Authorization to Plan (ATP) a New Academic Program
University of Hawai‘i-Kaua‘i Community College
Certificate of Achievement (CA) in Geographic Information Systems (G.I.S.)

1. Vice Chancellor for Academic Affairs James Dire was consulted by the proposers. He is on the planning committee.

2. Campus, College, and Division requesting the ATP:
Kaua`i Community College (KCC, hereafter) Division of Science and Math (SAM)

3. Planning Committee Chair and Members:
   Dr. Nan Greer – chair, SAM faculty
   Dr. Steven Taylor, SAM faculty
   Brian Yamamoto, SAM faculty
   Dennis Chun, Hawaiian Studies faculty
   Dr. James Dire, VCAA

4. Proposed Program:
Certificate of Achievement in Geographic Information Systems (G.I.S.)

5. Describe the need for program:
   a. Provide a program description
   1) Program Learning Outcomes:
   Upon completion of the G.I.S. Certificate Program students should be able to:
   • Analyze and describe contemporary and interdisciplinary geographical representation, with a focus on social and environmental management issues;
   • Apply acquired knowledge and skills, incorporating geographic perspectives into their major fields of specialization;
   • Critically analyze the specific advancements of geographical representation, and support geographic decisions and the furthering of geographic scientific and technological knowledge, especially related to the presentation of geographic mapping across cultures and through time, and assessing theories and assumptions about mapping and decision-making that relate to the student’s particular academic focus;
   • Illustrate critical thinking skills in decision-making that reflect ethical and professional understandings of geographical mapping;
   • Describe and analyze the politics and influences of geographical representation;
   • Construct maps utilizing digital techniques, computer assisted design (CAD), database development and map design;
   • Communicate successfully orally and in writing in Standard American English, and interpret and/or express themselves in, some other form of communication at a basic level, whether from knowledge of a second language or through artistic or symbolic expression; and,
   • Analyze and demonstrate quantitative methods appropriately, based upon a scientific understandings of the physical and natural world, and an understanding of the mathematics of digitized geographical representation

   2) Program Justification
As the industry leader notes (ESRI, 2014), “Geographic inquiry and geographic information system (GIS) technology are important tools that help educators, students, and their institutions answer personal and community questions with local to global implications. Today, more and more schools are including GIS in their curricula to help their students gain valuable background knowledge and skills with which to face global challenges. In addition, school administrators have turned to GIS for help with facilities management, vehicle routing, district boundary mapping, safety and preparedness, and more.”

3) Discuss how the program will impact campus, island and/or the state’s economic development.

While adhering to the guide of the campus mission statement, a C.A. in G.I.S. would encourage further educational service for the community of Kaua‘i, its educators, governmental and nongovernmental planners, and even broaden KCC’s ability to assist the island in providing for its own needs, self-sufficiency, present and future imaging, and planning.

Due to current faculty and staff, KCC has the current capacity to deliver a Certificate of Achievement in G.I.S. Additionally, with matching NSF-TCUP grant funds, the campus has the financial wherewithal to establish a cutting edge G.I.S. lab with an unusual ability to offer complex technological skills at a community college level. Examining socioeconomic and census statistics on Kaua‘i residents, it is notable to reflect on levels of education. With 31% of the population receiving only some college, and a lesser graduating with an Associate’s Degree (17%), it is clear a Certificate of Achievement in G.I.S. would supply those with the ability only to achieve some college coursework, to advance into a well-paying field of high demand (Kaua‘i Data Book, 2012). According to Hawai‘i P-20’s Partnerships for Education (2014), “our statewide goal is to have 55% of working age adults holding a 2-year or 4-year college degree by 2025.” Admittedly, Kaua‘i’s average of college educated adults is much lower than the state average, and will need greater attention to achieve the state-wide goal, as stated above (www.55by25.org).

