UNIVERSITY of HAWAI‘I

WINDWARD COMMUNITY COLLEGE
Application to Plan
Associate in Science (A.S.) Degree in Natural Sciences

Date of Proposal: Spring 2012
Proposed Date of Implementation: Fall 2013
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1. Consultation with Vice Chancellor
The Chief Academic Officers of the Community Colleges who had not yet proposed an ASNS have agreed to file an ATP jointly. WCC’s Vice Chancellor for Academic Affairs has concurred with that decision.

2. Proposing entities
This proposal is submitted by Windward Community College, WCC’s Division II (Dean Brian Richardson), and the Department of Natural Sciences (Chair Inge White).

3. Planning Committee
Planning Committee is made up of the Dean of Division II and the members of the Natural Science Department:
Brian Richardson (Dean)
Inge White (NS Chair)
Ross Langston, David Krupp, David Ringuette, Joe Ciotti, Floyd McCoy, Letty Colmenares

4. Degree Proposed
Associate of Science in Natural Science

5. Program Description and Need
The proposed A.S. in Natural Science degree at Windward CC is designed to match those requirements found in the A.S. degrees at Kapi‘olani CC and UH Maui College and to parallel the proposed A.S. in N.S. from Leeward Community College. The common requirements will provide continuity through the UH system while also serving the needs of Windward CC STEM students. The general outline is presented below.

General Education Requirements (23 - 26 credits)

**Foundation - 13 credits**
- FW – 3 credits
- FS – 4 credits
- FG – 6 credits

**Diversification - 10 to 13 credits**
- DS – 3 credits
- DA/DH/DL – 3 credits
- DP – 3 credits
- DB – 3 credits
- DY – 1 credit
Concentration Requirements (5 - 13 credits)
(two example tracks)
  Life Sciences - 5 credits
  Physical Sciences - 13 credits

Additional Program Requirements (6 - 7 credits)

Natural Science Electives (14 - 22 credits)

Additional Requirements
  2 Writing Intensive (WI) Classes
  1 Hawaiian/Asian Pacific (HAP) course

Total Minimum Credits 60 credits

The Windward CC A.S. degree will use the same Diversification (Dx) and Foundation (Fx) designations already in use and articula

noa qualified course and the actual courses accepted will change as new courses are developed and qualified for the Foundation and Diversification categories. The Concentration Electives in the Natural Sciences will be from a list of the appropriate Natural Science course offerings at Windward CC. It will require a computer competency component (ICS 101) just as the other A.S. degrees require. The curriculum will require a minimum of 60 credits of 100- and 200-level courses as specified below. Courses required for the degree must have a minimum 2.0 grade point average (GPA).

The proposed AS-NS Degree will fulfill most of the General Education Core

noa.

The Foundation requirements will be met in full, including Symbolic Reasoning (FS, 3 credits/1 course), Written Communication (FW, 3 credits, 1 course), and Global & Multicultural Perspectives (FG, 6 credits, 2 courses).

The majority of Diversification Requirements will be met, including Biological (DB, 3 credits, 1 course except Engineering), Physical (DP, 3 credits, 1 course), and Laboratory (DY, 1 credit, 1 course). Half of the Diversification Arts, Humanities, and Literature (DA/DH/DL, 2 courses, 6 credits) and Social Sciences (DS, 2 courses, 6 credits) will be met with 1 course required of each. This leaves 2 Diversification courses (1 DA/DH/DL and 1 DS) to be completed during the last two years of study towards the completion of a STEM baccalaureate degree.

All A.S.–N.S. students must complete Additional Requirements including second semester of Chemistry and a Computer Competency requirement. Students will also take specific Concentration Requirements appropriate for their major depending on their Pathway.
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<tr>
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<tr>
<td>Phys 272</td>
<td>3 credits</td>
</tr>
<tr>
<td>Phys 272L</td>
<td>1 credit</td>
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</tbody>
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- noa and are appropriate for their baccalaureate STEM major. It is expected that this list will change over time just as the Foundations and Diversification qualified courses change as courses are added, deleted, qualified and unqualified for transfer. A current list and further details are found in the Graduation Checklist in Appendix D.

These requirements and outcomes are essentially the same as those of the AS-NS degree offered at Kapiʻolani CC and UH Maui College, and those proposed by Leeward CC. All A.S. degrees meet exactly the same General Education requirements.

The Kapiʻolani CC A.S. degree and the proposed Windward CC A.S. noa General Education requirements, but this is to be expected. Students will have to take one DA/DH/DL course and one DS course during their final two years of study to complete the General Education requirements, as well as additional specific college and program requirements.

**Justification for an A.S. in Natural Sciences Degree**

Windward Community College proposes to offer an A.S. in Natural Sciences degree to align our college’s degree offerings with those of the other community college campuses and better serve the needs of our students with a recognized and supported pathway towards baccalaureate STEM (Science, Technology, Engineering and Mathematics) degrees.

The A.S. will also align with similar degrees being proposed by other community colleges in the University of Hawai‘i system, including Leeward CC.

**a. The Current Windward CC A.A. Degree and Four-year STEM students**

While the Windward CC A.A. noa General Education requirements, it requires students to complete their entire baccalaureate Foundation and Diversification requirements during their first two years of study. STEM studen noa typically complete their Foundation requirements during the first two years and Diversification requirements during years 2, 3, and 4. Students benefit from taking Diversification classes throughout their academic career rather than squeezing them
into the first two years of study and taking more math and science courses during their first two years of study. As has been the experience in other campuses, former students have expressed to their professors that they had to take too many classes that were not needed for their degree and more importantly, didn’t have the variety of Diversification classes to take to balance their class schedule during the last years of study when they were enrolled in demanding 300 and 400 level classes in their STEM field. STEM students on Financial Aid who transfer to a baccalaureate institution are required to take electives to fill their schedule and those non-STEM electives are a welcome change to the demands placed on those students by higher-level STEM courses in their later years of undergraduate studies.

Other specific groups of students will also benefit from an A.S. degree include those returning for a baccalaureate STEM degree after obtaining an A.A. or B.A. in other fields. In order to obtain financial aid, returning STEM focused students who wish to change careers have found that they are not eligible for assistance unless they are pursuing a new degree. An A.S. degree would allow those students to be eligible for financial aid while they prepare to transfer to a four-year institution.

b. The A.S. Degree Will Provide a Clear Pathway for Windward CC STEM Students
Windward Community College currently teaches the majority of required classes for the first two years of study towards a four-year STEM degree. Anecdotal evidence suggests that many of our students are pursuing a four-year STEM degree, as each of the Math/Science faculty knows of many students who have successfully transferred and completed their baccalaureate studies in STEM fields. Though the institution has not counted or tracked this group in any formal way, evidence of a significant number of students at Windward CC pursuing a baccalaureate STEM degree is found in the substantial enrollment in classes required for such degrees.

Several classes are required for all baccalaureate STEM degrees but not for the two-year A.A. degree offered by Windward CC. Those courses include: Chemistry 161B and 162B; Math 205, 206, 241, and 242; Physics 171 and 272; Biology 171 and 172; and others.

Despite the lack of a complete quantitative assessment of the total number of four-year STEM students at Windward, it is clear that there are a significant number of students pursuing this pathway.

There are national trends which show the importance of a strong STEM program at the Community College level. It is reported that an impressive 44% of students who successfully completed a bachelor or master’s degree in science or engineering at the beginning of this decade, attended a community college at some point in their education (C&EN, Chemical and Engineering News, Nov. 15, 2010). This was derived from analysis of the National Science Foundation “Characteristics of Recent Science and Engineering Graduates: 2006” (http://www.nsf.gov/statistics/nsf10318/start.cfm).

c. Relationship of the Program to the Functions of the College and the University
The proposed A.S. Degree will directly address three of the five major goals of the UHCC Strategic Plan 2002-2010, Updated 2008-2015. Windward CC’s Strategic Plan, 2008-2015 includes action plans that the campus will implement to achieve college goals, including
those that are furthered through the A.S. in Natural Science.

