University of Hawaiʻi
Code Request Form for Academic Programs

NEW OR REPLACE PROGRAM CODE

☒ **New Program Code** ☐ **Replace Program Code** Date: February 9, 2022

REQUESTOR CONTACT INFORMATION

Name	Pheng Xiong	Campus	UH Manoa
Title	University Registrar	Email	pxiong@hawaii.edu
Office/Dept	Office of the Registrar	Phone	808-956-5322

NEW PROGRAM CODE TO CREATE

Institution	UH Manoa	Campus	UH Manoa
Level	Undergraduate	Effective Term	202010 - Fall 2020

	Code (Max. Characters)		Description	Check if requesting new code:
College	(2)	11	School of Ocean & Earth Sci&Tech	☐ See Banner form STVCOLL
Department	(4)	HIGP	Hawaii Inst of Geophy&Planetology	☑ See Banner form STVDEPT
Degree/Certificate	(6)	UCERT	Undergraduate Certificate	☐ See Banner form STVDEGC
Major	(4)	EPET	Earth&Planetary Exploration Tech	☐ See Banner form STVMAJR
Concentration	(4)			☐ See Banner form STVMAJR
Minor	(4)			☐ See Banner form STVMAJR

If a similar major/concentration code exists in Banner, please list the code:

Justification to warrant a new major/concentration code similar to an existing major/concentration code:

Is this major/concentration code being used the same way at the other UH campuses? ☐ Yes ☑ No

Should this program be available for applicants to select as their planned course of study on the online application? *If yes, student may select the code as their only program of study.* ☐ Yes ☐ No

RULES PERTAINING TO FINANCIAL AID AND 150% DIRECT SUBSIDIZED LOAN LIMIT LEGISLATION

Is 50% or greater of the classes in this program offered at a location other than the Home Campus? ☐ Yes ☑ No

Is this program/major/certificate financial aid eligible? ☐ Yes ☑ No

Does this certificate qualify as a Gainful Employment Program (Title IV-eligible certificate program)? ☐ Yes ☑ No

See http://www.ifap.ed.gov/GainfulEmploymentInfo/index.html

Program Length
In academic years; decimals are acceptable. The length of the program should match what is published by the campus in any online and/or written publication. 2 Years

Special Program Designations ☐ A ☐ B ☐ N ☐ P ☐ T ☐ U
See Special Program Designations Code Definitions on IRAO Program Code Request webpage

Required Terms of Enrollment: ☒ Fall ☒ Spring ☐ Summer ☐ Extended

NEW OR REPLACE PROGRAM CODE

EXISTING PROGRAM CODE TO REPLACE, IF APPLICABLE

Program Code		Program Description	
Institution		Campus	UH Manoa
College		Department	
Level			

Are current students “grandfathered” under the program code? ☐ Yes ☐ No

Should the old program code be available for use in Banner? ☐ Yes ☐ No

Effective ______ (Term (ie. Fall 2020)) **, old program code will no longer be available to admit or recruit students.**

This will turn off the online application, recruitment (effects Banner forms SRASUMI and SRAQUIK) and admissions (effects Banner forms SAADCRV, SAAADMS, SAASUMI, SAAQUIK, and SAAQUAN) Banner modules.

Effective ______ (Term (ie. Fall 2020)) **, old program code will no longer be available to award degree to students.**

This will turn off the general student (effects Banner form SGASTDN) and academic history (effects Banner form SHADEGR) Banner modules.

ATTACHMENTS

BOR Approved: Sole-credential Certificate, Associate, Bachelor and Graduate Degrees, and sole credential certificates

☐ BOR Meeting Minutes & Supporting Documents ☐ Curriculum

Chancellor Approved: Concentrations, Certificates and Associate in Technical Studies (ATS) Degree

☒ Memo from Chancellor to notify Vice President for Academic Planning and Policy regarding program action.

☒ Curriculum

CERTIFICATES ONLY: Please check one (1) statement. This certificate is a...

☐ BOR approved certificate. BOR Meeting/Approval Date: _______________

☐ Chancellor approved within an authorized BOR program. BOR Program: ______________________________________

☐ Chancellor approved CO in accordance with UHCCP 5.203, Section IV.B.10.

VERIFICATIONS

By signing below, I verify that I have reviewed and confirm the above information that is pertinent to my position.

Registrar (Print Name)	**Financial Aid Officer** (Print Name)	**For Community Colleges, verification of consultation with OVPCC Academic Affairs:**
Pheng Xiong	Jodie Kuba	Tammi Oyadomari-Chun
Pheng Xiong — Digitally signed by Pheng Xiong Date: 2022.02.09 16:01:09 -10'00' — 2/9/22	Digitally signed by Jodie Kuba Date: 2022.02.10 17:05:02 -10'00'	
Signature / Date	Signature / Date	Signature / Date

ADDITIONAL COMMENTS

Prior approved program - Banner code needed in order to post certificate to student transcripts. Approval form attached. Note that dept had underwent a name change between 1993-1995. This change did not make into the Integrated Student Information System (ISIS). In addition to a new program code, we request an update to the department's description in Banner from Hawaii Institute of Geology & Geophysics. Organization exists on UH Manoa's organizational structure. OVPAE

Form modified: Oct 2020

DT 8882

Office of the Vice Chancellor for Academic Affairs

UNIVERSITY of HAWAI'I
MĀNOA

RECEIVED

19 MAR 20 A9 :25

MANOA CHANCELLOR'S OFFICE

March 13, 2019

MEMORANDUM

TO: David Lassner
Interim Chancellor

FROM: Michael Bruno
Interim Vice Chancellor for Academic Affairs

SUBJECT: REQUEST TO APPROVE THE UNDERGRADUATE CERTIFICATE IN EARTH & PLANETARY EXPLORATION

SPECIFIC ACTION REQUESTED:
It is requested that the Chancellor approve the Undergraduate Certificate in Earth and Planetary Exploration to be administered by the Hawai'i Institute of Geophysics and Planetology in the School of Ocean and Earth Science and Technology.

EFFECTIVE DATE:
Summer 2019.

ADDITIONAL COST:
None.

PURPOSE:
The proposed Undergraduate Certificate in Earth and Planetary Exploration is designed to provide science and engineering majors with a comprehensive understanding of scientific and engineering knowledge in theory and practice to successfully explore our own and other worlds, from the deepest oceans to the far reaches of the solar system.

BACKGROUND:
UH Executive Policy E5.205 grants the Chancellor the authority to approve certificate programs in specific subjects that represent the recognition of work taken within (or among) existing Board-authorized programs.

The proposed Undergraduate Certificate in Earth and Planetary Exploration employs lecture, laboratory, field and project-based instruction to enable students to enter the earth and space exploration workforce within their disciplines. While designed for science and engineering undergraduates, the program will also be of interest to working professionals who wish to upgrade their knowledge and skills in this area.

2500 Campus Road, Hawai'i Hall 209
Honolulu, Hawai'i 96822
Telephone: (808) 956-8447
Fax: (808) 956-7115

The cohort-based certificate will enroll between 15-20 students over a three-semester course sequence.

The following new courses were created to support the program:

EPET 201: Exploring the Solar System
EPET 301: Space Science and Instrumentation
EPET 302: Space Mission Design
EPET 401: Capstone Project: Producing a Science Satellite

The courses will be taught by a team of instructional and research faculty in SOEST (all in G-funded faculty positions). No new resources are required for this program.

The proposed program has been reviewed and recommended for approval by the Dean of SOEST, the Faculty Senate Committee on Academic Planning and Policy, and the Mānoa Faculty Senate (March 13, 2019). I recommend your approval.

ACTION RECOMMENDED:
It is recommended that the Chancellor approve the Undergraduate Certificate in Earth and Planetary Exploration to be administered by the Hawaiʻi Institute of Geophysics and Planetology in the School of Ocean and Earth Science and Technology.

APPROVED / DISAPPROVED

David Lassner
Interim Chancellor

MAR 2 1 2019
Date

Attachments

c: Donald Straney, Vice President for Academic Planning and Policy
Dean Taylor
Director
Director Iboshi
Professor Englert
Registrar Lau
Catalog Coordinator Nakashima

Presented to the Mānoa Faculty Senate by the Committee on Academic Policy and Planning (CAPP) for a vote of the full Senate on March 13, 2019, a resolution supporting the proposal for an undergraduate certificate in earth and planetary exploration technology.

RESOLUTION SUPPORTING THE PROPOSAL FOR AN UNDERGRADUATE CERTIFICATE IN EARTH AND PLANETARY EXPLORATION TECHNOLOGY

WHEREAS, the global space industry is currently worth $335 billion and growing; and

WHEREAS, a general issue in space mission development projects is that engineers do not understand the fundamental science that underpins space missions, while scientists do not understand the technological constraints under which engineers must work to design a successful mission; and

WHEREAS, an undergraduate certificate program in Earth and Planetary Exploration Technology (EPET) will seek to close this gap by providing a coherent body of classes through which students majoring in the physical sciences and engineering disciplines can obtain a formal qualification in the science and technology that underpins the human exploration of the solar system via orbiting spacecraft, planetary landers, and planetary rovers; and

WHEREAS, this proposal supports the goal of the Hawai'i Innovation Initiative to create more high-quality jobs and diversify Hawai'i's economy; and

WHEREAS, the faculty proposing this certificate have raised over $100 million in extramural funds to support their research in planetary science, primarily from NASA and the Department of Defense, have collectively served on 25 NASA instrument/mission science teams, regularly serve on NASA panels, and are at the forefront of research on planetary exploration; and

WHEREAS, this certificate will utilize only existing and approved resources present at the University of Hawai'i at Mānoa; and

WHEREAS, there is demonstrated interest in this certificate from UH Mānoa undergraduate students and anticipated interest from professionals working in the community who wish to upgrade their knowledge and skills, desire a certificate only, and will not enroll in a degree program; and

WHEREAS, the proposed certificate will provide enhanced training not currently provided in the University of Hawai'i System; therefore,

UNIVERSITY OF HAWAI'I AT MĀNOA FACULTY SENATE
2500 Campus Road • Hawai'i Hall 208 • Honolulu, Hawai'i 96822
Phone: (808) 956-7725 • Fax/Polycom: (808) 956-9813
E-Mail: uhmfs@hawaii.edu • Website: http://www.hawaii.edu/uhmfs/

BE IT RESOLVED, that the Mānoa Faculty Senate recommends approval of the proposal to establish an undergraduate certificate in Earth and Planetary Exploration Technology at the University of Hawai'i at Mānoa.

Supporting Document:

Proposal for Undergraduate Certificate in Earth and Planetary Exploration Technology [DOC]

UNIVERSITY OF HAWAI'I AT MĀNOA FACULTY SENATE
2500 Campus Road • Hawai'i Hall 208 • Honolulu, Hawai'i 96822
Phone: (808) 956-7725 • Fax/Polycom: (808) 956-9813
E-Mail: uhmfs@hawaii.edu • Website: http://www.hawaii.edu/uhmfs/

"Earth and Planetary Exploration Technology"

A New Undergraduate Certificate Program

Hawaii Institute of Geophysics and Planetology

1. Purpose and Objectives of EPET Certificate program

The Earth and Planetary Exploration Technology (EPET) certificate program provides science and engineering majors with a comprehensive understanding of the scientific and engineering knowledge, in theory and practice, to successfully explore our own and other worlds, from the deepest oceans to the far reaches of the solar system.

The EPET curriculum combines lecture-, laboratory-, field- and project-based approaches with effective interdisciplinary cohort/group learning strategies to integrate the nature of planetary materials and landforms with the science and engineering tools to study them. These include sensors and scientific instruments, robotic vehicles as platforms for remote sensing and sampling, spacecraft fundamentals, and mission architecture, planning and operation.

The EPET certificate enables students to enter the Earth and space exploration workforce in their major science or engineering discipline.

The objectives of the program are to provide a coherent body of classes via which students majoring in the physical sciences (e.g. physics, chemistry, geology) and engineering disciplines can obtain a formal qualification in the science and technology that underpins the human exploration of the Solar System via orbiting spacecraft, planetary landers and planetary rovers.

2. Administration of EPET Certificate Program

The EPET Certificate Program will be administered by an EPET program director appointed by the director of HIGP from the faculty actively engaged in teaching it. The EPET program director is responsible for all aspects of implementing and operating the EPET Certificate Program, including advising of students.

3. Campus, school and unit proposing the new program

Mānoa (UHM), School of Ocean, Earth Science and Technology (SOEST), Hawai'i Institute of Geophysics and Planetology (HIGP). Faculty involved in planning and teaching the program are named in the draft syllabi of the individual courses of the EPET certificate program.

4. Proposed Target audience of the EPET Certificate Program

The primary target audience of the EPET Certificate Program are students enrolled in science and engineering undergraduate degree programs at the University of Hawaii at Manoa, other parts of the UH-system, and other universities. The program will also be of interest (and can accommodate) professionals working in the community who wish to upgrade knowledge and skills, desire a certificate only, and will not enroll in a degree program.

Based on informal inquiries with students in space science related courses taught by the development team, interest in the certificate program is high among UH undergraduate students. We anticipate that cohorts of 15 to 20 students will enroll and complete the EPET Certificate Program within a concentrated three semester class sequence.

5. Program Outline, Organization, and Learning Objectives

a. Courses

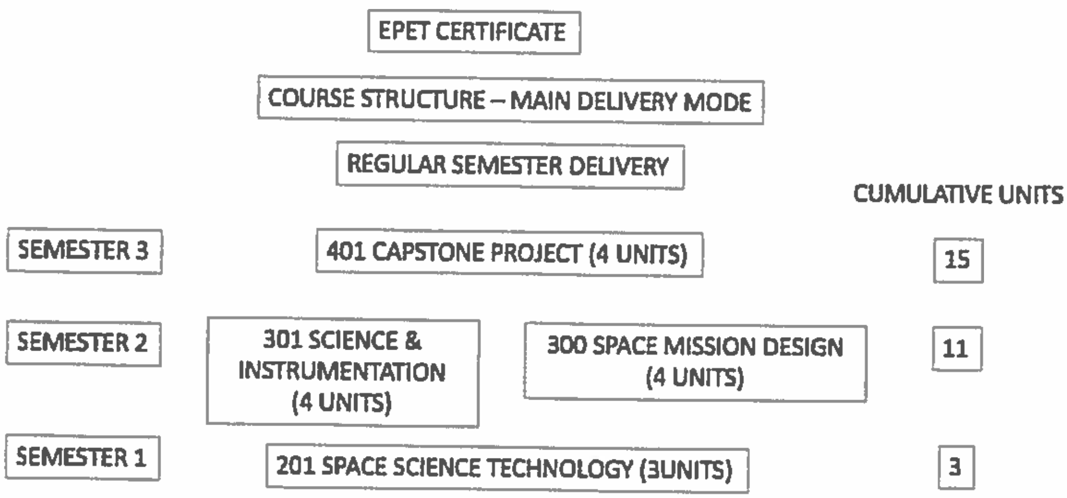
The EPET Certificate Program will consist of four courses totaling 15 units/credits: one 200 level introductory course of 3 credits, two 300 level courses of 4 credits each, and one 400 level course of 4 credits. This implies that all courses are required for the certificate.

- There will be no prerequisites for the 200-level introductory course.
- The 200-level introductory 3 credit course will be a prerequisite for the two 300 level courses; however, other courses and professional experience may be substituted. The 200-level course will be a regular lecture course.
- The two 300 level 4 credit (science & instrumentation, mission design) courses will both be prerequisites for the 400-level course (capstone).
- All 300 and 400 level courses will be lecture/laboratory courses with 6 contact hours per week.

b. Course Delivery

EPET Certificate Program courses will be offered on a regular three semester cycle (Mode 1)

- semester 1: EPET 201 (spring)
- semester 2: EPET 301 and EPET 302 (fall)
- semester 3: EPET 401 (spring)



Additional delivery modes will be considered when demand for them arises. The following modes are considered feasible:

- EPET courses can be offered on a three-semester regular/Online cycle (Mode 1OL)
  - semester 1: EPET 201 OL delivery
  - semester 2: EPET 301 (science and instrumentation course) regular delivery; EPET 302 (mission design course) OL delivery
  - semester 3: EPET 401 (capstone project) regular delivery

- EPET courses can be offered in two accelerated modes (Mode 2 ACC1 or 2):
  - Accelerated mode 1: EPET 201, EPET 301, and EPET 302 level are delivered in three 18 instruction day blocks during one semester; EPET 401 capstone project will be taught in the second semester (delivery mode to be determined).
  - Accelerated mode 2: courses are delivered in four blocks of 18 instruction days during one semester.

c. Course Numbers and Descriptions

The EPET Certificate Program consists of four courses. Courses form a logical sequence to achieve student learning outcomes and must be taken in a regular three semester cycle outlined in paragraph 6 b. above. Building on their experience and projects in designing science instruments and spacecraft from EPET 301 and EPET 302, the EPET 401 capstone project course will provide a culminating experience to students applying their 300 level design project outcomes to building a space worthy small satellite with payload.

EPET 201 Exploring the Solar System: Introductory course in the science or engineering of exploration of the Solar System. Covers instruments to collect data, mission trajectories (fly-by, orbit or lander), and engineering constraints imposed on spacecraft design. Lectures, discussions, class projects.

EPET 301 Space Science and Instrumentation: Essential techniques for remote compositional analysis of planets; understanding spectroscopy, mineralogy, and geochemistry of planetary surfaces and their measurement. Design of space flight instrumentation.

EPET 302 Space Mission Design: Space Mission Design will cover all aspects of spacecraft design, subsystems, science payload, systems engineering, project management, and budgets that are important to producing a fully successful mission.

EPET 401 Capstone Project: Producing a Science Satellite Develop a space mission using a multidisciplinary team of engineers and scientists using concurrent engineering methodologies (similar to a TeamX exercise from NASA/JPL). The class will build a small spacecraft and payload. The satellite will seek to answer important science questions.

d. EPET Certificate Program student learning objectives

The student learning objectives of the EPET Certificate Program are:

- Students can explain the relevance of Earth and Planetary Exploration to human needs (including those appropriate to Hawaii) and be able to discuss issues related to Earth and Space exploration and its impact on society.
- Students can use the scientific method to define, critically evaluate, and solve problems in Earth and Planetary exploration.
- Students can apply technical and field knowledge of science and engineering modalities, instrument and spacecraft design, mission architecture and design, and mission operations to solve problems in Earth and Planetary exploration.
- Students can explain, clearly and ethically, Earth and Planetary exploration knowledge in both oral presentations and written reports.

Each course will contribute to several of the objectives at introductory (i), advanced (a), and proficiency (p) levels.

- Introductory level (i): General overview and introduction of topics and concepts important for earth and planetary exploration technology to engage students and create interest for the subject.

- Advanced level (a): Development of subject specific knowledge through exploration, analysis, and application of topics and concepts.
- Proficiency level (p): Development of thorough and applicable knowledge through in-depth exploration, analysis, and professional engagement in real/realistic projects.

Student learning objectives and levels for EPET Certificate Program

		EPET 201	EPET 301	EPET 302	EPET 401
units		3	4	4	4
1. Relevance					
	society & human needs	i	a→p	a→p	p
	understanding exploration	i	a→p	a→p	p
2. Scientific method					
	problem definition	i	a→p	a→p	p
	critical analysis	i	a→p	a→p	p
	problem solving	i	a→p	a→p	p
3. Technical and field knowledge application					
	instrument design	i	a→p	-	p
	spacecraft design	i	-	a→p	p
	mission design	i	-	a→p	p
	mission operations	i	-	a→p	p
4. Communication					
	oral	i	a→p	a→p	p
	written	i	a→p	a→p	p
	ethics	i	a→p	a→p	p

6. New Resources

No new resources are required. The teaching team are all in G-funded faculty positions.

7. Effectiveness of Program and Assessment

A key component of the EPET certificate Program is the design of space instrumentation and space mission as part of the 300 level course outcomes. The culminating experience at the core of the 400-level capstone course is building a flight worthy space craft with payload.

In addition to traditional methods of assessment of student individual and group performance and learning outcomes, the project components of the EPET Certificate Program provide a natural assessment framework through project reviews and design reviews.

Final designs of the 300 level courses are evaluated through reviews of progress and upon completion. For the 400-level capstone project a series of reviews including a preliminary design review, a critical design review, integration and testing, and finally (mock-up) launch and operation simulations measure and assure successful completion and with-it validation of learning outcomes.

8. Support of Campus and UH system mission, academic plan, or strategic directions.

The proposed certificate is supporting the Hawai'i Innovation Initiative, the overarching goal of which is to "*Create more high-quality jobs and diversify Hawai'i's economy by leading the development of a $1 billion innovation, research, education and training enterprise that addresses the challenges and opportunities faced by Hawai'i and the world*". In 2015 the Hawai'i Space Flight Laboratory, a collaborative venture between SOEST and UHM's College of engineering, launched its own satellite from Kauai's Pacific Missile Range Facility. The satellite and the hyperspectral imaging instrument it carried were both designed and built in UHM's POST building, by UHM faculty, staff, and students (see photos above). The global space industry is currently worth $335 billion (Satellite Industry Association, 2016) and growing. In 2012, 22 CubeSats (satellites smaller than a microwave oven) were launched into space; in 2014 the number had grown to over 120. In 2017 the Hawai'i State Legislature passed SB1247, to examine the feasibility of another satellite launch site on Hawai'i island. The proposed certificate will be directly supportive of UHs role in the state's embryonic space industry, by providing students with a formal qualification in the design of planetary science instruments and missions. The proposed program is also supportive of the HI2 Action Strategy 2 to "*Integrate...innovation throughout the UH educational experience...*" (University of Hawai'i Strategic Directions, 2015-2021, p. 4,). The faculty proposing the EPET certificate have raised over $100M in extramural funds to support their research in planetary science, primarily from NASA and the Department of Defense. They have collectivity served on 25 NASA instrument/mission science teams, regularly serve on NASA panels, and published hundreds of scientific papers. They are at the cutting edge of planetary exploration and its associated technologies. A key philosophy guiding the proposed certificate will be to teach through experiential learning, leveraging the state-of-the-art research (and research facilities) of HIGP, including the Advanced Electron Microscopy Laboratory, and the W.K. Keck Cosmochemistry Laboratory.

9. Relationship of the EPET Certificate to existing degree programs

a. Justification of need

A general issue identified by the program development team is that in space mission development projects engineers do not understand the fundamental science that underpins space missions, while scientists do not understand the technological constraints under which engineers must work to design a successful mission. Closing this gap is part of the motivation and justification for the proposed EPET Certificate Program. In addition, the EPET Certificate Program satisfies a current and future need of UHM and the State's nascent space industry as a whole. The proposed certificate program will fill a need at the state (and national level) for a self-contained undergraduate qualification in planetary science and supporting technologies (i.e., a purely academic need). Whereas there are planetary science graduate programs across the nation there are no equivalents at undergraduate level (although planetary science courses are obviously taught as part of geoscience, and to a lesser extent, physics and astronomy degrees). There is currently no undergraduate program that deals specifically with the science, technology and engineering associated with the design and execution of planetary science missions.

The College of Engineering is planning a new BS in Engineering Science, within which there will be a track in "Astronautical Engineering". The proposed certificate program would dovetail well with such a program.

b. NON-DUPLICATION OF PROGRAMS

Undergraduate certificates are currently offered at UHM in Aging, Classics, Communications Sciences and Disorders, Ethnic Studies, Islamic Studies, Latin American and Iberian Studies, Law and Society, Marine Options Program, Mathematic Biology, Music, Peace Studies, Sustainable Tourism, Travel Industry Management, Tropical Agriculture and the Environment, Women's Studies, Zoology and many languages (Chinese, Filipino, French, German, Hawaiian, Hindi, Ilokano, Indonesian, Indo-Pacific Languages, Japanese, Khmer, Korean, Russian, Samoan, Sanskrit, Spanish, Tahitian, Thai, Vietnamese). At UH Hilo, undergraduate certificates are offered in Accounting, Asia-Pacific Business Relations, Beekeeping, Business Administration, Chinese Studies, Computer Application Development Specialization, Contemporary Indigenous Multilingualism, Creative Writing, Database Management, Digital Visualization and Communication, Educational Studies, Energy Science, Environmental Studies, Filipino Studies, Finance, Forest Resource management and Conservation, Global Engagement, Hawaiian Culture, Hawaiian Language, Health Care Administration, International Politics, International Studies, Marine Option Program, Multidisciplinary Hawaiian Studies, Pacific Island Studies, Performing Arts, Planning, Plant Tissue Culture, Pre-Law, Pre-Pharmacy, Public History, Spanish language for Careers, STEM Research Honors, Teaching English to Speakers of Other Languages, Tropical Farming, Unmanned Aerial Systems. **The proposed certificate is not duplicative.**

10. SUPPORT OF CAMPUS AND UH SYSTEM MISSION, ACADEMIC PLAN, OR STRATEGIC DIRECTIONS.

The proposed certificate is supporting the Hawai'i Innovation Initiative, the overarching goal of which is to "*Create more high-quality jobs and diversify Hawai'i's economy by leading the development of a $1 billion innovation, research, education and training enterprise that addresses the challenges and opportunities faced by Hawai'i and the world*". In 2015 the Hawai'i Space Flight Laboratory, a collaborative venture between SOEST and UHM's College of engineering, launched its own satellite from Kauai's Pacific Missile Range Facility. The satellite and the hyperspectral imaging instrument it carried were both designed and built in UHM's POST building, by UHM faculty, staff, and students (see photos above). The global space industry is currently worth $335 billion (Satellite Industry Association, 2016) and growing. In 2012, 22 CubeSats (satellites smaller than a microwave oven) were launched into space; in 2014 the number had grown to over 120. In 2017 the Hawai'i State Legislature passed SB1247, to examine the feasibility of another satellite launch site on Hawai'i island. The proposed certificate will be directly supportive of UHs role in the state's embryonic space industry, by providing students with a formal qualification in the design of planetary science instruments and missions. The proposed program is also supportive of the HI2 Action Strategy 2 to "*Integrate...innovation throughout the UH educational experience...*" (University of Hawai'i Strategic Directions, 2015-2021, p. 4,). The faculty proposing the EPET certificate have raised over $100M in extramural funds to support their research in planetary science, primarily from NASA and the Department of Defense. They have collectivity served on 25 NASA instrument/mission science teams, regularly serve on NASA panels, and published hundreds of scientific papers. They are at the cutting edge of planetary exploration and its associated technologies. A key philosophy guiding the proposed certificate will be to teach through experiential learning, leveraging the state-of-the-art research (and research facilities) of HIGP, including the Advanced Electron Microscopy Laboratory, and the W.K. Keck Cosmochemistry Laboratory.

11. POTENTIAL RISKS

None are foreseen.

Department/Division Chair:

ROBERT WRIGHT 09/20/18

Signature Print Name Date

Dean:

Brian Taylor Brian Taylor 9/23/18

Signature Print Name Date

Campus Chief Academic Officer:

3/19/19

Signature Print Name Date

Chancellor:

MAR 21 2019

Signature **Print Name** **Date**

Course Justification for Earth and Planetary Exploration Technology (EPET 201)

Exploration of the Solar System

1. Purpose & Objectives

EPET 201 is the introductory course for any science or engineering student interested in the exploration of the Solar System and earning an EPET certificate. The course will introduce students to the types of spacecraft sent to explore planetary bodies over the past 50 years. Course topics will include the types of instruments used to collect data, the trajectories (fly-by, orbiter, or lander) of the missions, the engineering constraints imposed on spacecraft design for different thermal and radiation environments, and the resulted discoveries made by these spacecraft.

Students will be exposed to the history of space exploration dating back to the 1950s, the key attributes of different bodies in the Solar System (e.g., distance from Sun, mass, atmospheric conditions, degree and types of geologic activity), and the basics of sensor design and operation. Students will work in small teams to design their own hypothetical mission to a planetary object of their choice, developing both a detailed understanding of an object in the Solar System and the spacecraft performance needed to investigate this body.

2. Contributions to Learning Objectives

EPET 201 will bring engineering and science students together to learn the basic methodologies used to investigate the Solar System, as well as receive a scientific over-view of the of the major objects in our Solar System. We will discuss spacecraft design, the differences between fly-by, orbiter, and lander missions, as well as the compare and contrast human and robotic exploration of the Moon. We will connect mission instruments with major scientific discoveries and show how these discoveries help reveal of the origin and evolution of our Solar System.

Through offering of EPET 201, we anticipate learning outcomes that are aligned with the University of Hawaii's Institutional Learning Objectives for Undergraduate Students. This course:

• Gives practical examples of the conduct of scientific and engineering research, using quantitative skills acquired by the typical sophomore or junior engineering or science major. **(Objective 1b).**

• Provides continuous practice with critical and creative thinking: Discuss how to solve the challenging and complex problems associated with collecting research data millions of miles from the Earth. This will require applying questioning and reasoning, generating and exploring new questions, negotiating the technologic world of space exploration. **(Objective 2a).**

• Introduces the science and engineering objectives behind the exploration of the Solar System by conceptualizing problems and asking research questions, analyzing data, and using library and information systems. **(Objective 2b).**

• Will require each student to communicate to the rest of the class the student's observations made from images of objects in our Solar System **(Objective 2c).**

• Directly cultivates the habits of continuous learning and personal growth through self-assessment of intellectual curiosity pertaining to the investigation of worlds beyond the Earth. **(Objective 3a).**

3. Number of Credits, Level, and Prerequisites

EPET 201 is meant to be an introductory course for students interested in science or engineering. It has 3 credits. Prerequisites: None.

4. Course Syllabus

A draft course syllabus is given at the end of this document. Some course elements are presented here.

4.1 Description

4.2 Number of Credits

EPET 201 is a 3-credit lecture/laboratory course. The course will meet twice (TR) or three times (MWF) per week. Students must attend two out of three field trips. Field trips will take place outside of class time and will be approximately ~4 hours long.

4.3 Prerequisites

None

4.4 Textbooks

Due to the rapidly evolving discipline of planetary exploration, there will be no text book. Students will be directed to a few (<10) journal articles and YouTube videos that specifically focus on the exploration of the Solar System. The papers will be given to the students electronically. Almost all the image data are available electronically as digital files, online at NASA sites such as the Jet propulsion Laboratory's Photojournal (https://photojournal.jpl.nasa.gov/). Details of specific rover missions and the data collected on a day-by-day basis will use the Planetary Data System web sites (e.g., https://an.rsl.wustl.edu/msl/mslbrowser/tab.aspx?t=MP).

4.5 Schedule

EPET 201 has lectures, in-class exercises, and oral class presentation components. These will be interspersed to provide a coherent picture of planetary science and exploration. Students' presence at all class meetings is essential. The students will be required to participate in two (out of three) weekend field trips, each lasting ~4 hours, to key localities in SE Oahu. The University generally has a standard of 4 hours of work each week per credit hour of class (including the time spent in class). For a typical enrollment of 3 credits, 3 contact hours per week, a student would then be expected to work an additional 9 hours/week on study and project work.

5. Relation to Curriculum

EPET 201 is an integral part of the proposed EPET certificate program because it sets a foundation for understanding planetary exploration.

6. Expected Enrollment

As the introductory course to the EPET certificate program, we expect it to enroll at least twenty students per year (assuming it is offered once per year), but it is possible that ~30 students will enroll.

7. Overlap with Other Courses

EPET 201 overlaps to some extent GG 105 (Voyage Through the Solar System), and will serve as the basis for discussion of the higher-level EPET courses (e.g., EPET 301, Space Science & Instrumentation, and EPET 302, Space Mission Design).

8. Degree Requirements

EPET 201 is not required for any major, but is an integral part of the EPET certificate program.

9. Primary Instructors

The class is team taught, with one lead faculty member. Committed instructors are:

Peter Mouginis-Mark
Jeff Gillis-Davis

EPET 201: Syllabus

Durations and exact scheduling listed below are tentative.

Week 1:
Background on history of Solar System
Geography of the Solar System – size and attributes of the planets and moons
Chronology of missions to planets and moons

Weeks 2 and 3:
Environmental properties of the planets and moon.
Thermal and atmospheric pressure on planets and moons
Contrast between the Earth, Moon, Venus and Titan

Weeks 4 and 5:
Selecting instrument payloads for planetary missions
Science as a process: observation, hypothesis creation, hypothesis testing, hypothesis modification, publication/presentation
Definition of science goals for a mission
Mars landing site selection
Orbital constraints on data acquisition
Examples of data plans
Cassini and Saturn's moons – radar vs. spectral data?
Rosetta at Comet 67P

Week 6:
Power and data communication constraints for planetary missions
How much data can a mission collect each day?
Historical perspective – Mariner 4 vs. Mars Reconnaissance Orbiter
Case studies from Galileo mission to Jupiter and New Horizons to Pluto

Week 7 and 8:
Lunar exploration
Engineering background for the Apollo landings (from Mercury to Apollo 17)
What is the lunar regolith? (Hazards of landing)
The role of "dust" affecting hardware and astronauts

Week 9:
Case Study
In-class discussion of designing a future mission to the Moon

Weeks 10 and 11:
How do we land on Mars?
Role of precursor missions
Determination of surface topography, geology surface roughness and atmospheric structure

Landing site constraints

Role of atmosphere (parachute design) vs. landing "blind" (Venera and Huygens)

Rockets (Viking) vs. air bags (Pathfinder and Mars Exploration Rovers [MER]) vs. Skycrane (Mars Science Laboratory [MSL])

Payload constraints and lander mass, the need for precision landing for science objectives, expected mission duration (rover range)

Week 12:

Rover mission operations

Power and data constraints of MERs and MSL

Working on a "Mars Day" – mission planning and the science team roles

Soviet rovers on the Moon – how could they do this in the 1970s?!

What innovation was there in Chang'e 3 mission to the Moon in 2016?

Weeks 13 and 14:

Case Study

In-class discussion and assignment of designing a future mission to Mars or other Solar System object.

Week 15:

Engineering requirements to investigate extreme environments

- Roles of pressure and temperature on Venus
- Exploration of the poles of the Moon
- Landing on a comet (67P) or sampling an asteroid (OSIRIS-Rex, Hayabusa 1 and 2)

Week 16 and 17:

Student presentations on space mission design

Additional/required topics will be added

Plagiarism

Other Resources

Disability Access

Learning Assistance Center (LAC) is here to help students

Gender-Based Discrimination or Violence

Standard Policies

Title IX

EPET 301 SPRING 2019 T,R 1:30 to 4:20 pm, POST 544

Space Science & Instrumentation

Contact information:
Dr. Peter Englert: POST 508B, 808-384-3500, penglert@hawaii.edu
Office Hour: T/R 11 am to noon, or by appointment

Course materials
At the beginning of the semester or a major instructional section participants will be receiving all necessary materials through Laulima. Please check for pre-class assignments before each class period in the resources folder!

A PDF copy of Remote Geochemical Analysis: Elemental and Mineralogical Composition, Carle M. Pieters and Peter A.J. Englert, Cambridge University Press 1993 will be available in the course resources folder of Laulima.

Course Description
Essential techniques for remote compositional analysis of planets; understanding spectroscopy, mineralogy, and geochemistry of planetary surfaces and their measurement. Design of space flight instrumentation.

Number of Credits
EPET 301 is a four credit lecture/laboratory course.

Relation to Curriculum
EPET 301 is an integral part of the proposed EPET certificate program.

Prerequisites:
EPET 201; or GG 101 and GG 105; or GG 101 and GG 107; or consent

Class contact hours
Tuesday/Thursday 1:30 to 4:20 pm, POST 544

Website
Computer access is required for this course. Pre-class assignments and course material is posted on Laulima. Please check for pre-class assignments before the next class period in the EPET 301 Resources folder!

Learning Objectives/Course Objectives
University-Level Learning Objectives
The design and structure of the course delivers learning outcomes aligned with the University of Hawaii Institutional Learning Objectives for Undergraduate Students. The course:

- Gives in depth experience in the conduct of scientific inquiry and research,
- Engages students in continuous practice with critical and creative thinking:

- Is structured around procedures of conducting research in Earth and planetary science:
- Engages students through intensive interaction with instructors and peers by means of classroom activities and projects,
- Directly cultivates the habits of scholarly inquiry and intellectual curiosity, including inquiry across disciplines.
- Through examination of the environmental consequences of processes on other planetary bodies, the course raises awareness of consequences to changes (natural and man-made) of the natural environment.

Department-Level Learning Objectives
HIGP EPET Certificate Program learning outcomes are also considered. Through completing the course:

- Students can explain the relevance of Earth and Planetary Exploration to human needs (including those appropriate to Hawaii) and be able to discuss issues related to Earth and Space exploration and its impact on society.
- Students can use the scientific method to define, critically evaluate, and solve problems in Earth and Planetary exploration.
- Students can apply technical and field knowledge of science and engineering modalities, instrument and spacecraft design, mission architecture and design, and mission operations to solve problems in Earth and Planetary exploration.
- Students can construct, clearly and ethically, Earth and Planetary exploration knowledge in both oral presentations and written reports.

Course-Level Student Learning Objectives
This will be achieved through course activities aimed at:

- acquiring knowledge of the principles, instrumentation, and application of planetary remote sensing..
- developing an ability to make sound assessments of applications of measurement/experiment remote sensing research modalities past and present.
- learning how to address increasingly complex planetary sciences problems that can be addressed using geochemical remote sensing.
- improving critical reasoning skills and expanded ability to formulate scientific arguments in the area of geochemical remote sensing..
- improving research and writing skills.

COURSE DETAILS

The course is structured into learning modules generally aligned with semester weeks. The lecture/laboratory course structure allows about 50% of instruction time for lectures and lecture activities and about 50% for laboratory activities and course project activities. The following outline provides an abbreviated list/description of course modules and course module activities. Lecture and laboratory activities support the learning objectives outlined in lecture topics. GG 301 project activities focus on the conceptualization and design of space instruments able to complete defined space mission objectives. This GG 301 class project design will be used in EPET 401 Capstone Project: Producing a science satellite.

Content and topics

Module 1

Lecture, Lecture activities: Setting the stage; Overview over remote sensing; Principles of Mineralogy; Lecture demonstrations, tutorials, problem solving.
Lab activities: Intro labs on mineralogy and remote sensing.

Module 2

Lecture, Lecture activities: Principles of in-situ and orbital remote sensing; ; Lecture demonstrations, tutorials, problem solving.
Lab activities: Advanced view of the electromagnetic spectrum with exercises.
Project activities: External Project brief (1).

Module 3

Lecture, Lecture activities: The Lunar surface; Lecture demonstrations, tutorials, problem solving.
Lab activities: VINR introductory experiments
Project activities: External project brief (2)

Module 4

Lecture, Lecture activities: The Lunar surface; Lecture demonstrations, tutorials, problem solving.
Lab activities: High energy radiation introductory experiments.
Project activities: External project brief (3).

Module 5

Lecture, Lecture activities: Visible and circum-visible remote sensing (VNIR); Lecture demonstrations, tutorials, problem solving.
Lab activities: High energy radiation introductory experiments.
Project activities: Introduction & selection of class research projects.

Module 6

Lecture, Lecture activities: The Martian surface; Lecture demonstrations, tutorials, problem solving.
Lab activities: VINR radiation detectors and measurements.
Project activities: Research project work: definition.

Module 7

Lecture, Lecture activities: The Martian surface; Lecture demonstrations, tutorials, problem solving.
Lab activities: VINR radiation detectors and measurements.
Project activities: Research project work: definition.

Module 8
Lecture, Lecture activities: High energy spectroscopy and remote sensing (UV to gamma rays, alphas, neutrons); Lecture demonstrations, tutorials, problem solving.
Lab activities: VINR radiation detectors and measurements.
Project activities: First review of class research project: advanced definition.

Module 9
Lecture, Lecture activities: Differentiated meteorites and asteroids; Lecture demonstrations, tutorials, problem solving.
Lab activities: High energy radiation detectors and measurements.
Project activities: Research project work.

Module 10
Lecture, Lecture activities: Differentiated meteorites and asteroids; Lecture demonstrations, tutorials, problem solving.
Lab activities: High energy radiation detectors and measurements.
Project activities: Research project work.

Module 11
Lecture, Lecture activities: Long wavelength remote sensing (mid to thermal infrared, radar); Lecture demonstrations, tutorials, problem solving.
Lab activities: High energy radiation detectors and measurements.
Project activities: Final design review and implementation of class research project.

Module 12
Lecture, Lecture activities: Primitive materials; Lecture demonstrations, tutorials, problem solving.
Lab activities: Long wavelength radiation detectors and measurements.
Project activities: Research project work

Module 13
Lecture, Lecture activities: Primitive materials; Lecture demonstrations, tutorials, problem solving.
Lab activities: Long wavelength radiation detectors and measurements.
Project activities: Research project work.

Module 14
Lecture, Lecture activities: Data and information processing; Lecture demonstrations, tutorials, problem solving.
Project activities: Research project work.

Module 15
Lecture, Lecture activities: Extraterrestrial materials analysis; Lecture demonstrations, tutorials, problem solving.
Project activities: Research project work.

Module 16
Lecture, Lecture activities: Extraterrestrial materials analysis; Lecture demonstrations, tutorials, problem solving.
Project activities: Research project work.

Module 17
Lecture: Course summary; Completion of group research project
Project activities: Research project work

Module 18
Project activities: Completion of group research project

Course delivery
The main elements of course delivery are mini-lectures, guided group discussions, and project-based learning activities. Students are engaged in studying foundational publications in the field of planetary science and are asked to critically evaluate research design, data acquisition, and data analysis and research outcomes.

The laboratory component of the course is characterized by the integration of theory and practice. In the initial weeks break-out group work and group discussions focus on practice and real problems underpinning lecture topics. Each of the break-out groups reports on the result of the exercise, leading to the advancement of the session topic. Later in the semester, break-out group work will increase in time to about half of the time assigned to the lecture component (on a weekly basis). The difficulty of problems will increase. In addition to problem solving, experimental demonstrations and laboratory experiments, as they are common in general laboratories, are increasing in time commitment as the semester progresses.

Learning objectives are integrated through and culminate in a group-based research project: the design of an instrument for a planetary exploration mission. The requirement is to deliver a design that can be built/implemented during the EPET 401 Capstone Project: Producing a science satellite.

Evaluation
A letter grade will be assigned on the basis of class participation (5%), announced quizzes throughout the semester (10%), assigned homework (15%), and a group research project and presentation (70%). Details of grading components will be discussed and finalized in the first class meeting. Letter grade breakdown:

A- = 90 – 92%, A = 93 – 96%, A+ = 97 – 100%
B- = 80 – 82%, B = 83 – 86%, B+ = 87 – 89%
C- = 70 – 72%, C = 73 – 76%, C+ = 77 – 79%
D- = 60 – 62%, D = 63 – 66%, D+ = 67 – 69%
F = < 60%

Textbook
The recommended course textbook is:
Remote Compositional Analysis: Techniques for Understanding Spectroscopy, Mineralogy, and Geochemistry of Planetary Surfaces, Editors: Janice L. Bishop, Jeffrey

E. Moersh, and James F. Bell, III. Publisher: Cambridge University Press (in preparation). The textbook functions as a resource for class activities and research projects. Its anticipated role is that of a supplementary reference rather than a core resource of course topics. The textbook will be available as a pdf.

In addition, foundational publications in planetary science will be made available to critically evaluate research design, data acquisition, and data analysis and research outcomes of current and past planetary exploration programs.

Recommended additional reading:
Remote Sensing Tools for Exploration: Observing and Interpreting the Electromagnetic Spectrum, Pamela Elizabeth Clark and Michael Lee Rilee, Springer, 2010.

Instructors
Peter Englert, Gary Huss, Paul Lucey, Rob Wright, Shiv Sharma

Additional/required topics will be added
Plagiarism
Other Resources
Disability Access
Learning Assistance Center (LAC) is here to help students
Gender-Based Discrimination or Violence
Standard Policies
Title IX

EPET 302 Fall 2019 T,R 9:30 am to 12:20 pm, POST 544

Space Mission Design

Contact information:

Dr. Miguel Nunes: POST 518, 808-956-0441, manunes@hawaii.edu
Office Hour: M/W at noon, or by appointment

Course materials

At the beginning of the semester or a major instructional section participants will be receiving all necessary materials through Laulima. Please check for pre-class assignments before each class period in the resources folder!

Course Description

Space Mission Design will cover all aspects of spacecraft design, subsystems, science payload, systems engineering, project management, and budgets that are important to producing a fully successful mission.

Number of Credits

EPET 302 is a four credit lecture/laboratory course.

Relation to Curriculum

EPET 302 is an integral part of the proposed EPET certificate program.

Prerequisites:

EPET 201; or GG 101 and GG 105; or GG 101 and GG 107; or consent

Class contact hours

Tuesday/Thursday 9:30 am to 12:20 pm, POST 544

Website

Computer access is required for this course. Pre-class assignments and course material is posted on Laulima. Please check for pre-class assignments before the next class period in the class Resources folder.

Learning Objectives/Course Objectives

University-Level Learning Objectives

The design and structure of the course delivers learning outcomes aligned with the University of Hawaii Institutional Learning Objectives for Undergraduate Students. The course:

- Gives in depth experience in the conduct of scientific inquiry and research,
- Engages students in continuous practice with critical and creative thinking:
- Is structured around procedures of conducting research in Earth and planetary science:
- Engages students through intensive interaction with instructors and peers by means of classroom activities and projects,

- Directly cultivates the habits of scholarly inquiry and intellectual curiosity, including inquiry across disciplines.

Department-Level Learning Objectives
HIGP EPET Certificate Program learning outcomes are also considered. Through completing the course:

- Students can explain the relevance of Earth and Planetary Exploration to human needs (including those appropriate to Hawaii) and be able to discuss issues related to Earth and Space exploration and its impact on society.
- Students can use the scientific and engineering methods to define, critically evaluate, and solve problems in Space exploration.
- Students can apply technical and field knowledge of science and engineering modalities, instrument and spacecraft design, mission architecture and design, and mission operations to solve problems in Earth and Planetary exploration.
- Students can construct, clearly and ethically, Earth and Planetary exploration knowledge in both oral presentations and written reports.

Course-Level Student Learning Objectives
This will be achieved through course activities aimed at:

- acquiring knowledge of the principles, instrumentation, and application of space remote sensing.
- developing an ability to make sound assessments of applications of measurement/experiment remote sensing research modalities past and present.
- learning how to address increasingly complex planetary sciences problems that can be addressed using remote sensing.
- improving critical reasoning skills and expanded ability to formulate scientific arguments in the area of remote sensing.
- improving research and writing skills.

COURSE DETAILS
The course is structured into learning modules generally aligned with semester weeks. The lecture/laboratory course structure allows about 50% of instruction time for lectures and lecture activities and about 50% for laboratory activities and course project activities. The following outline provides an abbreviated list/description of course modules and course module activities. Lecture and laboratory activities support the learning objectives outlined in lecture topics. Project activities focus on the conceptualization and design of space instruments able to complete defined space mission objectives.

Content and topics

Module 1
Lecture, Lecture activities: Setting the stage; Lecture demonstrations, tutorials, problem solving.
Lab activities: Setting the Stage.

Module 2
Lecture, Lecture activities: Space Environment; Lecture demonstrations, tutorials, problem solving.
Lab activities: CAD and STK workshop (Computer Aided Design, Software Toolkit AGI).

Module 3
Lecture, Lecture activities: Orbital Mechanics; Lecture demonstrations, tutorials, problem solving
Lab activities: COSMOS workshop (Spaceflight management software)

Module 4
Lecture, Lecture activities: Spacecraft Systems Architecture; Lecture demonstrations, tutorials, problem solving.
Lab activities: Orbital dynamics workshop.

Module 5
Lecture, Lecture activities: Systems Engineering; Lecture demonstrations, tutorials, problem solving.
Project activities: Introduction of class research project: preliminary definition.

Module 6
Lecture, Lecture activities: Spacecraft Structures; Lecture demonstrations, tutorials, problem solving.
Lab activities: Model Based Systems Engineering workshop.
Project activities: Preliminary project definition.

Module 7
Lecture, Lecture activities: Spacecraft Guidance, Navigation and Control; Lecture demonstrations, tutorials, problem solving
Lab activities: GNC workshop (Guidance, Navigation, and Control).
Project activities: Preliminary project definition.

Module 8
Lecture, Lecture activities: Spacecraft Propulsion; Lecture demonstrations, tutorials, problem solving.
Project activities: First review of class research project: advanced definition.

Module 9
Lecture, Lecture activities: Spacecraft Sensors and Actuators; Lecture demonstrations, tutorials, problem solving.
Lab activities: Payload workshop.
Project activities: Advanced project definition.

Module 10
Lecture, Lecture activities: Electrical Power Systems; Lecture demonstrations, tutorials, problem solving.
Lab activities: EPS workshop (Electrical Power Systems).
Project activities: Advanced project definition.

Module 11
Lecture, Lecture activities: Thermal Control; Lecture demonstrations, tutorials, problem solving.
Project activities: Final design review and implementation of class research project.

Module 12
Lecture, Lecture activities: Telecommunications; Lecture demonstrations, tutorials, problem solving.
Lab activities: COMM workshop (Communication Systems).
Project activities: Project final design.

Module 13
Lecture, Lecture activities: On Board Computing/ Telemetry, Command Data Handling and Processing; Lecture demonstrations, tutorials, problem solving.
Lab activities: OBCS workshop (On Board Computer System).
Project activities: Project final design.

Module 14
Lecture, Lecture activities: Ground Segment; Lecture demonstrations, tutorials, problem solving.
Project activities: Research project work.

Module 15
Lecture, Lecture activities: Spacecraft Mechanisms; Lecture demonstrations, tutorials, problem solving.
Project activities: Research project work

Module 16
Lecture, Lecture activities: Electromagnetic Compatibility; Lecture demonstrations, tutorials, problem solving.
Project activities: Research project work.

Module 17
Lecture, Lecture activities: Spacecraft Delivery and Launch, Product Assurance; Lecture demonstrations, tutorials, problem solving.
Project activities: Course summary; completion of research project.

Module 18
Project activities: Completion of research project.

Course delivery
The main elements of course delivery are mini-lectures, guided Concurrent Design Sessions, and project-based learning activities. Students are engaged in designing a space mission with scientific value and produce a quality final report that can be used as baseline proposal.

The laboratory component of the course is characterized by the integration of theory and practice. In the initial weeks break-out group work and group discussions focus on practice and real problems underpinning lecture topics. Each of the break-out groups reports on the result of the exercise, leading to the advancement of the session topic. Later in the semester, break-out group work will increase in time to about half of the time assigned to the lecture component (on a weekly basis). The difficulty of problems will increase.

Learning objectives are integrated through and culminate in a group-based research project: the design of spacecraft with a scientific instrument for a planetary exploration mission. The requirement is to deliver a realistic design a mission concept that can be proposed on a future NASA solicitation built/implemented.

Evaluation
A letter grade will be assigned on the basis of class participation (5%), announced quizzes throughout the semester (10%), assigned homework (15%), and a group research project and presentation (70%). Details of grading components will be discussed and finalized in the first class meeting. Letter grade breakdown:

A- = 90 – 92%, A = 93 – 96%, A+ = 97 – 100%
B- = 80 – 82%, B = 83 – 86%, B+ = 87 – 89%
C- = 70 – 72%, C = 73 – 76%, C+ = 77 – 79%
D- = 60 – 62%, D = 63 – 66%, D+ = 67 – 69%
F = < 60%

Textbook
The recommended course textbooks are:

- Space Mission Engineering: The New SMAD
  J. R. Wertz, D.F. Everett, and J.J. Puschell
  Microcosm, 2011
- Elements of Spacecraft Design
  C. Brown 2002 AIAA Education Series

The textbooks functions as a resource for class activities and research projects. Its anticipated role is that of a supplementary reference rather than a core resource of course topics. In addition, other relevant resources will be made available to design space missions.

Instructors
Miguel Nunes, Two HIGP engineering faculty (appointments in progress); Trevor Soerensen (College of Engineering)

Additional/required topics will be added
Plagiarism
Other Resources
Disability Access
Learning Assistance Center (LAC) is here to help students
Gender-Based Discrimination or Violence
Standard Policies
Title IX

EPET 401 SPRING 2020 T,R 1:30 to 4:20 pm, POST 544

Capstone Project: Producing a Science Satellite

Contact information:
Dr. Miguel Nunes: POST 518, 808-956-0441, manunes@hawaii.edu
Office Hour: M/W at noon, or by appointment

Course materials
At the beginning of the semester or a major instructional section participants will be receiving all necessary materials through Laulima. Please check for pre-class assignments before each class period in the resources folder!

Course Description
Develop a space mission using a multidisciplinary team of engineers and scientists using concurrent engineering methodologies (similar to a TeamX exercise from NASA/JPL). The class will build a small spacecraft and payload. The project satellite will seek to answer important science questions.

Number of Credits
EPET 401 is a four credit lecture/laboratory course.

Relation to Curriculum
EPET 401 is an integral part of the proposed EPET certificate program.

Prerequisites:
EPET 301 and EPET 302

Class contact hours
Tuesday/Thursday 1:30 to 4:20 pm, POST 544

Website
Computer access is required for this course. Pre-class assignments and course material is posted on Laulima. Please check for pre-class assignments before the next class period in the class Resources folder.

Learning Objectives/Course Objectives
University-Level Learning Objectives
The design and structure of the course delivers learning outcomes aligned with the University of Hawaii Institutional Learning Objectives for Undergraduate Students. The course:

- Gives in depth experience in the conduct of scientific inquiry and research,
- Engages students in continuous practice with critical and creative thinking:
- Is structured around procedures of conducting research in Earth and planetary science:

- Engages students through intensive interaction with instructors and peers by means of classroom activities and projects,
- Directly cultivates the habits of scholarly inquiry and intellectual curiosity, including inquiry across disciplines.

Department-Level Learning Objectives
HIGP EPET Certificate Program learning outcomes are also considered. Through completing the course:

- Students can explain the relevance of Earth and Planetary Exploration to human needs (including those appropriate to Hawaii) and be able to discuss issues related to Earth and Space exploration and its impact on society.
- Students can use the scientific and engineering methods to define, critically evaluate, and solve problems in Space exploration.
- Students can apply technical and field knowledge of science and engineering modalities, instrument and spacecraft design, mission architecture and design, and mission operations to solve problems in Earth and Planetary exploration.
- Students can construct, clearly and ethically, Earth and Planetary exploration knowledge in both oral presentations and written reports.

Course-Level Student Learning Objectives
This will be achieved through course activities aimed at:

- acquiring knowledge of the principles, instrumentation, and application of space remote sensing.
- developing an ability to make sound assessments of applications of measurement/experiment remote sensing research modalities past and present.
- learning how to address increasingly complex planetary sciences problems that can be addressed using remote sensing.
- improving critical reasoning skills and expanded ability to formulate scientific arguments in the area of remote sensing.
- improving research and writing skills.

COURSE DETAILS

The course is structured into learning modules generally aligned with semester weeks. The lecture/laboratory course structure allows about 50% of instruction time for lectures and lecture activities and about 50% for laboratory activities and course project activities. The following outline provides an abbreviated list/description of course modules and course module activities. Lecture and laboratory activities support the learning objectives outlined in lecture topics. Project activities focus on the conceptualization and design of space instruments able to complete defined space mission objectives.

Course Content and topics
Module 1 - Introduction
Lecture, Lecture activities: Setting the stage; Motivation for TeamX exercise; Principles of Spacecraft Design; Systems Integration & Design Convergence; Conceptual space mission design; Team formations and roles assignments
Lab activities: Intro lab on concurrent design.

Project activities: Project definition; Team formations and roles assignments.

Module 2 - Science / Instrument
Lecture, Lecture activities: Principles of remote sensing and science applications; Principles of orbital remote sensing; Overview of space science payloads; NOAA licensing for optical imagers.
Lab activities: Mission requirements definition from science objectives.
Project activities: Concurrent Design Session (1).

Module 3 - Mission Design
Lecture, Lecture activities: Orbital Analysis & Visualization; Orbital Debris and Assessment Report.
Lab activities: STK and COSMOS introduction for Orbital Analysis.
Project activities: Concurrent Design Session (2).

Module 4 - Spacecraft Systems Architecture
Lecture, Lecture activities: Systems engineering overview; Spacecraft subsystems; Architecture Conceptualization; Trade Studies.
Lab activities: Design System Level Diagram.
Project activities: System Requirements Review (SRR).

Module 5 - Project Management
Lecture, Lecture activities: Documentation; Work Breakdown Structure; System and Subsystem descriptions; Mission cost and schedule; Mission assurance; Leading a science and engineering team; Task Planning.
Lab activities: Collaborative project documentation structure, document current design.
Project activities: Concurrent Design Session (3)

Module 6 - Systems Engineering
Lecture, Lecture activities: Requirements definition; Model Based Systems Engineering; Sensitivity Analysis & Trade Space Exploration; Block Diagrams & Interface Analyses; Equipment Lists; Mass and Power budgets.
Lab activities: Define requirements, prepare the various budgets.
Project activities: Preliminary Design Review (PDR).

Module 7 - Structures and Mechanisms
Lecture, Lecture activities: Launch Environment; Structure Dynamics; Finite Element Analysis; Deployable Structures; Outgassing Materials.
Lab activities: Run Finite Element Analysis on satellite bus.
Project activities: Concurrent Design Session (4).
Module 8 - Guidance, Navigation and Control
Lecture, Lecture activities: Attitude Control; Orbital Position Control; Propulsion; Spacecraft Sensors and Actuators.
Lab activities: Create dynamic motion model and run for analysis and visualization.
Project activities: Concurrent Design Session (5).

Module 9 - Propulsion
Lecture, Lecture activities: Propulsion system selection; Orbital maneuvers; Orbital maintenance.
Lab activities: Propulsion System Selection;
Project activities: Concurrent Design Session (6).

Module 10 - Flight Software
Lecture, Lecture activities: Flight software options; Command and Control; Command Scheduler; Payload operations.
Lab activities: COSMOS and CFS workshop.
Project activities: Critical Design Review (CDR).

Module 11 - Power Systems
Lecture, Lecture activities: Solar Panels; Batteries; Power Management, Distribution and Control; Power Budgets.
Lab activities: Power system design and simulation.
Project activities: Concurrent Design Session (6).

Module 12 - Thermal Control
Lecture, Lecture activities: Thermal design; Thermal analysis; Passive vs active thermal control.
Lab activities: Thermal Desktop workshop.
Project activities: Concurrent Design Session (7).

Module 13 - Telecommunications
Lecture, Lecture activities: Link budget; Flight radios and antennas; Ground radios and antennas; FCC licensing.
Lab activities: COMM hardware selection and link budget.
Project activities: Concurrent Design Session (8).

Module 14 - On Board Computing
Lecture, Lecture activities: Flight Processor; Payload Processor; Software implementation.
Lab activities: OBC workshop and software implementation.
Project activities: Concurrent Design Session (8).

Module 15 - Ground Segment
Lecture, Lecture activities: Ground Stations; Ground Data System; Data transfer.
Lab activities: HSFL/MC3 ground station workshop and operations.
Project activities: Concurrent Design Session (9).

Module 16 - Mission Operations
Lecture, Lecture activities: Mission Operations Software; Scheduling and Task commanding; Flight Readiness Review (FRR).
Lab activities: Plan mission operations and run simulation.
Project activities: Flight Readiness Review (FRR).

Module 17 - Integration and Testing
Lecture, Lecture activities: Bus integration; Payload integration; Testing and Verification; Assembly, Integration, and Verification.
Lab activities: Integration and Testing Plan.
Project activities: Concurrent Design Session (9).

Module 18 - Spacecraft Delivery and Launch, Product Assurance
Lecture, Lecture activities: Configuration & Integration; Electromagnetic Compatibility; Dependability; Reliability; Quality Assurance.
Lab activities: Complete final report and present results.
Project activities: Completion of group research project.

Course delivery

The main elements of course delivery are mini-lectures, guided Concurrent Design Sessions, and project-based learning activities. Students are engaged in designing a space mission with scientific value and produce a quality final report that can be used as baseline proposal.

The laboratory component of the course is characterized by the integration of theory and practice. In the initial weeks break-out group work and group discussions focus on practice and real problems underpinning lecture topics. Each of the break-out groups reports on the result of the exercise, leading to the advancement of the session topic. Later in the semester, break-out group work will increase in time to about half of the time assigned to the lecture component (on a weekly basis). The difficulty of problems will increase.

Learning objectives are integrated through and culminate in a group-based research project: the design of spacecraft with a scientific instrument for a planetary exploration mission. The requirement is to deliver a realistic design a mission concept that can be proposed on a future NASA solicitation built/implemented.

Evaluation

A letter grade will be assigned on the basis of class participation (5%), announced quizzes throughout the semester (10%), assigned homework (15%), and a group research project and presentation (70%). Details of grading components will be discussed and finalized in the first class meeting. Letter grade breakdown:

A- = 90 – 92%, A = 93 – 96%, A+ = 97 – 100%
B- = 80 – 82%, B = 83 – 86%, B+ = 87 – 89%
C- = 70 – 72%, C = 73 – 76%, C+ = 77 – 79%
D- = 60 – 62%, D = 63 – 66%, D+ = 67 – 69%
F = < 60%

Textbook

The recommended course textbooks are:

- Space Mission Engineering: The New SMAD
  J. R. Wertz, D.F. Everett, and J.J. Puschell
  Microcosm, 2011

- Elements of Spacecraft Design
  C. Brown 2002 AIAA Education Series

The textbooks functions as a resource for class activities and research projects. Its anticipated role is that of a supplementary reference rather than a core resource of course topics. In addition, other relevant resources will be made available to design space missions.

Instructors
Miguel Nunes, Two HIGP engineering faculty (appointments in progress); Trevor Soerensen (College of Engineering)

Additional/required topics will be added
Plagiarism
Other Resources
Disability Access
Learning Assistance Center (LAC) is here to help students
Gender-Based Discrimination or Violence
Standard Policies
Title IX

STATE OF HAWAI`I
UNIVERSITY OF HAWAI'I
UNIVERSITY OF HAWAI`I AT MĀNOA
OFFICE OF THE PROVOST
SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY
ORGANIZATION CHART
CHART I

DEPARTMENT TOTAL:	**PERM**	**TEMP**
General Funds:	220.00	1.00

EDUCATION AND OUTREACH COUNCIL

EXTERNAL ADVISORY COUNCIL

RESEARCH COUNCIL

EXECUTIVE COMMITTEE

OFFICE OF THE PROVOST

OFFICE OF THE DEAN
SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY
Org Code: MAOEST

Dean, #89288	1.00
Secretary IV, SR-18, #10938	1.00

OFFICE OF THE ASSOCIATE DEAN FOR ACADEMIC AFFAIRS
Org Code: MAAAOE
Chart II

DEPARTMENT OF EARTH SCIENCES
DEPARTMENT OF ATMOSPHERIC SCIENCES
DEPARTMENT OF OCEAN AND RESOURCES ENGINEERING
DEPARTMENT OF OCEANOGRAPHY
JOINT INSTITUTE FOR MARINE AND ATMOSPHERIC RESEARCH
INTERNATIONAL PACIFIC RESEARCH CENTER
Chart II

OFFICE OF THE ASSOCIATE DEAN FOR RESEARCH
Org Code: MARSOE
Chart III

MARINE GEOLOGY AND GEOCHEMISTRY DIVISION
MARINE AND ENVIRONMENTAL GEOLOGY DIVISION
MARINE BIOLOGY AND COASTAL ECOSYSTEMS DIVISIONS
PHYSICAL OCEANOGRAPHY DIVISION
BIOLOGICAL OCEANOGRAPHY DIVISION
GEOPHYSICS AND TECTONICS DIVISION
VOLCANOLOGY, GEOCHEMISTRY AND PETROLOGY DIVISION
HAWAII UNDERSEA RESEARCH LABORATORY
CENTER FOR MICROBIAL OCEANOGRAPHY: RESEARCH AND EDUCATION
Chart III

OFFICE OF THE DIRECTOR OF ADMINISTRATION
Org Code: MAASOE
Chart IV

ENGINEERING SUPPORT FACILITY
UNIVERSITY MARINE CENTER/ SHIP OPERATIONS
ANALYTICAL SUPPORT FACILITY
RESEARCH COMPUTING FACILITY
Chart IV

FINANCIAL MANAGEMENT SYSTEMS OFFICE
PERSONNEL OFFICE
PROGRAM AND BUDGET OFFICE
PUBLICATIONS FACILITY
Chart IV

HAWAII INSTITUTE OF MARINE BIOLOGY
Org Code: MAHIMB
Chart V

HAWAII INSTITUTE OF GEOPHYSICS AND PLANETOLOGY
Org Code: MAHIGP
Chart VI

HAWAII NATURAL ENERGY INSTITUTE
Org Code: MAHNEI
Chart VII

SEA GRANT COLLEGE PROGRAM
Org Code: MASGCP
Chart VIII

PACIFIC BIOSCIENCES RESEARCH CENTER
Org Code: MAPBRC
Chart IX

CHART TOTAL:	**PERM**	**TEMP**
General Funds:	2.00	- -

UNIVERSITY of HAWAI'I SYSTEM

Pheng Xiong <pxiong@hawaii.edu>

Re: EPET issues

19 messages

April Nozomi Quinn <agoodwin@hawaii.edu> Mon, Nov 1, 2021 at 9:32 AM
To: Peter Englert <peter.englert@gmail.com>, Pheng Xiong <pxiong@hawaii.edu>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Aloha Peter,
I hope your semester is going well! I have added Max, the University Registrar to this message to help respond to your question regarding certificates and Cari and Lisa from GEO to respond to your Gen Ed question. Please see my responses in red below and feel free to contact me again if you have additional questions.
Have a great week!
April

April Nozomi Quinn, PhD
Director of Program Development and Review
Office of the Vice Provost for Academic Excellence
University of Hawaii at Manoa
2500 Campus Road, Hawaii Hall, 209
Honolulu, HI 96822
Office: (808) 956-4568 / Fax: (808) 956-7115
http://www.manoa.hawaii.edu

On Thu, Oct 28, 2021 at 5:23 PM Peter Englert <peter.englert@gmail.com> wrote:

> Aloha April,
>
> It is nice to be in regular classroom settings this semester.
> I am sending this email to you with a few questions anticipating that you could direct me to a staff member that can assist me with the issues below.
>
> Mahalo, Peter
>
> Issues:
>
> The status of the ERTH 404 stacking with EPET 301 proposal. This stacking of undergraduate classes has come up in a few cases in the last semester, and the response has been to request that the courses are either cross-listed (in which case they would have the exact same title and course description) or that the students enroll in only one of the courses, but that they cannot be offered at the same place and time otherwise. I will check with the course action committee on this issue again tomorrow and also discuss it with VP Lyons in my Wednesday meeting with her and get back to you later this week.
>
> Completion of the first EPET certificate program this fall. I will defer to Max, but have provided my thoughts below.
> Issuing certificates-The university does not issue acutal certificates (as we do for degrees) but you are welcome to create your own- I believe some programs do this.
> Report to university-I will defer to Max on this point, but I am not actually sure if you need to report these at this time.
>
> EPET courses WI, OC, and E focus designations: Do I need to complete UHM-2 forms? I believe so, but have added Lisa and Cari from GEO to respond.
>
> Change of EPET course delivery semesters: development of a transition plan to a fall start of the EPET sequence. What approvals are needed? I believe you will need to submit a program modificaiton: https://manoa.hawaii.edu/ovcaa/program-approval-review/program-modifications/
>
> Discussion of process for proposing a Bachelor of Science Degree in Aerospace Engineering. You will need to complete an ATP. Please see the instructions here and let me know if you have any questions: https://manoa.hawaii.edu/ovcaa/program-approval-review/degrees-authorization-to-plan-atp/
>
> --

Peter A. J. Englert
penglert@hawaii.edu
+ 1 808 384 3500

Pheng Xiong <pxiong@hawaii.edu> Tue, Dec 21, 2021 at 5:15 PM
To: April Nozomi Quinn <agoodwin@hawaii.edu>
Cc: Peter Englert <peter.englert@gmail.com>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Aloha e Peter,

Apologies for the delay. Following up this email from April and your earlier emails regarding the Earth and Planetary Exploration Technology (EPET) certificate.

Since we currently do not have a program code for the certificate in the Banner student information system, it would be up to HIGP if they wish to print their own certificate of completion in house to students. With that said, ideally we should have a Banner code created for the program, so that the university and the program can track completion and we can accurately record a student's entry or completion on the student's transcript.

Per EP 5.205 - certificates should be noted on student's transcripts, so it will be important to get a program code created for the certificate, especially if its already something approved by the president (April - correct me here, certificates are approved by the president if coursework is taken within existing Board authorized academic programs. Just want to make sure I'm interpreting this correctly?). All I will need to make that happen is a the program approval memo and the program's curriculum.

Please let me know if you have further questions.

Max

[Quoted text hidden]

--

UNIVERSITY of HAWAI'I MĀNOA

Pheng Xiong, M.Ed. (my personal pronouns: he, him, his)
University Registrar, Office of the Registrar
See My Availability
p: 808-956-8010
w: manoa.hawaii.edu/registrar
e: pxiong@hawaii.edu

The different racial groups in the Territory are represented in the student body and one of the ideals held by those who guide the University is that these students, working and playing together on our campus, shall go out not to break down race differences but to disseminate understanding of these differences, toleration for them, and goodwill. A challenge to us all! - H. MacNeil (University of Hawai'i Registrar - 1922 - 1956)

Peter Englert <peter.englert@gmail.com> Wed, Dec 22, 2021 at 7:29 AM
To: Pheng Xiong <pxiong@hawaii.edu>
Cc: April Nozomi Quinn <agoodwin@hawaii.edu>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Aloha e Max,

Thank you very much for your email response to my questions.

I intend to send you a memo containing all the details and documents about the EPET Certificate that your office needs to include the certificate into Banner, if possible before the holidays, but at the latest before the end of the year.

That answers my questions and will be timely to provide the first EPET certificate cohort the credit they are entitled to in line with EP 5.205.

Best, Peter
[Quoted text hidden]

April Nozomi Quinn <agoodwin@hawaii.edu> Wed, Dec 22, 2021 at 10:36 AM
To: Pheng Xiong <pxiong@hawaii.edu>
Cc: Peter Englert <peter.englert@gmail.com>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Aloha Max,
Your interpretation of the policy is correct.
Thanks!
April

April Nozomi Quinn, PhD
Director of Program Development and Review
Office of the Vice Provost for Academic Excellence
University of Hawaii at Manoa
2500 Campus Road, Hawaii Hall, 209
Honolulu, HI 96822
Office: (808) 956-4568 / Fax: (808) 956-7115
http://www.manoa.hawaii.edu

[Quoted text hidden]

Pheng Xiong <pxiong@hawaii.edu> Wed, Dec 22, 2021 at 5:19 PM
To: Peter Englert <peter.englert@gmail.com>
Cc: April Nozomi Quinn <agoodwin@hawaii.edu>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Thanks Peter and April.

Once I receive the details we can get the ball rolling on getting the program coded into Banner. As a side note - we are onboarding a new diploma vendor to begin with Spring 2022 graduates, so we may be able to utilize the vendor to print certificates. Not 100% sure, but something that may be an option.

Max
[Quoted text hidden]

Lisa Fujikawa <haradal@hawaii.edu> Wed, Dec 22, 2021 at 9:42 PM
To: Peter Englert <peter.englert@gmail.com>
Cc: Pheng Xiong <pxiong@hawaii.edu>, April Nozomi Quinn <agoodwin@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>, General Education Office <gened@hawaii.edu>

My apologies as well. I found a half-written email in my drafts folder, which popped up when Max sent this email.

UHM-2 forms are NOT needed to add a Focus designation (i.e., HAP, E, OC, and WI) to a course. Focus designations are requested by submitting a Focus Designation Proposal Form and are approved by the relevant Gen Ed Focus Board. Then the Gen Ed Office works with the Scheduling Office to designate Focus sections each semester.

The only time when a UHM-2 form is needed for Focus is when a course receives a course-based Focus designation and the course description in the UHM Catalog needs to be modified to reflect the inherency of the approved Focus. In these instances, our office (Gen Ed) generates the UHM-2 form and sends it to the department along with the approval memo, so that all that's needed is routing the UHM-2 form for signatures.

Please let me know if you have any other questions about Gen Ed designations. Thank you and again, my apologies for the delay in responding!

Lisa Fujikawa
Academic Coordinator, General Education Office
[Quoted text hidden]

Peter Englert <peter.englert@gmail.com> Fri, Dec 24, 2021 at 7:21 AM
To: Pheng Xiong <pxiong@hawaii.edu>
Cc: April Nozomi Quinn <agoodwin@hawaii.edu>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Aloha Max,

I have put together the document you may need to get the EPET certificate coded into Banner. The documents include the VCAA approval for the EPET certificate, a memo from me describing the curriculum and the actual class and section sequence over the past two years for the students who have completed the course sequence, and a copy of the EPET course/program description from the UHM catalog. I designed the memo to ensure that the development of the program and the credit students achieved along that process can be better identified.

I hope that these documents are the ones you are looking for. Please let me know if there is any essential information missing. I am looking forward to having the EPET certificate program coded into Banner.

Thanks to you and your staff for moving this process forward.

With best wishes for the holiday season.

Mahalo, Peter

[Quoted text hidden]

3 attachments

2019 VCAA-Request to Approve Undergraduate Certificate in Earth and Planetary Exploration-3-13-19 Approved.pdf
839K

EPET CERTIFICATE MEMORANDUM PE to UHM REGISTR 12-24-2021 pe signed.pdf
300K

EPET UHM catalog description.pdf
279K

Pheng Xiong <pxiong@hawaii.edu> Wed, Feb 9, 2022 at 2:10 PM
To: Peter Englert <peter.englert@gmail.com>
Cc: April Nozomi Quinn <agoodwin@hawaii.edu>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Hi Peter,

Following up on this - thanks for the documents. We'll go ahead and request a Banner code for the certificate and then once the certificate has been added, we'll post the certificate on the students' transcript.

Max
[Quoted text hidden]

Peter Englert <peter.englert@gmail.com> Wed, Feb 9, 2022 at 2:17 PM
To: Pheng Xiong <pxiong@hawaii.edu>
Cc: April Nozomi Quinn <agoodwin@hawaii.edu>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Aloha Max, thank you very much. Mahalo, Peter
[Quoted text hidden]

Pheng Xiong <pxiong@hawaii.edu> Wed, Feb 9, 2022 at 2:31 PM
To: Peter Englert <peter.englert@gmail.com>
Cc: April Nozomi Quinn <agoodwin@hawaii.edu>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Hi Peter, one last question - to make sure I can categorize the program correctly, can you tell me if the Hawaiʻi Institute of Geophysics and Planetology went by the name "Hawaii Institute of Geology & Geophysics" before?
[Quoted text hidden]

Peter Englert <peter.englert@gmail.com> Wed, Feb 9, 2022 at 2:36 PM
To: Pheng Xiong <pxiong@hawaii.edu>
Cc: April Nozomi Quinn <agoodwin@hawaii.edu>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Aloha Max, in the very old days what is currently the Hawaiʻi Institute of Geophysics and Planetology was indeed named "Hawaii Institute of Geology & Geophysics". The name changed when Klaus Keil became the director of the institute and introduced planetary exploration and cosmochemistry to its activities. Mahalo, Peter
[Quoted text hidden]

Pheng Xiong <pxiong@hawaii.edu> Wed, Feb 9, 2022 at 2:41 PM
To: Peter Englert <peter.englert@gmail.com>
Cc: April Nozomi Quinn <agoodwin@hawaii.edu>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Thanks for clarifying, Peter. I thought as much, but couldn't find anything in the university's reorg & rename archives.

April - thoughts? I don't think we have any other programs listed under the old name in Banner, so I'm leaning towards just requesting that IRAO update the description for the department code.

Max
[Quoted text hidden]

April Nozomi Quinn <agoodwin@hawaii.edu> Wed, Feb 9, 2022 at 2:50 PM
To: Pheng Xiong <pxiong@hawaii.edu>
Cc: Peter Englert <peter.englert@gmail.com>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Hi Max,
So long as we note the reason for the change, I think that makes good sense.
Thanks!
April

April Nozomi Quinn, PhD
Director of Program Development and Review
Office of the Vice Provost for Academic Excellence
University of Hawaii at Manoa
2500 Campus Road, Hawaii Hall, 209
Honolulu, HI 96822
Office: (808) 956-4568 / Fax: (808) 956-7115
http://www.manoa.hawaii.edu

[Quoted text hidden]

Pheng Xiong <pxiong@hawaii.edu> Wed, Feb 9, 2022 at 3:28 PM
To: April Nozomi Quinn <agoodwin@hawaii.edu>
Cc: Peter Englert <peter.englert@gmail.com>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Sounds good to me. I just found that the name change was not made in the old student information system when the change happened between 1993 and 1995. For IRAO's purposes - can you confirm this change for me and then I can add it along with the org chart on the PCR?

Max
[Quoted text hidden]

April Nozomi Quinn <agoodwin@hawaii.edu> Wed, Feb 9, 2022 at 3:44 PM
To: Pheng Xiong <pxiong@hawaii.edu>
Cc: Peter Englert <peter.englert@gmail.com>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Hi Max,
I was not able to find the actual name change approval, but all of our OVCAA files beginning in 2005 (which is the earliest in our system) refer to the institute as HIGP. Unless Peter's office has a record of the name change approval, I think it is safe to make the change as all of our documented actions use the current name.
Thanks!
April

April Nozomi Quinn, PhD
Director of Program Development and Review
Office of the Vice Provost for Academic Excellence
University of Hawaii at Manoa
2500 Campus Road, Hawaii Hall, 209
Honolulu, HI 96822
Office: (808) 956-4568 / Fax: (808) 956-7115
http://www.manoa.hawaii.edu

[Quoted text hidden]

Pheng Xiong <pxiong@hawaii.edu> Wed, Feb 9, 2022 at 3:50 PM
To: April Nozomi Quinn <agoodwin@hawaii.edu>
Cc: Peter Englert <peter.englert@gmail.com>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Okay - thanks April. Peter, let me know if you have a copy of the original approval. If not, we can make do with what we have and go from there since the name change occurred so long ago.
[Quoted text hidden]

Pheng Xiong <pxiong@hawaii.edu> Wed, Feb 9, 2022 at 3:54 PM
To: April Nozomi Quinn <agoodwin@hawaii.edu>
Cc: Peter Englert <peter.englert@gmail.com>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Actually scratch that - just talked with IRAO and this email will be fine.

Thanks everyone.
[Quoted text hidden]

Peter Englert <peter.englert@gmail.com> Wed, Feb 9, 2022 at 3:56 PM
To: Pheng Xiong <pxiong@hawaii.edu>
Cc: April Nozomi Quinn <agoodwin@hawaii.edu>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

Great, thanks! I was just going on the hunting trail. Mahalo, Peter
[Quoted text hidden]

Pheng Xiong <pxiong@hawaii.edu> Wed, Feb 9, 2022 at 3:58 PM
To: Peter Englert <peter.englert@gmail.com>
Cc: April Nozomi Quinn <agoodwin@hawaii.edu>, Lisa Fujikawa <haradal@hawaii.edu>, Cari Gochenouer <carigo@hawaii.edu>

No worries. We'll make it official in Banner. :)
[Quoted text hidden]