4) Discuss how the proposed program addresses workforce needs

Individuals with knowledge and skills in Geographic Information Systems (G.I.S.) are in high demand and will increasingly be so in the future. Geographic skills are paramount to current local, regional, and global environmental management, economic planning, and even human health monitoring. The U.S. Bureau of Labor Statistics classifies G.I.S. and Remote Sensing (R.S.) as “new emerging fields”. Job openings and opportunities for G.I.S. and R.S. scientists, technicians, and cartographers are expected to grow twenty-nine (29) percent between 2012 and 2022 (U.S. BLS, 2014), where the average growth rate for all occupations is only 11 percent. As stated, the Bureau classifies this growth rate as much faster than average job growth. According to the Bureau, median salaries for these positions continue to rise. While this is true, due to the competitive nature of such jobs, education in the field is clearly critical.

A greater widespread use of geographic technologies in all areas will continue to drive job growth. Such technologies allow government agencies, business, and nonprofits to use geographic data to make better business and planning decisions. Notable is the use of geographic technologies in the area of environmental management, monitoring, planning, and regulation – obviously an increasingly critical field given the nature of global change and climate insecurities of the present and future. As an example, NASA has increased their involvement even in groundwater mitigation in states such as California, where the Jet Propulsion Lab work and Landsat imagery are principal in managing a dangerously threatened public resource (NASA, February 25 2014). Geographers are increasingly needed to understand environmental changes, human adaptation, and impacts on the future of the environment. Geographers will thus become more and more involved in land management decisions.
critical to human survival. According to GeoApplications World Press (2013), landing a job in G.I.S. involves learning a minimum of geospatial skills including:

- Cartographic production
- Data creation
- Geodatabase design and creation
- Data editing
- Topology
- Projections
- G.I.S. analysis
- Geoprocessing
- GPS data capture
- Aerial photography interpretation
- Georeferencing
- Data conversion
- Metadata implementation

Mentioned, are an additional list of preferred skills including with software and hardware proposed for use in this G.I.S. Certificate of Achievement Authorization to Plan (GeoApplications World Press, 2013).

5) Demonstrate how the proposed program aligns with system and campus mission and strategic plan and outcomes.

Initiating both Fall and Spring semesters of this academic year (2013-2014), a Geography class in G.I.S. already approved by KCC-Curriculum Committee has experienced interest in both new students and students returning to renew their prior G.I.S. knowledge-base. Interest in G.I.S. classes by students has represented a broad range of fields, including: architecture, engineering, political governance, anthropology/archaeology, health, environmental monitoring, disaster mitigation, climate change, and botanical taxonomic community identification, among others.

The demand for G.I.S. technology is great as it matches well as a tool and skill set for virtually any primary field of study within the College – Business, Health Services, Liberal Arts, Public Service, Science and Mathematics, and clearly, various emphases within Technology.

**Guiding Principles**

Kaua‘i Community College’s request for an Authorization to Plan a new Certificate of Achievement in G.I.S. reflects its mission statement and strategic priorities of the college. The KCC mission statement is as follows:

> Kaua‘i Community College provides open access education and training in an ethical and innovative student-centered and community-focused environment, nurturing life-long learners who appreciate diversity and lead responsible and fulfilling lives.

KCC’s proposed CA in G.I.S. is projected as an academic program, yet concomitantly, it is proposed as an institutional center for students now and in the future. Inherent in its development is the establishment of a G.I.S. campus laboratory, and center for mapping studies. As such, KCC’s proposed CA in G.I.S. serves to flourish an educational and data hub for multiple disciplines relying on its valuable technological assistance. As G.I.S. is proving valuable in areas of disaster mitigation, cultural survival, and land management, it is perhaps critical in timing to support such activities, even on an island by island basis. Additionally, in the first few years of its inception, KCC’s CA in G.I.S. is geared to provide support for grant-mandated practical G.I.S. work, such as in the area of cultural survival and
community support, as mandated by KCC’s National Science Foundation’s TCUP grant (Tribal Colleges Universities Program) from 2013-2016.