**UHCC Outcome #1 - Increase Native Hawaiian Educational Attainment**
Windward CC has as one of its goals (1.6) to "Increase by 6-9% the number of Native Hawaiians (from 45 to 78) who receive degrees or certificates in each Annual Fiscal Year."

Given the significant number of students at Windward CC who are Native Hawaiian, the A.S. in Natural Science will be well-positioned to create successful Native Hawaiian students pursuing STEM related degrees.

**UHCC Outcome #2 - Enhancing Hawai'i's Educational Capital**
Windward CC is committed increasing enrollment of students from underserved areas of the Windward side, a goal that will be supported with an A.S. degree offering students pathways to transfer to a 4-year university and ultimately STEM related jobs.

**UHCC Outcome #3 - Creating a Competitive Workforce**
With the increased need for people trained to work in STEM-related fields, an A.S. in Natural Science will be a valuable mechanism for providing the educational foundation so that students can more successfully transfer to 4-year universities. Windward CC's Strategic Plan calls for the college to (4.5) "Promote the knowledge, skills, and opportunities that support current and emerging STEM fields and careers by increasing credit and noncredit STEM course enrollments by 3% per year" and to (4.8) "increase the number of degrees and certificates awarded in Science, Technology, Engineering, and Math (STEM) fields. (includes both credit and noncredit) by 3% per year."

6. **Planning the new program**
Planning for the new degree should be completed in the spring of 2013. Activities in the planning period will be mainly focused on deciding which tracks will be appropriate initially for WCC’s Department of Natural Science. Possible tracks include biology, physical science, engineering, environmental science, and biotechnology.
A full program proposal will be presented in the spring, 2013.
Planning will not significantly impact faculty workload or budget. The proposed program will be composed of existing courses. Most impact will be on academic advising and recruiting.
The new program will be reported to ACCJC as a substantive change after the program is approved by the Board of Regents.
The strength of the WCC science program makes the AS a natural complement to the AA.
New science facilities will be necessary, but not as a result of this program. Our current science program is simply running out of lab space. As noted in the mini cost/revenue template, the College will likely have to hire a few new lecturers as enrollment in the sciences grows.
The mini Cost Revenue template indicates that enrollments in the program will
come primarily from students currently enrolled in the AA program. Most of those students were forced either to take far more than 60 credits to satisfy the requirements of the AA degree and the requirements for most STEM majors for lower division prerequisites, or to simply transfer without a degree. We do expect a number of new enrollments as news of the quality of the degree spreads. Further, we expect new enrollments simply because CC credits cost far less than baccalaureate institution credits.

7. Impact on current courses or programs
We project an increase in enrollments in many of the STEM courses applicable to the program. On the positive side, we project an increase in enrollments in certain underenrolled, advanced (e.g., 200-level) classes in STEM disciplines.

8. Articulation
As noted above, all courses are currently fully articulated. As the CC system plans this degree, we intend to ensure that all courses will be applicable to all degree programs.

9. Multidisciplinary
The Department of Natural Science and the Department of Mathematics and Business are both committed to making this program successful.
Appendix A. Kapi‘olani CC A.S. – N.S. Degree Requirements

THE UNIVERSITY OF HAWAII - KAPI‘OLANI COMMUNITY COLLEGE ASSOCIATE IN SCIENCE (AS) DEGREE IN NATURAL SCIENCE - 60 Credits minimum of 100-200 level courses: 2.0 grade point ratio (GPR) minimum Effective Fall 2009

I. FOUNDATION REQUIREMENTS (13 Credits)
Written Communication (FW): (1 course) ENG 100 (Composition I) or ESL 100
Symbolic Reasoning (FS): (1 course) MATH 205 (Calculus I)
Global & Multicultural Perspectives (FG): (2 courses only, choose one course from two different groups below:)
   Group A. ANTH 151; HIST 151
   Group B. ANTH 152; GEOG 102; HIST 152
   Group C. GEOG 151; MUS 107; REL 150

II. DIVERSIFICATION REQUIREMENTS (10-13 Credits)
Arts, Humanities, & Literature: (1 course only; choose one course from any group below:)

   Arts (DA):
   ART 101, 189; DNCE 150; MUS 108; SP 251; THEA 101

   Humanities (DH):
   AMST 201, 202; HIST 231, 232, 241, 242, 252, 281, 282, 284, 288; HUM 269; HWST 100;
   HWST 107; LING 102; MUS 106; PACS 273; PHIL 100, 101, 102, 211 (formerly 200), 213
   (formerly 201), 250; REL 151, 202

   Literature (DL):
   EALL 261, 262, 269, 271, 272; ENG 214, 256, 257C, 257P, 270B, 270E, 270F, 270M,
   257

   Natural Sciences: (2-3 courses) Biological (DB): (1 course) ANTH 215; BIOL 101, 103,
   120, 124, 130, 171, 172, 270; BOT 101, 130; ESS 100; FSHE 185; MICR 130, 135, 230;
   PHYL 160; PSY 230; SCI 124; ZOOL 100; 101; 141; 142; 200 *DB (Diversification
   Biological) not required for LIFE SCIENCE concentration majors.

   Physical (DP): (1 course) CHEM 161 (General Chemistry I)
   Laboratory Science (DY): (1 course) CHEM 161L (General Chemistry II)

   Social Sciences (DS): (1 course) AMST 211, 212; ANTH 150, 200, 210; ASAN 100; BOT
   105; COM 201; ECON 120; FAMR 230; IS 105B, 105C; JOUR 150; PACS 108; POLS 110,
   120, 130, 171, 270; PSY 100, 170; SOC 100, 218, 231, 257; SSCI 260

III. Kapi‘olani CC ADDITIONAL REQUIREMENTS (7 Credits)

   Computer Competence (CC): (1 course) ICS 101
   General Chemistry (GC): (2 courses)
   CHEM 162 (General Chemistry II)
CHEM 162L (General Chemistry II Lab)
*CHEM 162L not required for Engineering students, however 1 credit must be made-up in elective.

IV. LIFE SCIENCE OR PHYSICAL SCIENCE CONCENTRATION

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 I Lab)
PHYS 272 (Physics II)
PHYS 272L (Physics II Lab)
MATH 206 (Calculus II)

V. CONCENTRATION ELECTIVES (20-27 Credits)


Writing Intensive (W): (2 courses); May be shared with above areas. Hawaiian, Asian, and Pacific (HAP): (1 course): May be shared with above areas.
Appendix B. Maui College A.S. degree.

Organization of the Program

The 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:
      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)

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 A.S. Application for Graduation form obtained from Student Services.
Appendix C. Mini Cost/Revenue Template

Initially there will be no additional cost in terms of facilities, equipment, and personnel, as this program will use already existing courses. In Fall, 2012, Windward CC’s Math & Sciences Division has 14 full-time faculty and 22 lecturers teaching courses that are appropriate for either the degree or for remedial and complementary classes.

However with the growth of the program, we anticipate the need to hire more lecturers and a slight increase in the costs of supplies. As outlined below, our costs will be offset by tuition; the enrollment projections are based on the current number of students taking STEM classes.

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*Faculty costs based on a Lecturer B pay rate, per credit hour: $1603 (AY 2013-2014), $1651 (AY 2014-2015). No UHPA contract beyond 2015, so an AY 2014-15 pay rate will be used for the following years for cost projections.

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UHCC Resident Tuition Rate Per Credit Hour in a 4 credit, 20 capped class. The revenue from tuition is based on the 2012-2013 through AY 2016-2017 (http://www.hawaii.edu/offices/app/). No Proposed Tuition Schedule for the UHCC’s, AY increase in the number of STEM courses is anticipated during the first year that the AS-NS degree is offered.