable, high quality credit and non-credit educational opportunities to a diverse community of lifelong learners."*

The College's vision statement is

*"We envision a world-class college that meets current and emerging Maui County education and training needs through innovative, high quality programs offered in stimulating learning environments."*

The proposed AS-NS Degree supports the following goals, objectives, and action strategies of the College's 2003-2010 Strategic Plan.

**Goal 1 - Educational Effectiveness and Student Success: Embrace a culture of excellence and performance as the hallmarks of effective student learning and success.**

**Objective 1: Achieve a shared institutional culture that makes student learning and success the responsibility of all.**

**Action Strategies**

2. Provide instructional methods, technologies, materials, facilities, and academic support services that accommodate students of varied learning styles, backgrounds, interests, and abilities.
3. Provide students with access to a seamless UH system with full articulation between all campuses.
4. Engage students in active learning.
12. Provide full student support services, including advising, tutoring, counseling, and library services, that increase student retention and success in a learning-centered environment.
13. Create seamless instructional and support services, offering academic intervention at the earliest indication that a student is experiencing difficulties.

**Objective 3: Develop and implement a comprehensive evaluation system for regular review of all educational and student service programs.**

**Action Strategies**

1. Establish a comprehensive institutional effectiveness system that integrates assessment with planning, budgeting, and program implementation in a continuous improvement cycle.
2. Implement educational program review/assessment and learning outcomes to evaluate and improve student learning.
3. Evaluate curriculum to improve student learning.
4. Identify student learning goals established by instructional programs.
5. Identify and make public expected learning outcomes for degree and certificate programs.

**Goal 2 - A Learning, Applied Research, and Service Network: Engage in intellectual and educational activities that enable the county of Maui and the state of Hawai'i to flourish.**

**Objective 1: Support the county and state economy and workforce development.**

**Action Strategies**

1. Foster and maintain a working partnership with the Department of Education that focuses on public education (P-20), teacher education, Hawaiian language and culture education, student preparation, and lifelong learning.
4. Involve faculty in the development of an efficient articulation process based on trust among faculties and on student outcomes and competencies.
5. Maximize opportunities for students to enroll and transfer among campuses in order to achieve their educational objectives in a timely manner.
10. Facilitate dialogue and discussion with business and community partners to better serve workforce needs
11. Determine the need for emerging specializations in the workplace; create partnerships between college and community representatives to address new program initiatives.
14. Partner with the community to identify educational and training needs and to determine how the College can best meet those needs.

**Objective 3: Practice applied research for the discovery of knowledge. Students will be carrying out applied research in STEM courses.**

**Action Strategies**

1. Promote applied research through collaboration across disciplines and among campuses.
2. Develop, implement, and support new applied research projects

In March 2008, the UH System Strategic Outcomes and Performance Measures were updated through 2015. This degree program will promote the goals of 1) assuring a solid return on its investment in higher education through research and training and 2) contributing to the development of a high-skilled, high-wage workforce through the establishment of new education and training programs in STEM degrees. Many of the goals of the 2002-2010 UH System strategic plan will be met through an emphasis on learning through place-based research, use of emerging learning technologies, and cooperation with other branches of the UH system.

The development of this degree directly supports three of the State Department of Education (DOE) Career Pathways. These serve to guide career exploration and planning activities, to focus teaching and learning, and to link education with relevant real-world experiential activities. Related career pathways include Natural Resources, Industrial and Engineering Technology, as well as Public and Human Services because these STEM majors will have the strong

backgrounds that are required for entering credential programs for certification to teach secondary math and science.

### **Organization of the Program**

The proposed curriculum will require a minimum of 60 credits of 100- and 200-level courses and a 2.0 grade point ratio (GPA) minimum for all courses required by the degree. The curriculum includes 24 credits of General Education requirements, 7 credits of additional program requirements, two writing intensive courses, 16-17 required credits in the Biological Science Concentration or 13 required credits in the Physical Science Concentration, and 12-16 credits of electives in STEM courses (see Appendix E. Associate Degree in Natural Science with Concentrations in Biological Science or Physical Science Program Requirements and Map).

#### **1. General Education:**

**a. Quantitative Reasoning (4 credits):**

Math 205(4)

**b. English/Communications (6 credits):**

English 100(3) and at least one of the following: English 106(3), 209(3), 210(3) or Speech 151(3), 251(3)

**c. Elective credits (14 credits):**

At least one course from each Humanities and Social Science. Applicable courses may be chosen from the following:

1) Humanities (3 credits): Choose one from Art, Communication, Dance, Drama, East-Asian Languages, English 250-257, Hawaiian, Hawaiian Studies, History, Humanities, Japanese, Linguistics, Music, Philosophy, Religion, Spanish, Speech

2) Natural Sciences: (8 credits): Chemistry 161/161L(4), choose any four credits from Agriculture, Anthropology 215, Astronomy, Biology, Biochemistry, Food Science & Human Nutrition, Geography 101/101L, Geology & Geophysics, Microbiology, Oceanography 201/201L, Physics, Science, Zoology

3) Social Sciences (3 credits): Choose from Anthropology (*except 215*), Botany 105, Economics, Family Resources, Geography (*except 101/101L*), Political Science, Psychology, Social Science, Sociology

#### **2. Additional Program Requirements (7 credits):**

**a. Chemistry 162/162L(4)**

**b. Information and Computer Sciences 101(3) or higher with approval**

NOTE: UHMC faculty members are developing a computer competency evaluation instrument that will allow students to receive credit-by-examination for this requirement. Once that examination has been tested, students in this degree program will be able to enroll in an additional three credits of STEM course electives if they pass the computer competency evaluation test.

3. Area of Concentration (choose one):
  - a. Biological Science (16-17 credits): Biology 171/171L(4), 172/172L(4) and Physics 151(4) and 152(4) or Physics 170(5) and 272(4)
  - b. Physical Science (13 credits): Mathematics 206(4), Physics 170(5), 272(4)
4. Concentration Electives (12-16 credits)

If not taken for Area of Concentration, choose from: Agriculture 200(4); Anthropology 210/210L, 215; Astronomy 110/110L(4); Biochemistry 241(3), 244(3); Biology 105(4), 124/124L(4), 151/151L(4), 171/171L(4), 172/172L(4), 200(4), 225(4), 226(5); Geography 101/101L(4); Geography Information Systems 150(4), 180(4); Geology & Geophysics 101(4), 103(3); Mathematics 206(4), 231(3)\*, 232(3)\*; Microbiology 130(3), 140(2); Oceanography 201/201L(4); Physics 170(5), 272(4); Zoology 141(4), 142(4), 200(4)

*\*Recommended for Physical Science Concentration*
5. Cumulative Grade Point Average:  
2.0 or better
6. Information & Computer Science requirement may be satisfied with credit-by-examination
7. Writing Intensive:  
Two (2) courses with "WI" designation.
8. Residence Requirement:  
12 credits in the major must be completed at Maui College. May be waived for cause or credit-by-examination used with approval of the VCAA.
9. Graduation Requirement:  
Students must complete the AS Application for Graduation form obtained from Student Services.

## **Program Learning Outcomes**

Upon successful completion of the AS-NS Degree Program, students will be able to:

1. explain the natural and technological world using reflection and quantitative analysis including preparation of a plan to collect, process, and interpret data; evaluation of the plan, procedures, and findings; and communication of the conclusions;
2. explain scientific knowledge and understanding to different audiences for a range of purposes; and
3. apply scientific knowledge, skills, and understandings to problems and issues in daily life.

## **Enrollment Projections**

Data for Spring 2010 indicates that the Maui College registration in all STEM courses was over 3,000. Any of these students could have been taking math, science, and computer courses, but rarely more than one of each. This is a large number based on the Spring 2010 total enrollment of 4,040 students.

UHMC instructors are finding that students are entering with stronger backgrounds in math and sciences. Many of these students have volunteered to serve in science and technology areas, or have actual work experience in STEM-related jobs, and are looking forward to obtaining degrees that will make them more competitive in the job market. Students registered in STEM courses also provide a pool for student assistant jobs within the college as lab assistants in the sciences and tutors in science and math.

Enrollments in science and math courses required for the AS-NS Degree have either remained constant or gradually increased in the past five years. The number of students registered in General Chemistry I and II (Chemistry 161, 161L, 162, 162L) has remained about the same with notable increases in continuation from first semester into the second semester course. The Introductory Biology I and II courses (Biology 171, 171L, 172, 172L) were first offered in Fall 2005, and College Physics I and II (Physics 170, 272) were revived in Fall 2008. Enrollments in all four Calculus classes have increased over the past five years (see Appendix A, Table 1. Enrollment in selected STEM Courses at UHMC from Spring 2005 to Spring 2010).

UHMC counselors see this degree as helpful for the increasing number of pre-engineering and astronomy students enrolling at the college. Even though UHMC does not offer the full inventory of pre-engineering courses, through this degree pre-engineering students will be able to complete the required science and math courses that are part of the AS-NS and required for engineering transfer. Moreover, there are plans at the system level to develop and offer those pre-engineering courses that are missing from the UHMC inventory. At that time, a more formal pre-engineering track could easily be incorporated into the AS-NS.

## **Resources Required for Program Implementation**

All the required courses are currently being offered at the college. Consequently, no additional STEM faculty will be required to institute the program. This would allow the degree to be offered in Fall 2010.

The program budget does include 0.5 FTE STEM Department counselor and 0.25 released time for a faculty program coordinator. A \$25,000 grant proposal has been submitted to the Rural Development Program (RDP) to support a part-time counselor and program coordinator. There are budget increases for additional library resources, equipment and supplies, and an additional student laboratory assistant (see Appendix F. Academic Cost Revenue Template – New Program and Notes to Budget Template).

The college has a National Science Foundation (NSF), Tribal College and University Programs (TCUP) grant to support Native Hawaiian students' success in STEM courses. This grant supports the highly successful STEM Lab, *Ho'okahua*. In the lab, students have access to computers, printers, cameras and other digital equipment, and tutors for STEM classes.

The State Legislature recently appropriated \$25 million to build a new science building on the Maui College campus and the construction bids have been received. Additional supplies, computer hardware and software, and laboratory equipment will need to be purchased to assure that the new laboratories will have the most up-to-date technologies available.

## **Measures of Program Efficiency**

All programs at UHMC complete annual reviews which support and guide modifications and improvements. Program efficiency is measured by program health indicators that include 1) average class size, 2) class fill rate, 3) FTE of BOR appointed program faculty, 4) student/faculty ratio, 5) number of majors per FTE faculty, 6) program budget allocation (personnel, supplies and services, equipment), 7) cost per SSH, and 8) number of classes that enroll less than ten students.

## **Measures of Program Effectiveness**

The effectiveness of the degree program will be documented as an essential part of the annual program review. This will include an assessment of student learning outcomes for the required courses for the AS-NS Degree. Program effectiveness will be measured by 1) persistence of majors fall to spring, 2) student retention, 3) annual number of degrees and certificates earned, 4) degrees earned in relationship to the number of majors, number of students transferring into STEM baccalaureate programs, and 5) documentation of achievement of the course and program learning outcomes as measured by appropriate assessment techniques, tools, and products. The analysis of the program data will include a discussion of the strengths and weaknesses in terms of demand, efficiency, and effectiveness. Annual action plans will be recommended based on the



analysis including new certificates, gain/loss of positions, and review of the results of prior year's action plan.

All students in the degree program will be required to maintain portfolios of their STEM course work, field notes, data analyses and summaries, research papers, selected readings, directed studies materials, service-learning journals, web pages and other media presentations, instructors evaluations, and other pertinent materials. These portfolios will provide authentic assessment of student learning outcomes for required and elective courses, as well as program learning outcomes.

Initial assessment plans, including the AS-NS program learning outcomes and general education outcomes, are summarized in Appendix G.

## Appendix A

### UHMC STEM Enrollment and Transfer Data

**Table 1: Enrollment in Selected STEM Courses at UHMC from Spring 2005 to Spring 2010**

|                                | S05 | F05 | S06 | F06 | Su07 | S07 | F07 | S08 | F08 | S09 | F09 | S10 |
|--------------------------------|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|
| <b>Introductory Biology I</b>  |     |     |     |     |      |     |     |     |     |     |     |     |
| BIOL 171                       |     | 15  |     |     |      |     | 20  |     | 12  |     | 12  |     |
| BIOL 171L                      |     | 15  |     |     |      |     | 20  |     | 15  |     | 12  |     |
| <b>Introductory Biology II</b> |     |     |     |     |      |     |     |     |     |     |     |     |
| BIOL 172                       |     |     | 8   |     |      |     |     | 13  |     | 4   |     | 10  |
| BIOL 172L                      |     |     | 10  |     |      |     |     | 15  |     | 5   |     | 11  |
| <b>General Chemistry I</b>     |     |     |     |     |      |     |     |     |     |     |     |     |
| CHEM 161                       |     | 25  |     | 20  |      |     | 27  |     | 19  |     | 22  |     |
| CHEM 161L                      |     | 25  |     | 19  |      |     | 27  |     | 19  |     | 21  |     |
| <b>General Chemistry II</b>    |     |     |     |     |      |     |     |     |     |     |     |     |
| CHEM 162                       | 9   |     | 8   |     |      | 12  |     | 19  |     | 14  |     | 19  |
| CHEM 161L                      | 7   |     | 8   |     |      | 12  |     | 18  |     | 14  |     | 18  |
| <b>Calculus I</b>              |     |     |     |     |      |     |     |     |     |     |     |     |
| MATH 205                       | 20  | 10  | 27  | 13  | 6    | 10  | 12  | 13  | 17  | 12  | 29  | 7   |
| <b>Calculus II</b>             |     |     |     |     |      |     |     |     |     |     |     |     |
| MATH 206                       | 12  |     |     | 21  |      | 13  | 16  |     | 27  |     | 2   | 29  |
| <b>Calculus III</b>            |     |     |     |     |      |     |     |     |     |     |     |     |
| MATH 231                       |     | 16  | 17  |     |      | 18  |     | 7   |     | 16  | 23  |     |
| <b>Calculus IV</b>             |     |     |     |     |      |     |     |     |     |     |     |     |
| MATH 232                       |     |     |     |     |      |     | 16  |     |     |     |     | 32  |
| <b>College Physics I</b>       |     |     |     |     |      |     |     |     |     |     |     |     |
| PHYS 151                       |     | 13  |     | 9   |      |     | 17  |     | 9   |     |     |     |
| <b>College Physics II</b>      |     |     |     |     |      |     |     |     |     |     |     |     |
| PHYS 152                       |     |     | 7   |     |      | 4   |     | 6   |     | 5   |     |     |
| <b>General Physics I</b>       |     |     |     |     |      |     |     |     |     |     |     |     |
| PHYS 170                       |     |     |     |     |      |     |     | 7   |     |     | 15  |     |
| <b>General Physics II</b>      |     |     |     |     |      |     |     |     |     |     |     |     |
| PHYS 272                       |     |     |     |     |      |     |     |     | 7   |     |     | 14  |

**Table 2: Numbers and Percentages of UHMC Transfer Students Declaring STEM Majors at UH-Manoa Entering With and Without Degrees from 2005 to 2010**

| UH-Manoa Major                 | UHMC Major                      | Students |
|--------------------------------|---------------------------------|----------|
| Animal Sciences                | Liberal Arts                    | 3        |
| Biology                        | Human Services                  | 1        |
| Biology                        | Liberal Arts                    | 19       |
| Botany                         | Liberal Arts                    | 1        |
| Chemistry                      | Liberal Arts                    | 5        |
| Civil Engineering              | Liberal Arts                    | 3        |
| Computer Science               | Accounting                      | 1        |
| Computer Science               | Business Careers                | 1        |
| Computer Science               | Electronics & Comp Engin. Tech  | 5        |
| Computer Science               | Liberal Arts                    | 6        |
| Electrical Engineering         | Business Careers                | 1        |
| Electrical Engineering         | Liberal Arts                    | 3        |
| Food Science & Human Nutrition | Liberal Arts                    | 3        |
| General (Pre-Math)             | Liberal Arts                    | 2        |
| General (Pre-Medical Program)  | Business Careers                | 1        |
| General (Pre-Medical Program)  | Liberal Arts                    | 3        |
| General (Pre-Nursing)          | Liberal Arts                    | 12       |
| General (Pre-Nursing)          | Nursing                         | 2        |
| Global Environmental Science   | Liberal Arts                    | 3        |
| KLS, Hth/Exer Sci & Lifest Mgt | Liberal Arts                    | 2        |
| KLS, Hth/Exer Sci & Lifest Mgt | Nursing                         | 1        |
| Marine Biology                 | Accounting                      | 1        |
| Marine Biology                 | Hotel Operations                | 1        |
| Marine Biology                 | Liberal Arts                    | 6        |
| Mechanical Engineering         | Accounting                      | 1        |
| Mechanical Engineering         | Fashion Technology              | 1        |
| Mechanical Engineering         | Liberal Arts                    | 2        |
| Microbiology                   | Liberal Arts                    | 1        |
| Natural Res & Environmentl Mgt | Liberal Arts                    | 3        |
| Nursing                        | Liberal Arts                    | 5        |
| Physics                        | Liberal Arts                    | 3        |
| Plant & Environ Protection Sci | Liberal Arts                    | 1        |
| Plant & Environmental Biotech  | Liberal Arts                    | 1        |
| Pre-Dentistry                  | Liberal Arts                    | 1        |
| Pre-Engineering                | Business Careers                | 2        |
| Pre-Engineering                | Drafting Technology             | 1        |
| Pre-Engineering                | Electronics & Comp Engin. Tech  | 1        |
| Pre-Engineering                | Liberal Arts                    | 1        |
| Tropical Plant & Soil Sciences | Agriculture                     | 2        |
| Tropical Plant & Soil Sciences | Liberal Arts                    | 2        |
| Zoology                        | Liberal Arts                    | 3        |
|                                | Percent entering with degree    | 70%      |
| Electrical Engineering         | Unclassified or Early Admit     | 1        |
| Animal Sciences                | Unclassified or Early Admit     | 3        |
| Biology                        | Unclassified or Early Admit     | 10       |
| Chemistry                      | Unclassified or Early Admit     | 1        |
| Civil Engineering              | Unclassified or Early Admit     | 1        |
| Computer Science               | Unclassified or Early Admit     | 6        |
| Food Science & Human Nutrition | Unclassified or Early Admit     | 1        |
| General (Pre-Medical Program)  | Unclassified or Early Admit     | 6        |
| Geology & Geophysics           | Unclassified or Early Admit     | 6        |
| Mechanical Engineering         | Unclassified or Early Admit     | 3        |
| Microbiology                   | Unclassified or Early Admit     | 2        |
| Natural Res & Environmentl Mgt | Unclassified or Early Admit     | 1        |
| Nursing                        | Unclassified or Early Admit     | 5        |
| Ocean & Resources Engineering  | Unclassified or Early Admit     | 1        |
| Physics                        | Unclassified or Early Admit     | 2        |
| Pre-Engineering                | Unclassified or Early Admit     | 1        |
|                                | Percent entering without degree | 30%      |

**Table 3: Numbers and Percentages of UHMC Transfer Students Declaring STEM Majors at UH-Hilo Entering With and Without Degrees from 2005 to 2010**

| <b>UH-Hilo Major</b>           | <b>UHMC Major</b>                      | <b>Students</b> |
|--------------------------------|--|-----------------|
| Agriculture                    | Agriculture                            | 3               |
| Agriculture                    | Food Service                           | 1               |
| Agriculture                    | Liberal Arts                           | 8               |
| Astronomy                      | Food Service                           | 1               |
| Biology                        | Business Careers                       | 1               |
| Biology                        | Liberal Arts                           | 9               |
| Biology                        | Nursing                                | 1               |
| Chemistry                      | Liberal Arts                           | 6               |
| Computer Science               | Liberal Arts                           | 1               |
| Environmental Studies          | Liberal Arts                           | 1               |
| Marine Science                 | Auto Body Repair & Painting            | 1               |
| Marine Science                 | Liberal Arts                           | 8               |
| Mathematics                    | Liberal Arts                           | 1               |
| Natural Science                | Human Services                         | 1               |
| Nursing                        | Liberal Arts                           | 1               |
| Nursing                        | Nursing                                | 3               |
| Pharmacy                       | Liberal Arts                           | 2               |
|                                | <b>Percent entering with degree</b>    | <b>75%</b>      |
|                                |  |                 |
| Agriculture                    | Unclassified or Early Admit            | 2               |
| Astronomy                      | Unclassified or Early Admit            | 1               |
| Biology                        | Unclassified or Early Admit            | 2               |
| Chemistry                      | Unclassified or Early Admit            | 2               |
| Computer Science               | Unclassified or Early Admit            | 3               |
| Kinesiology & Exercise Science | Unclassified or Early Admit            | 2               |
| Marine Science                 | Unclassified or Early Admit            | 2               |
| Pharmacy                       | Unclassified or Early Admit            | 2               |
|                                | <b>Percent entering without degree</b> | <b>25%</b>      |

**Table 4: Number of Students Transferring from UHMC to STEM Majors at UH Manoa and UH-Hilo from 2005 to 2010**

|                           |                                |   |            |     |
|---------------------------|--------------------------------|---|------------|-----|
| AA Degree<br>Liberal Arts |                                |   | 130        | 56% |
| AAS or AS<br>Degrees      |                                |   | 36         | 16% |
|                           | Accounting                     | 3 |            |     |
|                           | Agriculture                    | 5 |            |     |
|                           | Auto Repair                    | 1 |            |     |
|                           | Business Careers               | 6 |            |     |
|                           | Drafting Technology            | 1 |            |     |
|                           | Electronics & Comp Engineering | 6 |            |     |
|                           | Fashion Technology             | 1 |            |     |
|                           | Food Service                   | 2 |            |     |
|                           | Hotel Operations               | 2 |            |     |
|                           | Human Services                 | 2 |            |     |
|                           | Nursing                        | 5 |            |     |
|                           | Practical Nursing              | 2 |            |     |
| Unclassified              |                                |   | 45         | 19% |
| Early Admission           |                                |   | 20         | 9%  |
| <b>Total</b>              |                                |   | <b>231</b> |     |

**Appendix B**  
**SOC and Occupation Projection Data Tables**

**Table 1: Occupation Data by SOC Code Level 5, Bachelor's Degree Education Level,  
Region: Maui County**

| SOC Code | Description                        | 2006 Jobs | 2017 Jobs | New Jobs | Replacement Jobs | Annual Jobs | Annual EPW |
|----------|------------------------------------|-----------|-----------|----------|------------------|-------------|------------|
| 17-2081  | Environmental engineers            | 27        | 34        | 7        | 5                | 1           | 61,644     |
| 19-1023  | Zoologists & wildlife biologists   | 13        | 14        | 1        | 4                | 0           | 44,878     |
| 19-1029  | Biological scientists              | 24        | 29        | 5        | 8                | 1           | 56,843     |
| 19-1031  | Conservation scientists            | 10        | 11        | 1        | 3                | 0           | 50,573     |
| 19-1099  | Life scientists                    | 9         | 9         | 0        | 3                | 0           |            |
| 19-2099  | Physical scientists                | 16        | 21        | 5        | 4                | 1           | 62,970     |
| 25-2021  | Elementary teachers                | 706       | 842       | 136      | 171              | 28          | 36,409     |
| 25-2022  | Middle school teachers             | 354       | 397       | 43       | 86               | 12          | 35,870     |
| 25-2031  | Secondary teachers                 | 589       | 684       | 95       | 182              | 25          | 40,783     |
| 25-2043  | Training & development specialists | 72        | 101       | 29       | 12               | 4           | 36,013     |
| 25-3099  | Teachers, all others               | 147       | 173       | 26       | 20               | 4           | 38,550     |
| 27-3042  | Technical writers                  | 34        | 44        | 10       | 11               | 2           | 44,789     |

**Table 2: Selected Technology Industry Job Projections for Hawaii**

*Source: Economic Modeling Specialists Inc., from Innovation and Technology in Hawai'i: An Economic and Workforce Profile, 2008*

*([http://www.hiscitech/org\\_data0001/resources/live/Innovation+Tech+Hawaii+Report+Sept30.pdf](http://www.hiscitech/org_data0001/resources/live/Innovation+Tech+Hawaii+Report+Sept30.pdf))*

|   | <b>Annual<br/>Growth<br/>Rate<br/>2002-07</b> | <b>Number<br/>Employed<br/>2007</b> | <b>Projected<br/>Annual<br/>Growth<br/>Rate<br/>2007-17</b> | <b>Projected<br/>Number<br/>of New<br/>Jobs<br/>2007-17</b> |
|---|---|-------------------------------------|---|---|
| <b>Industries</b>   |   |                                     |   |   |
| <b>All Technology Industries</b>                                    | <b>2.9%</b>                                   | <b>31,106</b>                       | <b>1.9%</b>   | <b>5,910</b>  |
| <b>Private Sector</b>   | <b>3.3%</b>                                   | <b>23,985</b>                       |   |   |
| <b>Public Sector</b>  | <b>1.8%</b>                                   | <b>7,121</b>                        |   |   |
| <b>Agriculture biotechnology<br/>including aquaculture</b>          | <b>6.4%</b>                                   | <b>4,833</b>                        | <b>3.2%</b>   | <b>1,546</b>  |
| <b>Bio/life sciences,<br/>except agricultural<br/>biotechnology</b> | <b>2.3%</b>                                   | <b>7,970</b>                        | <b>0.9%</b>   | <b>717</b>  |
| <b>Engineering and professional<br/>and technical services</b>      | <b>3.8%</b>                                   | <b>12,019</b>                       | <b>0.7%</b>   | <b>841</b>  |
| <b>Environmental</b>  | <b>4.0%</b>                                   | <b>8,593</b>                        | <b>1.7%</b>   | <b>1,460</b>  |
| <b>Ocean sciences</b>   | <b>5.2%</b>                                   | <b>5,288</b>                        | <b>2.6%</b>   | <b>1,374</b>  |
| <b>Renewable energy</b>   | <b>8.4%</b>                                   | <b>3,587</b>                        | <b>2.8%</b>   | <b>1,000</b>  |

**Table 3: Education Industry Job Projections for Hawaii and Maui County**

*Source: HireNetHawaii (<http://www.hirenethawaii.com/>)*

|  | <b>Number<br/>of Jobs</b> | <b>Projected<br/>Rate</b> | <b>Projected<br/>New Jobs</b> |
|--|---------------------------|---------------------------|-------------------------------|
| <b>Education Industry Subsectors<br/>in the State of Hawaii</b>                | <b>2005<br/>12,710</b>    | <b>2002-12<br/>18.8%</b>  | <b>2002-12<br/>9,530</b>      |
| <b>High Demand Jobs in Maui County</b>   | <b>2004</b>               | <b>2004-14</b>            | <b>2004-14</b>                |
| <b>Secondary School Teachers<br/>Except Special &amp; Vocational Education</b> | <b>680</b>                | <b>11.8%</b>              | <b>760</b>                    |
| <b>Elementary School Teachers,<br/>Except Special Ed</b>                       | <b>460</b>                | <b>13%</b>                | <b>520</b>                    |

**Appendix C**  
**Local science-related institutions, agencies, non-profit organizations,**  
**and businesses that utilize and/or hire Maui College**  
**research assistants, interns, and service-learning students**

County of Maui,  
    Department of Water Supply \*  
    Planning Department  
Dolphin Quest  
East Maui Watershed Restoration \*  
Haleakala Ranch \*  
Hawai'i Nature Center \*  
Hawai'i Source Education Outreach Program (aka Maui Digital Bus/Akimeka) \*  
Hawai'i Wildlife Fund  
Hawaiian Islands Humpback Whale National Marine Sanctuary \*  
Ho'ike o Haleakala \*  
Lahaina Divers \*  
Maui Dive Shop \*  
Maui Invasive Species Committee (MISC) \*  
Maui Land & Pineapple Company \*  
Maui Nui Botanical Garden \*  
Maui Ocean Center \*  
National Marine Fisheries \*  
Neighborhood Place \*  
Pacific Disaster Center  
Pacific Whale Foundation \*  
Papahānaumokuākea Marine National Monument  
Reef Environmental Education Foundation (REEF) \*  
Ritz-Carlton Ocean Ambassador Program \*  
Project S.E.A.-Link \*  
State of Hawai'i  
    Department of Education, elementary, middle school, and high-school sciences \*  
    Department of Land & Natural Resources, Division of Conservation & Enforcement \*  
    Department of Land & Natural Resources, Division of Aquatic Resources \*  
    Department of Land & Natural Resources, Natural Area Reserve System \*  
The Nature Conservancy \*  
Trilogy \*  
US Fish & Wildlife Service  
US National Wildlife Refuge at Kealia Pond \*  
US Parks Department, Haleakala National Park \*  
University of Hawai'i, Department of Botany \*  
Hawai'i Institute of Marine Biology  
Sea Grant Extension Service \*

*\* Hired former and current Maui College students*



# Appendix D

## Kapiolani Community College Advising & Planning Sheet - Associate in Science, Natural Science 2009 and Catalog Information Sheet

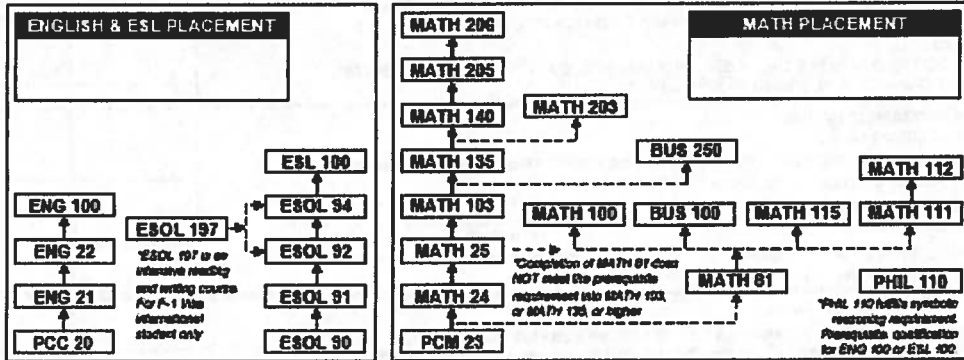
ARTS & SCIENCES



### Advising & Planning Sheet - Associate in Science, Natural Science 2009

The A.S. in Natural Science with concentration in Life Science and in Physical Science Degree Requirements Advising & Planning Sheet is designed to assist students in selecting courses toward a Kapiolani Community College A.S. Degree as well as in transferring to other colleges and universities. The A.S. Degree curriculum provides clear, explicit, coherent pathways for students intending to transfer into Science, Technology, Engineering, and Mathematics (STEM) majors at baccalaureate institutions. Contact information for Kapiolani Community College academic advisors and counselors can be found in the Kapiolani Community College Schedule of Classes or on our website at <http://www.kcc.hawaii.edu>.

- S 1 STEP** Determine Math and English placement based on COMPASS Test scores or transfer courses. Refer to program sheets and/or counselor for Math and English Requirement for Associate in Science, Natural Science degree.



- S 2 STEP** Develop a semester academic plan. Choose courses for each semester that meet A.S. Natural Science requirements. Courses and degree requirements are on back of this page. Check catalog for course prerequisites or other requirements.

| Semester: Fall |  |  | Spring  |  |  | Summer  |  |  |
|----------------|--|--|---------|--|--|---------|--|--|
| Courses        |  |  | Courses |  |  | Courses |  |  |
| Credits        |  |  | Credits |  |  | Credits |  |  |
| 1.             |  |  | 1.      |  |  | 1.      |  |  |
| 2.             |  |  | 2.      |  |  | 2.      |  |  |
| 3.             |  |  | 3.      |  |  | 3.      |  |  |
| 4.             |  |  | 4.      |  |  | 4.      |  |  |
| 5.             |  |  | 5.      |  |  | 5.      |  |  |
| 6.             |  |  | 6.      |  |  | 6.      |  |  |

- S 3 STEP** Go to STEM website, download and complete A.S. Natural Science Eligible advising sheet. Associate in Science - NS advising sheet currently unavailable on the web. Projected date: Spring 2009.
- S 4 STEP** Contact Fie Abara, STEM Connector for personal counseling and advising. Room 1141 115 • Phone: (808) 734-8247 • Email: [abaraf@hawaii.edu](mailto:abaraf@hawaii.edu) • Website: <http://www.kcc.hawaii.edu/STEM/>

KAPĪOLANI COMMUNITY COLLEGE  
University of Hawaii

Kapiolani Community College is an equal opportunity/affirmative action (EEO/AA) institution and is committed to a policy of nondiscrimination on the basis of race, sex, age, color, religion, ethnicity, disability, marital status, sexual orientation, national origin, and veteran status. This policy covers admission and access to, and participation in, treatment and employment in the College's programs, activities, and services. For more information on EEO/AA policies and compliance procedures, contact the Office of Student Services at 734-8622.

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

**THE UNIVERSITY OF HAWAII - KAPI'OLANI COMMUNITY COLLEGE**

ASSOCIATE IN SCIENCE (A.S.) DEGREE IN NATURAL SCIENCE - 60 C credits minimum of 100-200 level courses; 2.0 grade point ratio (GPR) minimum  
Effective Spring 2009

| I. FOUNDATION REQUIREMENTS (13 Credits)  |                                    | COURSE | CR | GR | SEM |
|--|------------------------------------|--------|----|----|-----|
| Written Communication (FW): (1 course)<br>ENG 100 (Composition) or ESL 100   |                                    |        |    |    |     |
| Symbolic Reasoning (FS): (1 course)<br>MATH 205 (Calculus I)   |                                    |        |    |    |     |
| Global & Multicultural Perspectives (FG): (2 courses only choose one course from two different groups below)   |                                    |        |    |    |     |
| Group A  | ANTH 151, HIST 15                  |        |    |    |     |
| Group B  | ANTH 152 GEOS 102 HIST 152         |        |    |    |     |
| Group C  | GEOS 151 MUS 107 NEL 150           |        |    |    |     |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     ENG 100, ESL, ENG 157, ESL 150 count as FW if taken Fall 2009 semester or later                 </div>   |                                    |        |    |    |     |
| II. DIVERSIFICATION REQUIREMENTS (10-13 Credits)   |                                    | COURSE | CR | GR | SEM |
| Arts, Humanities, & Literature: (1 course only choose one course from any group below)   |                                    |        |    |    |     |
| Arts (DA):<br>ART 101 102 DNCE 150 MUS 108 SP 251 THEA 101   |                                    |        |    |    |     |
| Humanities (DH):<br>ANST 201, 202 HIST 231 232, 241 242, 252, 261 262, 264 265 HUM 268, HIST 100, HIST 107 LING 102;<br>MUS 108 PACS 273; Phil. 100 101 102, 211 (formerly 203), 213 (formerly 201) 260 REL 15 202   |                                    |        |    |    |     |
| Literature (DL):<br>EALL 261 262 269 271 272; ENG 214, 256, 267C, 267P, 270B, 270E, 270F, 270M, 270N, 271M, 272B, 272P, 272Q, 272R, 272N, 273C, 273N; HIST 261, 262, PACS 267  |                                    |        |    |    |     |
| Natural Sciences: (3-3 courses)  |                                    |        |    |    |     |
| Biological (DB): (1 course)<br>ANTH 218, BIOL 101 103 120, 130 17 172, 270, BOT 101 130 ESS 100, FSHS 100, MICR 130, 135, 230<br>PHYL 180, PSY 230; SCI 124 ZOO 102, 104, 141 142, 200   |                                    |        |    |    |     |
| Physical (DP): (1 course)<br>CHEM 101 (General Chemistry)  |                                    |        |    |    |     |
| Laboratory Science (DY): (1 course)<br>CHEM 101L (General Chemistry I)   |                                    |        |    |    |     |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     *DB (Generalizes Biological) not required for LIFE SCIENCES concentration majors.                 </div>   |                                    |        |    |    |     |
| Social Sciences (DS): (1 course)<br>ANST 211, 212, ANTH 180 230, 210; ASAN 100, BOT 105, COM 201 ECON 120, FAMR 230 IS 105B, 106C,<br>JOURN 180, PACS 100, POLS 110, 120, 130, 17 270; PSY 100 170; SOC 100, 215, 23 257 SSC 250   |                                    |        |    |    |     |
| III. KCC ADDITIONAL REQUIREMENTS (7 Credits)   |                                    | COURSE | CR | GR | SEM |
| Computer Competence (CC): (1 course)<br>ICS 101  |                                    |        |    |    |     |
| General Chemistry (GC): (2 courses)<br>CHEM 102 (General Chemistry II)<br>CHEM 102L (General Chemistry II Lab)   |                                    |        |    |    |     |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     *CHEM 102L not required for Engineering students. However, a credit must be made-up in division.                 </div>  |                                    |        |    |    |     |
| IV. LIFE SCIENCE OR PHYSICAL SCIENCE CONCENTRATION   |                                    | COURSE | CR | GR | SEM |
| Life Science or Physical Science Concentration: (Select either life science or physical science concentration only)  |                                    |        |    |    |     |
| Life Science   | BIOL 171 (General Biology I)       |        |    |    |     |
|  | BIOL 171L (General Biology Lab)    |        |    |    |     |
|  | BIOL 172 (General Biology II)      |        |    |    |     |
|  | BIOL 172L (General Biology Lab II) |        |    |    |     |
| Physical Science   | PHYS 170 (Physics I)               |        |    |    |     |
|  | PHYS 170L (Physics Lab)            |        |    |    |     |
|  | PHYS 272 (Physics II)              |        |    |    |     |
|  | PHYS 272L (Physics II Lab)         |        |    |    |     |
|  | MATH 205 (Calculus II)             |        |    |    |     |
| X X X X X X X X X X X X X X  |                                    |        |    |    |     |
| V. CONCENTRATION ELECTIVES (20-27 Credits)   |                                    | COURSE | CR | GR | SEM |
| Concentration Electives (ELGT): (20 credits minimum, choose from courses below)  |                                    |        |    |    |     |
| ASTR 280, BIOC 241, 244, BIOL 171 171L 172, 172L 270, 270L,<br>CHEM 272, 272L, 273, 273L; CS 113, 270, 275; EE 160, 211, 280,<br>294, 294L, 283, 288; GEOL 101L, 103, 105 111, 141, 211, 212, 241;<br>MATH 205, 205L, 231, 232, MCR 130, 140, 161, 230 240,<br>OCN 201, PHYS 151, 151L, 152, 152L, 170, 170L, 272, 272L, 274,<br>PHYL 180, ZOO 141, 141L, 142, 142L, 200 200L, ZOO 141 141L,<br>142, 142L, 200, 200L |                                    |        |    |    |     |
| Writing Intensive (WI): (2 courses); May be shared with above areas.<br>Please refer to Schedule of Classes for current list of Writing-Intensive courses.   |                                    |        |    |    |     |
| Hawaiian, Asian, and Pacific (HAP): (1 course); May be shared with above areas.<br>Please refer to the following website for current listings and updates: <a href="http://www.hawaii.edu/grad/c/gradinfo_hap.cfm">http://www.hawaii.edu/grad/c/gradinfo_hap.cfm</a>   |                                    |        |    |    |     |



(Two (2) Writing Intensive courses and one (1) HAWAIIAN, ASIAN, & PACIFIC ISLANDS course are required and assessed taken as diversification courses.)  
This document is for advising purposes only. Please refer to current KCC Catalog for residency curriculum and other graduation requirements.

**A.S. Degree in Natural Science with a concentration in Life Science or in Physical Science  
(Total credits: 60 credits)**

**Shared General Education Course Requirements**

| General Education Courses   | Title               | CR | S1 | S2 | S3 | S4        |
|---|---------------------|----|----|----|----|-----------|
| Foundation  | FW ENG100           | 3  | *  |    |    |           |
| Foundation  | FS MATH205          | 4  | *  |    |    |           |
| Foundation  | FG Group A, B, or C | 6  |    |    | *  | *         |
| Diversification   | DA, DL, DH          | 3  | *  |    |    |           |
| Diversification   | DB*, DP*            | 3  |    | *  |    |           |
| Diversification   | DS                  | 3  |    |    | *  |           |
| <p>Note: The above schedule assumes that two Writing-intensive courses and one HAP course are taken as diversification courses.<br/>                     *Life Science concentration students need to take one DP that may also be part of the required or elective courses for the degree.<br/>                     *Physical Science concentration students need to take one DB that may also be part of the required or elective courses for the degree.</p> |                     |    |    |    |    |           |
| <b>Total Number of Shared General Education Credits</b>   |                     |    |    |    |    | <b>22</b> |

FW - Foundations Writing  
 FS - Foundations Symbolic Reasoning  
 FG - Foundations Global/Multicultural Issues Courses  
 are in three groups, A, B and C.  
 DA - Diversification Arts

DL - Diversification Literature  
 DH - Diversification Humanities  
 DB - Diversification Biological Sciences  
 DP - Diversification Physical Sciences  
 DS - Diversification Social Sciences

**Shared Program Course Requirements**

**COURSES REQUIRED for both Life Science or Physical Science**

| Alpha #                             | Title                         | CR        |   |   |  |  |
|-------------------------------------|-------------------------------|-----------|---|---|--|--|
| CHEM 161                            | General Chemistry I           | 3         | * |   |  |  |
| CHEM 161 L                          | General Chemistry I Lab       | 1         | * |   |  |  |
| CHEM 162                            | General Chemistry II          | 3         |   | * |  |  |
| CHEM 162 L                          | General Chemistry II Lab      | 1         |   | * |  |  |
| ICS 101                             | Tools for the Information Age | 3         | * |   |  |  |
| <b>Total Shared Program Credits</b> |                               | <b>11</b> |   |   |  |  |

**COURSES REQUIRED for Concentration in Life Science**

|   |                        |          |  |   |   |  |
|---|------------------------|----------|--|---|---|--|
| BIOL 171  | General Biology I      | 3        |  | * |   |  |
| BIOL 171 L  | General Biology I Lab  | 1        |  | * |   |  |
| BIOL 172  | General Biology II     | 3        |  |   | * |  |
| BIOL 172 L  | General Biology II Lab | 1        |  |   | * |  |
| <b>Total Credits Required for Concentration in LS</b> |                        | <b>8</b> |  |   |   |  |

**COURSES REQUIRED for Concentration in Physical Science**

|   |                |           |  |   |   |  |
|---|----------------|-----------|--|---|---|--|
| MATH 206  | Calculus II    | 4         |  | * |   |  |
| PHYS 170  | Physics I      | 4         |  | * |   |  |
| PHYS 170 L  | Physics I Lab  | 1         |  | * |   |  |
| PHYS 272  | Physics II     | 3         |  |   | * |  |
| PHYS 272 L  | Physics II Lab | 1         |  |   | * |  |
| <b>Total Credits Required for Concentration in PS</b> |                | <b>13</b> |  |   |   |  |

The program of courses listed above satisfies the requirements for the ASNS degree with concentration in Life Science or Physical Science at Kapi'olani Community College. The remaining course credit requirements (60 credits total) are taken as STEM electives in your concentration and chosen pathway. See the list below of STEM elective courses.

For more information about the ASNS Degree or the STEM program please contact:

Koolani Noa  
 Koko 202G  
 (808) 734-9236  
[koolani@hawaii.edu](mailto:koolani@hawaii.edu)

Kapi'olani Community College  
 4303 Diamond Head Road  
 Honolulu, HI 96816



**ELECTIVE COURSES for ASNS LS and PS Concentrations**

(for 60 credit degree, LS= 19 credits of electives; PS= 14 credits of electives)

\* - Strongly Recommended for A.S. in Natural Science with a concentration in LS or PS

<sup>1</sup> - Strongly Recommended for A.S. LS

<sup>2</sup> - Strongly Recommended for A.S. PS

|                |   |                |  |
|----------------|---|----------------|--|
| ASTR 280 (3)   | Evolution of the Universe                     | ICS 212 (3)    | Program Structure                            |
| BIOC 241 (5)   | Fundamentals of Biochemistry                  | ICS 241 (2)    | Discrete Mathematics for Computer Science II |
| BIOC 244 (3)   | Essentials of Biochemistry                    | MATH 206 (4)   | Calculus II*                                 |
| BIOL 171 (3)   | General Biology I                             | MATH 206 L (3) | Calculus II Lab                              |
| BIOL 171 L (1) | General Biology I Lab                         | MATH 231 (4)   | Calculus III <sup>1</sup>                    |
| BIOL 172 (3)   | General Biology II                            | MATH 232 (4)   | Calculus IV <sup>2</sup>                     |
| BIOL 172 L (1) | General Biology II Lab                        | MICR 130 (3)   | General Microbiology                         |
| BIOL 275 (3)   | Cell and Molecular Biology <sup>1,2</sup>     | MICR 140 (2)   | General Microbiology Lab                     |
| BIOL 275 L 2   | Cell and Molecular Biology Lab <sup>1,2</sup> | MICR 161 (2)   | Immunology and Protein Chemistry             |
| CHEM 272 (3)   | Organic Chemistry I <sup>1,2</sup>            | MICR 230 (3)   | Molecular Biology                            |
| CHEM 272 L (1) | Organic Chemistry I Lab <sup>1</sup>          | MICR 240 (2)   | Cell Biology and Tissue Culture              |
| CHEM 273 (3)   | Organic Chemistry II <sup>1,2</sup>           | OCEAN 201 (3)  | Science of the Sea                           |
| CHEM 273 L (1) | Organic Chemistry II Lab <sup>1,2</sup>       | PHYS 51 (3)    | College Physics I                            |
| CE 113 (3)     | Introduction to Computer and Design           | PHYS 151 L (1) | College Physics I Lab                        |
| CE 270 (3)     | Applied Mechanics I                           | PHYS 52 (3)    | College Physics II                           |
| CE 271 (3)     | Applied Mechanics II                          | PHYS 52 L (1)  | College Physics II Lab                       |
| EE 160 (4)     | Programming for Engineers <sup>2</sup>        | PHYS 170 (4)   | General Physics I                            |
| EE 211 (4)     | Basic Circuit Analysis                        | PHYS 201 (1)   | General Physics I Lab                        |
| EE 260 (4)     | Introduction to Digital Design                | PHYS 271 (3)   | General Physics II                           |
| ESS 254 (2)    | Physiological Basis for Exercise              | PHYS 272 L (1) | General Physics II Lab                       |
| ESS 254 L (1)  | Physiological Basis for Exercise Lab          | PHYS 274 (3)   | General Physics III <sup>2</sup>             |
| ESS 263 (3)    | Sport Biomechanics                            | PHYS 60 (3)    | The Science of Sleep                         |
| ESS 288 (1)    | Body Composition and Weight Management        | ZOO 4 (3)      | Human Anatomy and Physiology                 |
| GFOL 101 I (1) | Introduction to Physical Geology Lab          | ZOO 4 I (1)    | Human Anatomy and Physiology Lab             |
| GEOG 103 (3)   | Geology of the Hawaiian Islands               | ZOOL 142 (3)   | Human Anatomy and Physiology I               |
| ICS 111 (3)    | Introduction to Computer Science I            | ZOOL 142 L (1) | Human Anatomy and Physiology I Lab           |
| ICS 141 (3)    | Discrete Mathematics for Computer Science I   | ZOO 100 (2)    | Marine Biology                               |
| ICS 211 (3)    | Introduction to Computer Science II           | ZOO 100 L (1)  | Marine Biology Lab                           |

**SAMPLE Elective Choices**

for STEM KCC Pathways

These Kapi'olani Community College Elective Courses are unique to various STEM Programs at UHM and UHH

| <i>Life Science<br/>WAIKIKI<br/>WATERSHED<br/>ECOLOGICAL</i> | CR           | <i>Life Science<br/>BIOTECHNOLOGY &amp;<br/>MOLECULAR<br/>SCIENCE</i> | CR | <i>Life Science<br/>PHYSIOLOGY &amp;<br/>EXERCISE<br/>SCIENCE</i> | CR           | <i>Physical Science<br/>ENGINEERING &amp;<br/>SPACE SCIENCE</i> | CR |
|--|--------------|---|----|---|--------------|---|----|
| BIOL 275 + LAB   | 5            | MICRO 130/140   | 5  | BIOL 130 OR<br>ZOOL 141 142 -<br>LABS                             | 3<br>OR<br>6 | PHYS 274  | 3  |
| ZOOL 200 + LAB<br>OR<br>OCN 201                              | 3            | MICRO 161/230   | 5  | BIOC 241  | 4            | EE 160  | 4  |
| CHEM 272 + LAB   | 4            | BIOL 275 + LAB  | 5  | FSHE 165  | 3            | CE 270<br>OR<br>ASTR 280  | 3  |
| BOY 130 + Lab<br>OR<br>GG 103                                | 4<br>OR<br>3 | CHEM 272 + LAB  | 4  | ESS 254 OR<br>ESS 280 OR<br>PHYL 160                              | 3            | EE 211  | 4  |

**Kapiolani Community College Justification for  
a Two-Year Degree as a Transfer to a Baccalaureate Degree**

*From "Authorization to Plan and Academic Program, Associate in Science degree  
with concentration in either Life Science or Physical Science", 2005*

While it is true that heretofore in the University of Hawai'i system, associate in science degrees have typically been two-year programs in the career and technical education fields, nothing in current Board or executive policies precludes an associate in science transfer degree. i.e. an associate's degree in science. Board of Regents policy 5-1a (1) (4) lists the associate as a kind of degree. Similarly, Executive Policies E5.201-E-1, E5.203 and E5.205 all list an associate as a kind of degree, along with bachelor's, master's and doctorates. No further distinction is made for associate degrees. In E5.209, the articulation and transfer policy refers specifically to an articulated AA degree. The policy "clarifies that the AA degree satisfies Gen Ed requirements and admission to UH baccalaureate campuses" and specifies the criteria by which the AA can be considered an "articulated AA." E5.209 does not, however, preclude associate in science degrees from transferring.

The definition of an associate in science degree is found only in Chancellor for Community Colleges' Memo 6004:

"Associate in Science (A.S.) degree: A two-year technical-occupational-professional degree, consisting of at least 60 semester credits, which provides students with skills and competencies for gainful employment, entirely at the baccalaureate level. The skills and competencies should be in conformance with the recommendations listed in the "Report of the Associate in Science (AS) Degree Task Force" (see Appendix 2). The issuance of an A.S. degree requires that the student must earn a GPA of 2.0 or better for all courses applicable toward the degree."

Since the formulation of that definition, a number of circumstances have changed. Increasingly, two-year degrees are considered as pathways to careers, even transfer degrees are now so framed. In addition, a number of existing UHCC A.S. degrees are now or will soon be transfer degrees to baccalaureate programs, both within and outside the UH System. The Early Childhood Education degree will now transfer to UH West O'ahu, as does the Respiratory Care A.S. degree and as the Culinary A.S. degree soon will. The A.S. in Hospitality transfers to the UHM Travel Industry Management program. The Accounting and IT A.S. degrees transfer to Hawai'i Pacific University. Given these changes in circumstances, it would suggest that a review of the basic definitions may be in order.

## Appendix E

### Associate in Science Degree in Natural Science with Concentrations in Biological Science or Physical Science Program Requirements & Map

#### Requirements for Applied Science (AS) Degree - Natural Sciences: 60 credits

##### General Education: 24 credits

English 100(3) and 106(3), 209(3), or 210(3),  
or Speech 151(3) or 251(3)

Math 205(4)

Humanities elective (3)

Natural Sciences (8) Chemistry 161/161L(4) plus 4 credits  
Social Sciences elective (3)

##### Additional Program Requirements: 7 credits

Chemistry 162(3), 162L(1)

Information & Computer Sciences 101(3)

##### Biological Science Concentration: 16-17 credits

Biology 171(3), 171L(1), 172(3), 172L(1)  
Physics 151(4) and 152(4) or 170(5) and 272(4)

##### Physical Science Concentration: 13 credits

Math 206(4)  
Physics 170(5), 272(4)

#### Concentration electives for both Biological and Physical Science Concentrations: 12-16 credits

##### Full-time students in the Biological Sciences Concentration would take courses in this sequence

| First Semester (Fall)    | Credits   | Second Semester (Spring) | Credits |
|--------------------------|-----------|--------------------------|---------|
| CHEM 161                 | 3         | CHEM 162                 | 3       |
| CHEM 161L                | 1         | CHEM 162L                | 1       |
| ENG 100                  | 3         | ICS 101                  | 3       |
| MATH 205                 | 4         | Concentration electives  | 7       |
| Natural Science elective | 4         | Total                    | 14      |
| <b>Total</b>             | <b>15</b> |                          |         |

| Third Semester (Fall)           | Credits   | Fourth Semester (Spring) | Credits   |
|---------------------------------|-----------|--------------------------|-----------|
| BIOL 171                        | 3         | BIOL 172                 | 3         |
| BIOL 171L                       | 1         | BIOL 172L                | 1         |
| *PHYS 151                       | 4         | *PHYS 152                | 4         |
| English/Communications elective | 3         | Humanities elective      | 3         |
| Social Science elective         | 3         | Concentration electives  | 6         |
| <b>Total</b>                    | <b>14</b> | <b>Total</b>             | <b>17</b> |

##### Full-time students in the Physical Sciences Concentration would take courses in this sequence

| First Semester (Fall)    | Credits   | Second Semester (Spring) | Credits   |
|--------------------------|-----------|--------------------------|-----------|
| CHEM 161                 | 3         | CHEM 162                 | 3         |
| CHEM 161L                | 1         | CHEM 162L                | 1         |
| ENG 100                  | 3         | MATH 206                 | 4         |
| MATH 205                 | 4         | Natural Science elective | 4         |
| Natural Science elective | 4         | ICS 101                  | 3         |
| <b>Total</b>             | <b>15</b> | <b>Total</b>             | <b>15</b> |

| Third Semester (Fall)                        | Credits   | Fourth Semester (Spring)                     | Credits   |
|--|-----------|--|-----------|
| PHYS 170                                     | 5         | PHYS 272                                     | 4         |
| **MATH 231 ( <i>Concentration elective</i> ) | 3         | **MATH 232 ( <i>Concentration elective</i> ) | 3         |
| Social Science elective                      | 3         | Concentration electives                      | 6         |
| English/Communications elective              | 3         | Humanities elective                          | 3         |
| <b>Total</b>                                 | <b>14</b> | <b>Total</b>                                 | <b>16</b> |

\* Or PHYS 170 and 272

\*\* Recommended

| AS Degree in Natural Sciences with a concentration in Biological or Physical Science (60 credits) |               |   |           |    |    |    |    |
|---|---------------|---|-----------|----|----|----|----|
| General Education Requirements  |               |   |           |    |    |    |    |
| Area  | Course        | Title                                   | CR        | S1 | S2 | S3 | S4 |
| English   | ENG 100       | English Composition I                   | 3         | *  |    |    |    |
| English/Speech elective   |               |   | 3         |    |    | •  |    |
| Quant Reasoning   | MATH 205      | Calculus I                              | 4         | *  |    |    |    |
| Humanities elective   |               |   | 3         |    |    |    | •  |
| Social Sciences elective  |               |   | 3         |    |    | •  |    |
| Natural Sciences elective   | CHEM 161/161L | General Chemistry I & Lab               | 4         | *  |    |    |    |
| Natural Sciences elective   |               |   | 4         | *  |    |    |    |
| <b>Total</b>  |               |   | <b>24</b> |    |    |    |    |
| Additional Program Requirements for both Biological and Physical Science (7 credits)              |               |   |           |    |    |    |    |
|   | CHEM 162/162L | General Chemistry I & Lab               | 4         |    | •  |    |    |
|   | ICS 101       | Digital Tools for the Information World | 3         |    | •  |    |    |
| <b>Total</b>  |               |   | <b>7</b>  |    |    |    |    |
| Biological Science Concentration Requirements (16 credits)  |               |   |           |    |    |    |    |
|   | BIOL 171/171L | Introductory Biology I & Lab            | 4         |    |    | •  |    |
|   | BIOL 172/172L | Introductory Biology II & Lab           | 4         |    |    |    | •  |
|   | PHYS 151      | College Physics I                       | 4         |    |    | •  |    |
|   | PHYS 152      | College Physics II                      | 4         |    |    |    | •  |
| <b>Total</b>  |               |   | <b>16</b> |    |    |    |    |
| <b>Concentration electives</b>  |               |   | <b>13</b> |    | •  |    | •  |
| <b>Total</b>  |               |   |           |    |    |    |    |
| Physical Science Concentration Requirements (13 credits)  |               |   |           |    |    |    |    |
|   | MATH 206      | Calculus II                             | 4         |    | •  |    |    |
|   | PHYS 170      | General Physics I                       | 5         |    |    | •  |    |
|   | PHYS 272      | General Physics II                      | 4         |    |    |    | •  |
| <b>Total</b>  |               |   | <b>13</b> |    |    |    |    |
| <b>Concentration electives</b>  |               |   | <b>10</b> |    | •  |    | •  |
|   | MATH 231*     | Calculus III                            | 3         |    |    | •  |    |
|   | MATH 232*     | Calculus IV                             | 3         |    |    |    | •  |
|   | * Recommended |   |           |    |    |    |    |



## Appendix F

### Academic Cost Revenue Template – New Program and Notes to Budget Template

|    | A  | B | C | D                                       | E         | F         | G         | H         | I          |
|----|--|---|---|---|-----------|-----------|-----------|-----------|------------|
| 1  | Academic Cost and Revenue Template - New Program (adjust template for appropriate number of years) |   |   |   |           |           |           |           |            |
| 2  |  |   |   |   |           |           |           |           |            |
| 3  | ENTER VALUES IN YELLOW CELLS ONLY  |   |   |   |           |           |           |           |            |
| 4  | CAMPUS/Program   |   |   | AS Natural Science                      |           |           |           |           |            |
| 5  | Provisional Years (2 yrs for Certificate, 3 yrs for Associate Degree, 6 yrs for Bachelor's Degree) |   |   |   |           |           |           |           |            |
| 6  | ENTER ACADEMIC YEAR (i.e., 2004-05)  |   |   | Year 1                                  | Year 2    | Year 3    | Year 4    | Year 5    | Year 6     |
| 7  | Students & SSH   |   |   | 2010-11                                 | 2011-12   | 2012-13   | 2013-14   | 2014-15   | 2015-16    |
| 8  | A. Headcount enrollment (Fall)   |   |   | 20                                      | 25        | 30        | 30        | 30        | 30         |
| 9  | B. Annual SSH  |   |   | 480                                     | 680       | 720       | 720       | 720       | 720        |
| 10 | Direct and Incremental Program Costs Without Fringe  |   |   |   |           |           |           |           |            |
| 11 | C. Instructional Cost without Fringe   |   |   |   |           |           |           |           |            |
| 12 | C1. Number (FTE) of FT Faculty/Lecturers   |   |   | \$ 17,304                               | \$ 18,218 | \$ 37,525 | \$ 38,651 | \$ 40,197 | \$ 41,805  |
| 13 | C2. Number (FTE) of PT Lecturers   |   |   | 0.25                                    | 0.25      | 0.50      | 0.50      | 0.50      | 0.50       |
| 14 | D. Other Personnel Costs   |   |   | \$ 28,740                               | \$ 29,600 | \$ 29,824 | \$ 30,850 | \$ 32,125 | \$ 33,410  |
| 15 | E. Unique Program Costs  |   |   | \$ 22,000                               | \$ 22,550 | \$ 21,124 | \$ 22,748 | \$ 24,378 | \$ 26,033  |
| 16 | F. Total Direct and Incremental Costs  |   |   | \$ 68,044                               | \$ 69,678 | \$ 88,573 | \$ 92,288 | \$ 96,700 | \$ 101,248 |
| 17 | Revenue  |   |   |   |           |           |           |           |            |
| 18 | G. Tuition   |   |   | \$ 42,240                               | \$ 58,200 | \$ 69,840 | \$ 69,840 | \$ 69,840 | \$ 69,840  |
| 19 | Tuition rate per credit  |   |   | \$ 65                                   | \$ 97     | \$ 97     | \$ 97     | \$ 97     | \$ 97      |
| 20 | H. Other   |   |   | \$ 25,000                               | \$ 25,000 | \$ 25,000 | \$ 25,000 | \$ 25,000 | \$ 25,000  |
| 21 | I. Total Revenue   |   |   | \$ 67,240                               | \$ 83,200 | \$ 94,840 | \$ 94,840 | \$ 94,840 | \$ 94,840  |
| 22 | J. Net Cost (Revenue)  |   |   | 804                                     | -13,524   | -6,287    | -2,552    | 1,850     | 6,408      |
| 23 | Program Cost per SSH With Fringe   |   |   |   |           |           |           |           |            |
| 24 | K. Instructional Cost with Fringe/SSH  |   |   | \$ 33                                   | \$ 32     | \$ 55     | \$ 56     | \$ 59     | \$ 61      |
| 25 | K1. Total Salary FT Faculty/Lecturers  |   |   | \$ 17,304                               | \$ 18,218 | \$ 37,525 | \$ 38,651 | \$ 40,197 | \$ 41,805  |
| 26 | K2. Cost including Fringe of K1  |   |   | \$ 18,159                               | \$ 19,127 | \$ 39,401 | \$ 40,584 | \$ 42,207 | \$ 43,695  |
| 27 | K3. Total Salary PT Lecturers  |   |   | \$ 252                                  | \$ 252    | \$ 252    | \$ 252    | \$ 252    | \$ 252     |
| 28 | K4. Cost including fringe of K3  |   |   | \$ 203                                  | \$ 203    | \$ 203    | \$ 200    | \$ 200    | \$ 200     |
| 29 | L. Support Cost/SSH  |   |   | \$ 44                                   | \$ 44     | \$ 44     | \$ 44     | \$ 44     | \$ 44      |
| 30 | M. Total Program Cost/SSH  |   |   | \$ 290                                  | \$ 294    | \$ 307    | \$ 308    | \$ 311    | \$ 313     |
| 31 | N. Total Campus Expenditure/SSH  |   |   | \$ 483                                  | \$ 488    | \$ 488    | \$ 488    | \$ 488    | \$ 488     |
| 32 | Instruction Cost with Fringe per SSH   |   |   |   |           |           |           |           |            |
| 33 | K. Instructional Cost/SSH  |   |   | \$ 38                                   | \$ 32     | \$ 55     | \$ 56     | \$ 59     | \$ 61      |
| 34 | O. Comparable Cost/SSH   |   |   | \$ 61                                   | \$ 61     | \$ 61     | \$ 61     | \$ 61     | \$ 61      |
| 35 | Program used for comparison:   |   |   | UHMC, INSTRUCTION, GEN & PRE-PROF, Natu |           |           |           |           |            |
| 36 | Reviewed by campus VC for Administrative Affairs: <i>[Signature]</i> (date) <i>6/11/10</i>         |   |   |   |           |           |           |           |            |
| 37 | Instructions   |   |   |   |           |           |           |           |            |
| 38 | Please include an explanation of this template in your narrative.                                  |   |   |   |           |           |           |           |            |



**Notes to Budget Templates:**  
**Natural Science**  
 Explanation of Calculations

**A. Headcount enrollment (Fall)**

The following table displays headcounts for resident and non-resident students. Very modest increases were used to display increases in years 1-6.

| Year         | FY 2011   | FY 2012   | FY 2013   | FY 2014   | FY 2015   | FY 2016   |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Resident     | 20        | 25        | 30        | 30        | 30        | 30        |
| Nonresident  | 0         | 0         | 0         | 0         | 0         | 0         |
| <b>Total</b> | <b>20</b> | <b>25</b> | <b>30</b> | <b>30</b> | <b>30</b> | <b>30</b> |

**B. Annual SSH**

| Year   | FY 2011    | FY 2012    | FY 2013    | FY 2014    | FY 2015    | FY 2016    |
|--|------------|------------|------------|------------|------------|------------|
| Headcount  | 20         | 25         | 30         | 30         | 30         | 30         |
| Non-Majors   |            |            |            |            |            |            |
| Average SSH per student<br>(factored in part-time and<br>full-time students)(Program<br>less Gen-Ed) | 24         | 24         | 24         | 24         | 24         | 24         |
| <b>Total Annual SSH</b>  | <b>480</b> | <b>600</b> | <b>720</b> | <b>720</b> | <b>720</b> | <b>720</b> |

**D. Other Personnel Costs**

| Year                       | FY 2011          | FY 2012          | FY 2013          | FY 2014          | FY 2015          | FY 2016          |
|----------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Clerical                   | \$ 6,240         | \$ 6,490         | \$ 6,749         | \$ 7,019         | \$ 7,300         | \$ 7,592         |
| Counselor (0.5 FTE)        | \$ 22,500        | \$ 22,500        | \$ 23,175        | \$ 23,870        | \$ 24,825        | \$ 25,818        |
| <b>Total</b>               | <b>\$ 28,740</b> | <b>\$ 28,990</b> | <b>\$ 29,924</b> | <b>\$ 30,889</b> | <b>\$ 32,125</b> | <b>\$ 33,410</b> |
| Clerical salary increases  | CB               | CB               | NO CB 4%         | NO CB 4%         | NO CB 4%         | NO CB 4%         |
| Counselor salary increases | CB               | CB               | CB 3%            | CB 3%            | NO CB 4%         | NO CB 4%         |

**E. Unique Program Costs**

| Year                          | FY 2011         | FY 2012         | FY 2013         | FY 2014         | FY 2015         | FY 2016         |
|-------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>Accreditation Expenses</b> |                 |                 |                 |                 |                 |                 |
| Computer Software             | \$2,000         | \$2,080         | \$2,163         | \$2,250         | \$2,340         | \$2,433         |
| Dues and Subscriptions        | \$500           | \$520           | \$541           | \$562           | \$585           | \$608           |
| Equipment                     | \$5,000         | \$5,200         | \$5,408         | \$5,624         | \$5,849         | \$6,083         |
| Intrastate Travel             | \$1,000         | \$1,040         | \$1,082         | \$1,125         | \$1,170         | \$1,217         |
| Out of State Travel           | \$0             | \$0             | \$0             | \$0             | \$0             | \$0             |
| Library                       | \$500           | \$520           | \$541           | \$562           | \$585           | \$608           |
| Marketing, Advertising        | \$3,000         | \$3,000         | \$1,000         | \$1,000         | \$1,000         | \$1,000         |
| Photocopies                   | \$1,000         | \$1,040         | \$1,082         | \$1,125         | \$1,170         | \$1,217         |
| Supplies                      | \$1,000         | \$1,040         | \$1,082         | \$1,125         | \$1,170         | \$1,217         |
| Training Costs                | \$2,000         | \$2,080         | \$2,163         | \$2,250         | \$2,340         | \$2,433         |
| Lab Supplies                  | \$5,000         | \$5,000         | \$5,000         | \$6,000         | \$7,000         | \$8,000         |
| Other Misc. Costs             | \$1,000         | \$1,040         | \$1,082         | \$1,125         | \$1,170         | \$1,217         |
| <b>Total</b>                  | <b>\$22,000</b> | <b>\$22,560</b> | <b>\$21,142</b> | <b>\$22,748</b> | <b>\$24,378</b> | <b>\$26,033</b> |

**G. Tuition Rate Per Credit**

The average tuition was calculated to reflect the proportion of resident and non-resident students.

| Resident               |                |                |                |                |                |                |
|------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Headcount              | 20             | 25             | 30             | 30             | 30             | 30             |
| Annual SSH             | 10             | 14             | 14             | 14             | 14             | 14             |
| Tuition per credit     | \$88.00        | \$97.00        | \$97.00        | \$97.00        | \$97.00        | \$97.00        |
| Non-Resident           |                |                |                |                |                |                |
| Headcount              | 0              | 0              | 0              | 0              | 0              | 0              |
| Annual SSH             | 10             | 14             | 14             | 14             | 14             | 14             |
| Tuition per credit     | \$524.00       | \$587.00       | \$650.00       | \$713.00       | \$713.00       | \$713.00       |
| <b>Average Tuition</b> | <b>\$88.00</b> | <b>\$97.00</b> | <b>\$97.00</b> | <b>\$97.00</b> | <b>\$97.00</b> | <b>\$97.00</b> |

**H. Revenue - Other**

The following table displays anticipated revenues from other sources (e.g. grants) by year.

| Year         | FY 2011         | FY 2012         | FY 2013         | FY 2014         | FY 2015         | FY 2016         |
|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| ROP          | \$25,000        | \$25,000        | \$25,000        | \$25,000        | \$25,000        | \$25,000        |
| <b>Total</b> | <b>\$25,000</b> | <b>\$25,000</b> | <b>\$25,000</b> | <b>\$25,000</b> | <b>\$25,000</b> | <b>\$25,000</b> |

**K. Total Salary FT Faculty/Lecturer**

The salary was based on \$64,164 per year (nine month rank 2, step 5) with 4% increases per subsequent year.

**Appendix G**  
**Maps of Program Learning Outcomes by Course and**  
**Preliminary Assessment Plan**

Upon successful completion of the Associate in Science Degree in Natural Science, students will be able to

(PLO 1) explain the natural and technological world using reflection and quantitative analysis including preparation of a plan to collect, process, and interpret data; evaluation of the plan, procedures, and findings; and communication of the conclusions;

(PLO 2) explain scientific knowledge and understanding to different audiences for a range of purposes; and

(PLO 3) apply scientific knowledge, skills, and understandings to problems and issues in daily life.

The following tables indicate which required courses fulfill specific program learning outcomes (PLOs). This assessment model was developed by the Assessment Committee at UHMC.

## Maps of Program Learning Outcomes by Courses

*3 Major Emphasis: The student is actively involved (uses, reinforces, applies, and is evaluated) in the student learning outcomes. The learner outcome is the focus of the class.*

*2 Moderate Emphasis: The student is actively uses, reinforces, applies, and is evaluated by this learner outcome, but it is not the focus of the class.*

*1 Minor Emphasis: The student is provided the opportunity to use, reinforce, and apply but does not get evaluated on this learner outcome.*

*0 No Emphasis: The student does not address this learner outcome.*

### Map of Program Learning Outcomes by Course General Education and Program Requirements

|       | CHEM<br>161 | CHEM<br>161L | CHEM<br>162 | CHEM<br>162L | MATH<br>205 |
|-------|-------------|--------------|-------------|--------------|-------------|
| PLO 1 | 3           | 3            | 3           | 3            | 2           |
| PLO 2 | 3           | 3            | 3           | 3            | 1           |
| PLO 3 | 3           | 3            | 3           | 3            | 1           |

### Map of Program Learning Outcomes by Course Biological Science Concentration

|       | BIOL<br>171 | BIOL<br>171L | BIOL<br>172 | BIOL<br>172L | PHYS<br>151 | PHYS<br>152 |
|-------|-------------|--------------|-------------|--------------|-------------|-------------|
| PLO 1 | 3           | 3            | 3           | 3            | 3           | 3           |
| PLO 2 | 3           | 3            | 3           | 3            | 3           | 3           |
| PLO 3 | 3           | 3            | 3           | 3            | 3           | 3           |

### Map of Program Learning Outcomes by Course Physical Science Concentration

|       | MATH<br>206 | PHYS<br>170 | PHYS<br>272 |
|-------|-------------|-------------|-------------|
| PLO 1 | 2           | 3           | 3           |
| PLO 2 | 2           | 3           | 3           |
| PLO 3 | 2           | 3           | 3           |

## Maps of General Education Outcomes

### Map of General Education Outcomes by Course General Education & Program Requirements

|                                    | CHEM<br>161 | CHEM<br>161L | CHEM<br>162 | CHEM<br>162L | MATH<br>205 |
|------------------------------------|-------------|--------------|-------------|--------------|-------------|
| Critical thinking                  | 3           | 3            | 3           | 3            | 3           |
| Information retrieval & technology | 2           | 2            | 2           | 2            | 1           |
| Quantitative reasoning             | 3           | 3            | 3           | 3            | 3           |
| Oral communication                 | 1           | 1            | 1           | 1            | 1           |
| Written communication              | 2           | 2            | 2           | 2            | 2           |
| Creativity                         | 2           | 2            | 2           | 2            | 1           |

### Map of General Education Outcomes by Course Biological Science Concentration

|                                    | BIOL<br>171 | BIOL<br>171L | BIOL<br>172L | BIOL<br>172 | PHYS<br>151 | PHYS<br>152 |
|------------------------------------|-------------|--------------|--------------|-------------|-------------|-------------|
| Critical thinking                  | 3           | 3            | 3            | 3           | 3           | 3           |
| Information retrieval & technology | 2           | 2            | 2            | 2           | 2           | 2           |
| Quantitative reasoning             | 2           | 2            | 2            | 2           | 3           | 3           |
| Oral communication                 | 2           | 2            | 2            | 2           | 1           | 1           |
| Written communication              | 2           | 2            | 2            | 2           | 2           | 2           |
| Creativity                         | 2           | 2            | 2            | 2           | 2           | 2           |

**Map of General Education Outcomes by Course  
Physical Science Concentration**

|                                    | MATH<br>206 | PHYS<br>170 | PHYS<br>272 |
|------------------------------------|-------------|-------------|-------------|
| Critical thinking                  | 3           | 3           | 3           |
| Information retrieval & technology | 2           | 2           | 2           |
| Quantitative reasoning             | 3           | 3           | 3           |
| Oral communication                 | 1           | 1           | 1           |
| Written communication              | 2           | 2           | 2           |
| Creativity                         | 1           | 2           | 2           |

**Program learning outcomes to be assessed each year of the  
program review cycle learning outcomes identified by PLO number**

| PLO | F10              | S11              | F11              | S12              | F12              | S13              | F13              | S14              |
|-----|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| 1   | CHEM<br>161/161L | CHEM<br>162/162L | MATH<br>205      | MATH<br>206      | PHYS<br>170      | PHYS<br>272      | BIOL<br>171/171L | BIOL<br>172/172L |
| 2   |                  |                  | BIOL<br>171/171L | BIOL<br>172/172L | CHEM<br>161/161L | CHEM<br>162/162L | PHYS<br>170      | PHYS<br>272      |
| 3   |                  |                  | PHYS<br>151      | PHYS<br>152      | BIOL<br>171/171L | BIOL<br>172/172L | CHEM<br>161/161L | CHEM<br>162/162L |

## **Appendix H**

### **AUTHORIZATION TO PLAN (ATP) AN ACADEMIC PROGRAM**

**1. School/College and Department/Unit:** Maui College, Science, Technology, Engineering, and Math (STEM) Department

**2. Chair/Convener of Planning Committee:** Ann Coopersmith

**3. Program Category:** X New \_\_\_ Modified \_\_\_ Interdisciplinary

**4a. Degree or Certificate Proposed:** Associate in Science Degree in Natural Science (AS-NS) with a concentration in Biological Science or Physical Science

**4b. List similar degrees or certificates offered in UH System:** Kapiolani Community College, Associate in Science in Natural Science Degree with a concentration in Life Science or Physical Science

#### **5. Planning**

**a. Planning period:** Spring 2010

**b. Activities to be undertaken during the planning phase:**

Spring 2010:

- Convene AS-NS Committee including science and math faculty from the STEM Department, STEM academic counselor, and STEM Department Chair
- Develop program proposal and submit to Maui College STEM Department, Curriculum Committee, Academic Senate, Vice Chancellor for Academic Affairs, Chancellor, Council of Chief Academic Officers (CCAO), University of Hawai'i Administration, and Board of Regents (BOR)

Summer 2010:

- Program proposal approved by UH Administration and BOR

**c. Submission date of program proposal:** Spring 2010, implementation in Fall 2010

**d. Workload/budget implications during planning period:** Reassigned time

#### **6. Program Description**

The new AS-NS Degree will be very similar to the degree that Kapiolani Community College designed for students who are planning to transfer to science, technology, engineering, or mathematics baccalaureate degree programs (refer to Appendix A).

The proposed curriculum will require a minimum of 60 credits of 100- and 200-level courses and a 2.0 grade point average (GPA) minimum for all courses required by the degree (refer to Appendix B). This includes

- 24 credits of General Education requirements,
- 7 credits of additional program requirements,
- two writing intensive courses,
- 16 required credits in the Biological Science Concentration or
- 13 required credits in the Physical Science Concentration, and
- 13-16 credits of Concentration electives

**Objectives:** The AS-NS Degree will

- \* facilitate articulation and transfer agreements between Maui College and four-year STEM programs at UH-Manoa (UHM) and UH-Hilo (UHH) and on the U.S. mainland,
- \* provide a comprehensive background in STEM courses, and
- \* provide an associate's degree option for STEM transfer students.

**Relation to Maui College and UH System Mission, Vision, and Strategic Plans:** The proposed degree directly supports the College's Mission, Vision, and Strategic Plan which are guided by the Native Hawaiian reverence for the *ahupua`a*, a practice of sustaining and sharing diverse but finite resources for the benefit of all. The mission statement is "the College is a learning-centered institution that provides affordable, high quality credit and non-credit educational opportunities to a diverse community of lifelong learners." The College's vision statement is "We envision a world-class college that meets current and emerging Maui County education and training needs through innovative, high quality programs offered in stimulating learning environments. Refer to Appendix C for a summary of the specific goals, objectives, and action strategies in the College's 2003-2010 Strategic Plan that are directly related to this proposed degree.

In March 2008, the UH System Strategic Outcomes and Performance Measures were updated through 2015. This degree program will promote the goals of 1) assuring a solid return on its investment in higher education through research and training and 2) contributing to the development of a high-skilled, high-wage workforce through the establishment of new education and training programs in STEM degrees. Many of the goals of the 2002-2010 UH System strategic plan will be met through an emphasis on learning through place-based research, use of emerging learning technologies, and cooperation with other branches of the UH system.

**Relation to Hawai'i Department of Education Career Pathway:** The development of this degree directly supports three of the State Department of Education (DOE) Career Pathways. These serve to guide career exploration and planning activities, to focus teaching and learning, and to link education with relevant real-world experiential activities. Related career pathways include Natural Resources, Industrial & Engineering Technology, as well as Public & Human Services because these STEM majors will have the strong backgrounds that are required for entering credential programs for certification to teach secondary math and science.

**Program Requirements:** Advising & planning sheets, counseling, and recruitment will begin once the program is approved. Program requirements and map are in Appendix B.

## 7. Program Justification

Data for Fall 2009 indicates that the Maui College enrollment in STEM courses was 3,009 students. Note that students may be taking both a math and a science course, but rarely more than one of each. This is a very large number based on the 2009 Fall enrollment of over 4,000 students. Currently the only STEM-related AS/AA degrees that students can declare majors in are AS in Electronic & Computer Engineering Technologies or Associated of Arts (AA) in Liberal Arts.

In 2005, the faculty at Kapiolani Community College noted that the AA degree in Liberal Arts was not meeting the needs of transfer students in STEM areas and there was a need for a



specialized AS degree the STEM area. They indicated that, “The absence of a STEM AS degree impacts the growth of coherent, strong, and diverse STEM offerings and the success of our students in STEM.” The STEM faculty justified the development of a two-year academic program, which does not directly fulfill a critical and immediate need in the job market, by demonstrating the lack of depth in the math and science courses in the AA in Liberal Arts (refer to Appendix D). Kapiolani Community College instituted the AS-NS Degree Program in Fall 2007.

This new AS-NS degree will now fill the gap in the Maui College AA in Liberal Arts that does not adequately prepare students for intensive upper-division work in STEM courses. Maui College has recorded increased student enrollments reaching 4,040 in Spring 2010 semester. Instructors are finding that students are entering with stronger backgrounds in math and sciences. Many have work experience in science and technology areas and these students are looking forward to obtaining degrees that will make them more competitive in the job market. These students also provide a pool for student assistant jobs within college as lab technologists in the sciences and tutors in science and math.

Through this new AS degree, the college will prepare students with strong STEM backgrounds to enter baccalaureate degree programs to meet the increasing demands in the areas biotechnology, marine and environmental sciences, and renewable energy. Appendix E, Table 1 includes a summary of relevant SOC data for Maui County and Appendix E, Table 2 indicates the technology industry job projections for Hawai‘i. Note that the annual salaries are well above the county average of \$38,000. This data also indicates a tremendous need for secondary and middle school teachers.

There is also an urgent need for teacher candidates to fill local secondary-school teaching positions (refer to Appendix E, Table 3). Traditionally, the Hawai‘i State Department of Education has gone outside the state to recruit additional STEM teachers and unfortunately, there are still many under qualified people teaching STEM courses in the public schools.

The ability to identify STEM majors earlier in their academic careers will allow counselors and STEM academic advisors to enroll students in appropriate courses as soon as possible, arrange for tutoring, closely follow their progress, and assure success for transfer to baccalaureate programs. Currently the college is proposing additional baccalaureate degrees in areas with rapid economic growth and high job demand including the Renewable Energy Science & Management and Ocean Studies. These degrees will recruit from the pool of AS-NS graduates.

The college has a National Science Foundation (NSF), Tribal College & University Programs (TCUP) grant to support Native Hawaiian students’ success in STEM courses. This grant has supported the highly successful STEM Lab, *Ho’okahua*.

In a recent speech at the “Business Before Hours” breakfast for local business leaders that was sponsored by the Maui Chamber of Commerce, University of Hawai‘i President M.R.C. Greenwood said, “American workers need to get used to the idea that they will be going back to school. Typically, a worker in his or her 30s or 40s will work for five to seven employers over a lifetime. That will require retraining or additional training and that 45 percent of the coming jobs in the islands will require a bachelor’s degree. At the same time, schools and teachers need to rethink the way they accommodate these late learners.” She rejects the commonly heard claim that, “I’ll never need that math in the job I am planning for. **At least 90 percent of those new, desirable jobs will require the ability to quantify, and the goal will be to turn out students**

**who know math at least up to calculus.** The reason those jobs are more desirable is that they will pay a million dollars more over a lifetime than jobs requiring only a high-school diploma.”

Maui College students have demonstrated strong community involvement in STEM areas as research assistants, interns, and for Service-Learning credit (refer to Appendix F). Students are active in a wide variety of local STEM-related institutions, governmental agencies, non-profit organizations, and businesses. Many students have been hired by these organizations both before and after graduation.

**Assessment:** To assure that students fulfill the AS-NS degree program learning outcomes, all students will be required to maintain portfolios of their STEM course work, field notes, data analyses and summaries, research papers, selected readings, directed studies materials, service-learning journals, web pages and other media presentations, instructors evaluations, and other pertinent materials. In the courses that are required for the program, the students will be assessed on a continuing basis to assure that they are meeting the student learning outcomes. These courses directly support the program learning outcomes. The program learning outcomes, the maps indicating how the courses meet the program learning outcomes and the general education outcomes, and the assessment plan are all summarized in Appendix G.

#### **8. Description of resources required**

**a. Faculty: Existing:** Seven FTE faculty members teach courses in Biology, Chemistry, and Physics. No additional faculty will be required.

**b. Library resources:** A search will be carried out to determine if the library has access to the most commonly used online scientific journals. Subscriptions may be needed for any journals that are not available.

**c. Physical resources:** The State Legislature recently appropriated \$25 million to build a new science building on the Maui College campus. Additional supplies, computer hardware and software, and laboratory equipment will need to be purchased to assure that the new laboratories will have the most up-to-date technologies available.

In addition to The Learning Center, the college maintains a separate Math Laboratory with tutors available and the *Ho'okahua* STEM Laboratory.

**d. Other resources required:** Additional laboratory supplies and equipment

#### **9. Five-Year Business Plan. Provide a five-year projected budget for the program that includes:**

**a. Annual costs to implement the program:** Expenses shown in the Mini Cost Revenue Template includes

Faculty without fringe for released one-quarter time for a faculty program coordinator,  
Other personnel costs without fringe for an additional laboratory assistant,  
Library for up-to-date reference materials and access to online journals, and  
Equipment/Supplies for additional laboratory materials.

For budget details, refer to Appendix H “Academic Cost Revenue Template – New Program & Notes to Budget Template”.

**b. Projected enrollment and estimated tuition revenue:** Refer to Mini Cost Revenue Template and to Appendix H “Academic Cost Revenue Template – New Program & Notes to Budget Template”.

**c. How will the program be funded?** Tuition revenues will support the program.

**d. Does the current or proposed budget (Department/College/Campus) include funds or a request for funds for the proposed program? Yes**

**e. Given a “flat budget” situation, how will the proposed program be funded?** Tuition revenues will support the program.

**f. Mini Cost Revenue Template**

| ENTER VALUES IN HIGHLIGHTED CELLS ONLY |                 |                 |                 |                 |                 |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|
|  | FY              | FY              | FY              | FY              | FY              |
| YEAR                                   | 2010-11         | 2011-12         | 2012-13         | 2013-14         | 2014-15         |
| <b>PROGRAM COSTS</b>                   |                 |                 |                 |                 |                 |
| Faculty w/o fringe                     | \$16,041        | \$16,682        | \$17,350        | \$18,044        | \$18,766        |
| Other personnel costs w/o fringe       | \$6,240         | \$6,490         | \$6,749         | \$7,019         | \$7,300         |
| Library                                | \$500           | \$520           | \$541           | \$562           | \$585           |
| Equipment/Supplies                     | \$10,000        | 10,400          | \$10,840        | \$11,540        | \$12,849        |
| Other                                  |                 |                 |                 |                 |                 |
| <b>TOTAL Expenses</b>                  | <b>\$32,781</b> | <b>\$34,092</b> | <b>\$35,480</b> | <b>\$37,165</b> | <b>\$39,500</b> |
| <b>REVENUES</b>                        |                 |                 |                 |                 |                 |
| Projected Enrollment                   | 20              | 25              | 30              | 30              | 30              |
| No. of Courses                         | 7               | 7               | 7               | 7               | 7               |
| No. of Credits                         | 24              | 24              | 24              | 24              | 24              |
| SSH                                    | 480             | 600             | 720             | 720             | 720             |
| Tuition Rate/Credit                    | \$79            | \$88            | \$97            | \$97            | \$97            |
| Total Revenue from Tuition             | \$37,920        | \$52,800        | \$69,840        | \$69,840        | \$69,840        |
| Other Sources of Income                |                 |                 |                 |                 |                 |
| <b>TOTAL Revenues</b>                  | <b>\$37,920</b> | <b>\$52,800</b> | <b>\$69,840</b> | <b>\$69,840</b> | <b>\$69,840</b> |

**10. Impact on current courses or programs.** The AS-NS will have a positive impact on enrollment in STEM courses such as College Physics, Introductory Biology, and Calculus.

**11. If this program is multidisciplinary, provide evidence of commitment for support from the colleges, departments, programs, and/or individuals expected to participate.** N/A