While the Offices of Continuing Education and Training have proposed and initiated some training in the area of G.I.S., there is a clear need for supporting furthering basic knowledge in pursuit of careers on Kaua‘i in G.I.S. It is perhaps astounding that the USDA-NRCS on Kaua‘i Island currently flies in their G.I.S. contractor to manage county data. At KCC, we hope to change that kind of externally driven expertise, developing and building on local capabilities and community assets.

In congruence with the campus mission, G.I.S. education is by its nature, a student-centered innovative training. Those educated in G.I.S. at KCC are further encouraged to apply their work to the local community, addressing both its needs and capacities. As such, it is perhaps necessary for educators of youth to become adept at G.I.S., with current proposals of involving G.I.S. in K-12 STEM courses under the D.O.E.

b. Can identified need be met by existing UH program(s)?

Some effort has been made to establish G.I.S. classes in the UH-system, however there are few online courses available, none which provide for a Certificate of Achievement. Most studies of G.I.S. are found on both the Mānoa campus and Hilo campus, albeit with a Bachelor’s focus of study (4-year). KCC’s current proposal is to complement these programs, while filling the niche between OCET adult educational training and a longer, four-year degree available at Mānoa [Bachelor’s in Geography (emphasis on G.I.S.)] and Hilo Bachelor’s in Geography (emphasis on G.I.S.). As such, KCC plans to poise its G.I.S. program to collaborate with other G.I.S. groups of students and faculty, in addition to working with local community groups, leaders and non-profit/non-governmental groups.

1) List similar degrees or certificates offered in UH System
No similar certificate is offered in the UH System.

2) Describe the impact of the proposed program on current courses or programs at the campus and within the system (is it duplicative? Can resources be leveraged? Can a joint program be offered or campuses collaborate to offer one degree?).

KCC’s proposed Certificate of Achievement in G.I.S. will nicely compliment current OCET Adult Education classes focused on basic G.I.S. techniques. Additionally, with Architectural Computer Assisted Design (CAD) courses provided on campus, a C.A. in G.I.S. can add greater depth to Architectural degrees and classes, in addition to providing scientific geographically referenced data supporting virtually all of the natural sciences, in addition to supplying geo-visual capabilities for the social sciences. A C.A. in G.I.S. can also bolster other courses and programs around the campus, especially those with focus on advanced technology, spatial studies, and computer software programming.

3) If a similar program exists, consult with other campuses, identifying, who has been consulted, what campus and date of consultation. Consultation will include:
   a) The VCAA of the other UH campuses with relevant programs by the VCAA of the campus proposing the degree/certificate. VCAA Dire has consulted with the VCAAs and UH Manoa and UH Hilo

   b) Colleagues in related disciplines from other campuses have been consulted. Dean Denise Konan, College of Social Sciences at UH Manoa (geography, urban and regional planning programs) was consulted. In addition, Kathryn Besio, chair of the UH Hilo geography department, was consulted.
6. Planning
a. Planning Period.
1) Planning period: Summer and Fall 2014

2) Activities to be undertaken during the planning phase:
Develop program proposal and submit to Kaua‘i Community College Curriculum Committee, Vice-Chancellor for Academic Affairs, Chancellor, Council of Chief Academic Officers (CCAO), University of Hawai‘i Administration and Board of Regents (BoR)

3) Submission date of program proposal: Fall 2014, implementation in Spring 2015

4) Workload/budget implications during planning period:
The Chair of the Planning Committee, Dr. Nan Greer is hired as a Casual Hire under NSF-TCUP Grant (HRD-1265462), for the 2013/2014 academic year thru 2015/2016, providing funds for planning the G.I.S. program, and teaching the first two years of its G.I.S. courses. As reflected in the 2-year budget below, an additional lecturer will be hired as the number of courses provided on campus increase.

5) How program will be economically sustainable:
As proposed, the program is currently funded under a grant from NSF-TCUP, upon completion of this grant it is anticipated that the program will become economically sustainable due to continual increases in enrollment. Additionally, KCC will continue fundraising for G.I.S. projects, which will assist in economic sustainability and provide for expansion of the program at a future date.

6) Impact proposed program may have on accreditation:
The proposed program will have a positive effect on accreditation, and will bolster the programs and numbers of graduating students on the campus additionally it is intended to include an emphasis on the involvement of native Hawaiian students and cultural preservation, which aligns with the college’s mission and strategic plan.

7) How program will fit within campus and/or system organizational structure:
The program will offer certificates (CA and CO) under the Division of Science and Mathematics.

b. Description of resources required:
1. Faculty (existing and new FTEs): One SAM lecturer teaches courses in G.I.S. One additional lecturer will be required. These costs include payment of lecturer, at two courses per year, at a rate of $5,000 per course without associated fringe benefits.

2. Library resources (space, equipment, etc.): A search will be carried out to determine if the library has access to the most commonly used online G.I.S. journals; subscriptions may be needed for critical journals not available.

3. Physical resources: The current Natural Sciences building on the Kaua‘i Community College campus will provide classroom and laboratory resources. Additional supplies, computer hardware and software, G.P.S. equipment, and other field equipment will be purchased to assure the new G.I.S. laboratory will
have the most up-to-date technologies available – KCC’s NSF-TCUP Grant (HRD-1265462) includes funding for all additional resource needs in establishing the G.I.S. Program.

4. Other resources required (staff, graduate assistantships, etc.): Student assistantships will be required, and are included under KCC’s NSF-TCUP Grant (HRD-1265462) for year one. Student assistants are included in projected costs for other personnel, at $17,500 the first year and $10,500 the second year.

c. Two-Year Business Plan. Provide a two-year projected budget for the program that answers the following questions and includes a completed Mini Cost Revenue Template:

1) What will be the annual costs to implement the program? Please see the below cost spreadsheet. Please see the above description for cost breakdown estimates.

2) What will be the projected enrollment and estimated tuition revenue?
In year one (2015-2016) projected enrollment is 20 students. Given a tuition rate of $114/credit hour, this allows for an estimated tuition revenue of $36,480. In year two (2016-2017) projected enrollment is 25 students. Current tuition projections (albeit not set for the following year), amount to an approximate 7% increase, this allows for an estimated tuition revenue of $48,800 in year two (2016-2017)

3) How will the program be funded?
The development and establishment of the G.I.S. Program will be funded under KCC’s NSF-TCUP Grant (HRD-1265462), thereafter the program will be funded with student enrollment. Grant writing for the program will continue for the purpose of expanding the applied G.I.S. community-based mapping projects associated with the program, as both service learning and internship opportunities.

4) Does the current or proposed budget (Department/College/Campus) include funds or a request for funds for the proposed program? Please provide details.
The current budget includes funds for the proposed program, in addition to proposed funding.

5) Given a “flat budget” situation or if anticipated enrollment does not materialize, how will the proposed program be funded?
The current budget includes funds for the proposed program, a “flat budget” will not have an effect on the program.
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<th>YEAR</th>
<th>FY 2015-2016</th>
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<td>PROGRAM COSTS</td>
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<td>Faculty w/o fringe</td>
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<td>Other Sources of Income – TCUP Grant</td>
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<tr>
<td>TOTAL Revenues</td>
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7. Describe the impact on current courses or programs.
A Certificate of Achievement in G.I.S. will have a positive impact on enrollment in science and mathematics courses, in addition to those in Hawaiian Studies, Pacific Island Studies, the Marine Option Program, in addition to other related natural and social sciences.

8. If the curriculum includes courses that are offered at other UH campuses, describe how articulation of these courses will be assured prior to the program proposal submission. N/A

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

Sources Cited: