

1. Curriculum Action

- New Course Course Modification Five Year Review

2. Proposer

Tim Botkin

3. Department

- Allied Health Business & Hospitality Career & Tech Education
 English Humanities Social Science
 Science/Tech/Eng/Math

4. Course Alpha

SSM

5. Course Number

275

6. Course Title

Basic Energy Production

7. If this is a course modification or a five year review, please check the curriculum items being modified.

- | | | |
|--|--|---|
| <input type="checkbox"/> 1. Course Alpha | <input type="checkbox"/> 2. Course Number | <input type="checkbox"/> 3. Course Title |
| <input type="checkbox"/> 4. Credits | <input type="checkbox"/> 5. Contact Hours | <input type="checkbox"/> 6. Course Description |
| <input type="checkbox"/> 7. Prerequisites | <input type="checkbox"/> 8. Corequisites | <input type="checkbox"/> 9. Rec Prep |
| <input type="checkbox"/> 10. Cross-list w other course | <input type="checkbox"/> 13. Grading Method | <input type="checkbox"/> 14. Repeatable for credit? |
| <input type="checkbox"/> 15. SLOs | <input type="checkbox"/> 16. Course Competencies | <input type="checkbox"/> 17. Content & Timeline |
| <input type="checkbox"/> 18. PLOs | <input type="checkbox"/> 19. CASLOs | <input type="checkbox"/> 21. Method of Delivery |
| <input type="checkbox"/> 22. Text and Materials | <input type="checkbox"/> 23. Maximum Enrollment | <input type="checkbox"/> 29. Course Designation |
| <input type="checkbox"/> 31. Catalog Modification | | |
| <input type="checkbox"/> Other | <input type="text"/> | |

8. Proposed Semester

Fall 2015

9. Effective Semester (1 Year from Proposed Semester)

Fall 2016

University of Hawaii Maui College
SSM 275 - Basic Energy Production

1. Course Alpha.

SSM

2. Course Number.

275

3. Course Title/Catalog Title.

Basic Energy Production

4. Number of Credits.

3

5. Contact Hours/Type.

- Hour lecture (3)

6. Course Description.

Introduces basic energy concepts including gravitational and kinetic energy, heat, electromagnetism, chemical energy and the transducers used to convert from one form of energy to another. Transitions from the electric power grid to integrating renewable energy sources into contemporary grids and distributed systems.

7. Pre-Requisites.

SSM 101 and ENG 100 both with grade C or better, and MATH 103 or higher with grade C or better, or placement at least MATH 135, or consent.

8. Co-requisites.

9. Recommended Preparation.

10. Is this a cross-listed course?

NO

11. Reason for Proposal. Why is this course being proposed or modified? This question requires specific information as part of the explanation.

Previous foundation coursework in energy required two courses and did not focus on topics relevant to the program. This course specifically meets SSM program energy basics necessary as a foundation for SSM 375.

12. Effective Semester and Year.

Fall 2016

13. Grading Method. What grading methods may be used for this course?

- Standard (Letter,Cr/NCr,Audit) (0)

14. Is this course repeatable for credit? How often can this course be counted toward a degree or certificate?

NO

15. Course Student Learning Outcomes (SLOs).

Course SLO/Competency	Effectively use physical energy equations in basic energy applications.	Describe functions of and applications for transducers in electrical context.	Describe the structure, benefits and challenges of integrating renewable energy technologies into the electric power grid.
Comprehend the physical laws that govern energy, and the methods of converting from one form of energy to another, as shown through the use of mathematics, vocabulary and written responses.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Explain the complexities of the electric power grid and associated challenges for utilities and technology.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Demonstrate understanding of common renewable energy/distributed generation technologies, including the differences in their resource use and function, and their respective potential and associated challenges	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Describe the major technical, political, and economic aspects of creating and maintaining a sustainable, high renewable energy resource power grid			<input checked="" type="checkbox"/>

Course SLO/PSLO	Investigate, discover and summarize federal, state, local and industry codes, standards, laws, regulations, and guidelines	Identify, outline and illustrate the fundamentals of existing and emerging technologies in energy production, distribution and management; water supply; wastewater treatment; and waste management; their applications, processes and requirements.	Propose and justify creative solutions to sustainability challenges that are scientifically sound.
Comprehend the physical laws that govern energy, and the methods of converting from one form of energy to another, as shown through the use of mathematics, vocabulary and written responses.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Explain the complexities of the electric power grid and associated challenges for utilities and technology.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Demonstrate understanding of common renewable energy/distributed generation technologies, including the differences in their resource use and function, and their respective potential and associated challenges		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Describe the major technical, political, and economic aspects of creating and maintaining a sustainable, high renewable energy resource power grid	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

16. Course Competencies.

Competency
Effectively use physical energy equations in basic energy applications.
Describe functions of and applications for transducers in electrical context.
Describe the structure, benefits and challenges of integrating renewable energy technologies into the electric power grid.

17. Recommended Course Content and Timeline. The course content facilitates the course competencies. Course content may be organized by weeks, units, topics or the like.

1. Introduction - 1 week
2. Energy concepts and types - 2 weeks
3. Electromagnetism and heat - 2 weeks

4. History of the power grid - 1 week
5. Power plants and synchronous generators - 1 week
6. Efficiency in generation and delivery - 3 weeks
7. Overview of renewable energy sources - 2 weeks
8. Challenges and benefits of renewable energy, - 2 weeks
9. Student presentations - 2 weeks

18. Program Learning Outcomes.

Program SLO
Investigate, discover and summarize federal, state, local and industry codes, standards, laws, regulations, and guidelines
Identify, outline and illustrate the fundamentals of existing and emerging technologies in energy production, distribution and management; water supply; wastewater treatment; and waste management; their applications, processes and requirements.
Propose and justify creative solutions to sustainability challenges that are scientifically sound.

19. College-wide Academic Student Learning Outcomes (CASLOs).

	Creativity - Able to express originality through a variety of forms.
<input checked="" type="checkbox"/>	Critical Thinking - Apply critical thinking skills to effectively address the challenges and solve problems. <input checked="" type="checkbox"/> Level 2
	Information Retrieval and Technology - Access, evaluate, and utilize information effectively, ethically, and responsibly.
	Oral Communication - Practice ethical and responsible oral communications appropriately to a variety of audiences and purposes.
<input checked="" type="checkbox"/>	Quantitative Reasoning - Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately. <input checked="" type="checkbox"/> Level 2
	Written Communication - Write effectively to convey ideas that meet the needs of specific audiences and purposes.

20. Linking.

21. Method(s) of delivery appropriate for this course.

- Classroom/Lab (0)
- Hybrid (0)

22. Text and Materials, Reference Materials, and Auxiliary Materials.

ENERGY: ITS USE AND THE ENVIRONMENT, Fifth Edition by Roger Hinrichs, Merlin Kleinbach

23. Maximum enrollment.

24

24. Particular room type requirement. Is this course restricted to particular room type?

NO

25. Special scheduling considerations. Are there special scheduling considerations for this course?

NO

26. Are special or additional resources needed for this course?

No

27. Does this course require special fees to be paid for by students?

NO

28. Does this course change the number of required credit hours in a degree or certificate?

No.

29. Course designation(s) for the Liberal Arts A.A. degree and/or for the college's other associate degrees.

Degree	Program	Category
Associate in Arts:	Liberal Arts	DP - Physical
AS:	ECET - Electronic Engineering Technology	Other
AAS:	Sustainable Construction Technology	Other
BAS:	BAS - All	CR - Core Course/Requirement - BAS
Developmental/Remedial:		

30. Course designation(s) for other colleges in the UH system.

SSM 275

31. Indicate the year and page # of UHMC catalog referred to. For new or modified courses, please indicate the catalog pages that need to be modified and provide a sheet outlining those changes.

UHMC 2015-15 pp. 17, 19, 21, 140.

32. College-wide Academic Student Learner Outcomes (CASLOs).

Standard 1 - Written Communication	
Write effectively to convey ideas that meet the needs of specific audiences and purposes.	
Outcome 1.1 - Use writing to discover and articulate ideas.	1
Outcome 1.2 - Identify and analyze the audience and purpose for any intended communication.	1
Outcome 1.3 - Choose language, style, and organization appropriate to particular purposes and audiences.	1
Outcome 1.4 - Gather information and document sources appropriately.	1
Outcome 1.5 - Express a main idea as a thesis, hypothesis, or other appropriate statement.	1
Outcome 1.6 - Develop a main idea clearly and concisely with appropriate content.	2
Outcome 1.7 - Demonstrate a mastery of the conventions of writing, including grammar, spelling, and mechanics.	1
Outcome 1.8 - Demonstrate proficiency in revision and editing.	1
Outcome 1.9 - Develop a personal voice in written communication.	1
Standard 2 - Quantitative Reasoning	
Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately.	
Outcome 2.1 - Apply numeric, graphic, and symbolic skills and other forms of quantitative reasoning accurately and appropriately.	2
Outcome 2.2 - Demonstrate mastery of mathematical concepts, skills, and applications, using technology when appropriate.	2
Outcome 2.3 - Communicate clearly and concisely the methods and results of quantitative problem solving.	2
Outcome 2.4 - Formulate and test hypotheses using numerical experimentation.	2

Outcome 2.5 - Define quantitative issues and problems, gather relevant information, analyze that information, and present results.	2
Outcome 2.6 - Assess the validity of statistical conclusions.	1
Standard 3 - Information Retrieval and Technology. Access, evaluate, and utilize information effectively, ethically, and responsibly.	
Outcome 3.1 - Use print and electronic information technology ethically and responsibly.	1
Outcome 3.2 - Demonstrate knowledge of basic vocabulary, concepts, and operations of information retrieval and technology.	1
Outcome 3.3 - Recognize, identify, and define an information need.	1
Outcome 3.4 - Access and retrieve information through print and electronic media, evaluating the accuracy and authenticity of that information.	2
Outcome 3.5 - Create, manage, organize, and communicate information through electronic media.	2
Outcome 3.6 - Recognize changing technologies and make informed choices about their appropriateness and use.	2
Standard 4 - Oral Communication Practice ethical and responsible oral communications appropriately to a variety of audiences and purposes.	
Outcome 4.1 - Identify and analyze the audience and purpose of any intended communication.	1
Outcome 4.2 - Gather, evaluate, select, and organize information for the communication.	1
Outcome 4.3 - Use language, techniques, and strategies appropriate to the audience and occasion.	1
Outcome 4.4 - Speak clearly and confidently, using the voice, volume, tone, and articulation appropriate to the audience and occasion.	1
Outcome 4.5 - Summarize, analyze, and evaluate oral communications and ask coherent questions as needed.	1
Outcome 4.6 - Use competent oral expression to initiate and sustain discussions.	1
Standard 5 - Critical Thinking Apply critical thinking skills to effectively address the challenges and solve problems.	
Outcome 5.1 - Identify and state problems, issues, arguments, and questions contained in a body of information.	2
Outcome 5.2 - Identify and analyze assumptions and underlying points of view relating to an issue or problem.	1
Outcome 5.3 - Formulate research questions that require descriptive and explanatory analyses.	2
Outcome 5.4 - Recognize and understand multiple modes of inquiry, including investigative methods based on observation and analysis.	1
Outcome 5.5 - Evaluate a problem, distinguishing between relevant and irrelevant facts, opinions, assumptions, issues, values, and biases through the use of appropriate evidence.	1
Outcome 5.6 - Apply problem-solving techniques and skills, including the rules of logic and logical sequence.	1
Outcome 5.7 - Synthesize information from various sources, drawing appropriate conclusions.	2
Outcome 5.8 - Communicate clearly and concisely the methods and results of logical reasoning.	1
Outcome 5.9 - Reflect upon and evaluate their thought processes, value system, and world views in comparison to those of others.	1
Standard 6 - Creativity Able to express originality through a variety of forms.	
Outcome 6.1: Generate responses to problems and challenges through intuition and non-linear thinking.	1
Outcome 6.2: Explore diverse approaches to solving a problem or addressing a challenge.	1
Outcome 6.3: Sustain engagement in activities without a preconceived purpose.	2
Outcome 6.4: Apply creative principles to discover and express new ideas.	1
Outcome 6.5: Demonstrate the ability to trust and follow one's instincts in the absence of external direction	1
Outcome 6.6: Build upon or adapt the ideas of others to create novel expressions or new solutions.	2

33. Additional Information

UNIVERSITY OF HAWAII MAUI COLLEGE
ASSOCIATE IN ARTS DEGREE
REVIEW OF COURSES FOR DIVERSIFICATION REQUIREMENTS

Any UH course with a diversification or equivalent designation that transfers to another UH campus will be accepted with the sending campus' designation. At each participating UH campus, the diversification designation is consistent with the hallmarks described below. Courses are approved through a campus level process and reviewed at least every five years to ensure that the course continues to meet the hallmarks.

Banner Input Date: _____

SUBJECT ALPHA: SSM COURSE NUMBER: 275

If the course is cross-listed, please provide the cross-listing: Subject _____ Course # _____

Catalog Input Date: _____

COURSE TITLE: Basic Energy Production

STAR Check Date: _____

UH MANOA DIVERSIFICATION CATEGORY:

UHMC RECOMMENDED CATEGORY: DP
(Refer to attached Hallmarks)

AA Advising Sheet
Update Date: _____

Is the course outline, on file with the UHMC Curriculum Committee, consistent with the stated Hallmarks? Yes No

If "No" and you wish to submit changes to correspond with the Hallmarks, attach a University of Hawaii Maui College Curriculum Action Request (CAR) (Form 4-93) with new course outline.

OR

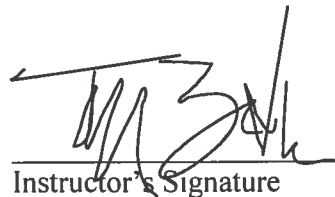
Recommend course be changed to another sub-category: _____

OR

Recommend course be used only as general elective

Tim Botkin

Instructor's Printed Name


Instructor's Signature

1-25-2015

Date

Michael Takemoto

Approved by: Diversification Chair Printed Name


Diversification Chair Signature

1/28/15

Date

HALLMARKS:

To satisfy the **Arts (DA)** area requirement, at least two thirds of a course will

- Use the definitions, descriptions, and terminology of the visual arts, performing arts, and other creative arts.
- Emphasize the acquisition of practical and theoretical skills necessary to produce visual, performing, or other creative arts for primarily aesthetic purposes.
- Develop creative abilities in which artistic conventions are applied and originality is sought.

To satisfy the **Humanities (DH)** area requirement, at least two thirds of a course will

- Use the terminology of historical, philosophical, language, or religious studies.
- Involve texts, artifacts, concepts, processes, theories, or issues of concern in these studies.
- Demonstrate inquiry that involves the methods of study, reflection, evidence gathering, and argumentation that are employed in these studies.

To satisfy the **Literatures (DL)** area requirement, at least two thirds of a course will

- Use the terminology of literary and/or cultural analysis.
- Involve the study of texts, concepts, forms, figures, styles, tonalities, processes, theories, or issues relating to literary and/or cultural analysis.
- Demonstrate inquiry that is guided by qualitative, argumentative, and/or quantitative methods employed in literary and/or cultural analysis.

To satisfy the **Biological Science (DB)** area requirement, at least two thirds of a course will

- Use the terminology of the biological sciences.
- Involve knowledge and theories relating to processes in the biological sciences.
- Demonstrate inquiry that is guided by observation/experimentation and reasoning/mathematics.

To satisfy the **Physical Science (DP)** area requirement, at least two thirds of a course will

- Use the terminology of the physical sciences.
- Involve knowledge and theories relating to processes in the physical sciences.
- Demonstrate inquiry that is guided by observation/experimentation and reasoning and mathematics.

To satisfy the **Laboratory (DY)** area requirement, at least two thirds of a course will

- Use the laboratory methods of the biological or physical sciences.
- Involve processes and issues of design, testing, and measurement.
- Demonstrate the strengths and limitations of the scientific method.

To satisfy the **Social Sciences (DS)** area requirement, at least two thirds of a course will

- Use the terminology of theories, structures, or processes in the social or psychological sciences.
- Involve the concepts, models, practices, or issues of concern in the scientific studies of those theories, structures, or processes.
- Demonstrate inquiry that is guided by quantitative and/or qualitative methods employed in the scientific study of structures or processes of these sciences.

Bachelor of Applied Science: Sustainable Science Management

The BAS in Sustainable Science Management (SSM) comprises a core curriculum in sustainability science, along with foundational sciences and liberal arts. Courses explore sustainability issues in energy, water, community and many others; analyzing the inter-relatedness of topics through systems thinking and dynamics models, monitoring progress through the use of sustainability indicators, and applying experience via internship and capstone.

~~The BAS in Sustainable Science Management (SSM) comprises a core curriculum emphasizing basic and applied science related to energy and sustainability, as well as communications and business fundamentals. Courses explore specific sustainability topics and recognize the inter-relatedness of topics through the use of systems thinking and dynamics models, as well as monitoring progress through the use of sustainability indicators.~~

The BAS degree is granted to students completing a four-year program. Only courses numbered 100 and above can be applied toward the degree.

SSM Admission Requirements

Students applying for admission to the SSM program must first meet the UH Maui College admission requirements. In order to declare as an SSM major, students must also complete the following:

1. ENG 100 with grade C or better;
2. MATH 103 with grade C or better or placement at MATH 135 or above;
3. ICS 101 with grade C or better, or consent;
4. SSM 101 with grade C or better.

SSM Lower Division Requirements

Prior to enrolling in upper division (300+ level) SSM courses, students should first complete lower division requirements that may be accomplished in a number of ways.

New Students - Base Program Path
Students starting at UH Maui College follow the SSM Program Map. While this path is unique to the SSM program, it also meets the requirements of Liberal Arts AA degree pathway.

Transfer & Other Non-New Students

1. All non-new students
All transferring and non-new students are required to meet the SE lower division requirements in order to qualify for upper division coursework in the SSM program:
 - a. MATH 115 or OCN 250; and MATH 135 or higher, both with grade C or better;
 - b. College chemistry with lab (minimum 4 credits) with grade C or better;
 - c. Biology with lab (minimum 4 credits) with grade C or better;
 - d. **SSM 275 or equivalent with grade C or better.**

~~ed. SSM 201 or OCN 201/201L, or SSM 275 either with grade C or better;~~

~~fe. SSM 101 and 202 with grade C or better.~~

~~gf. Minimum 62 credits in 100+ level coursework.~~

Note: Students should review and complete upper division SSM prerequisites early in their program.

2. UHMC degree graduates
Students who have graduated with a UHMC two-year degree in Natural Science (ASNS), AA Liberal Arts, or AA Hawaiian Studies, and have applied as an SSM major may take one SSM upper division course per semester for up to three semesters, as long as enrolled in 1a-f coursework.
3. Other degree graduates
Students holding a two or four year degree from an accredited institution must have a cumulative GPA of 2.5 or higher in their degree work, must have at least 40 hours of transferrable credit, and must meet the requirements of 1a-f above in order to take upper division coursework in the SSM program.
4. Non-degree students
Students who have completed 62 or more credits of 100+ coursework at an accredited institution may apply to take SSM upper division coursework. Non-degree students shall have a) substantially met the SSM lower division requirements set forth in the SSM Program Map, b) achieved grade C or better in all SSM program requirements with a cumulative 2.5 GPA on all transferring credits, and c) met all requirements of paragraph 1a-f.

SSM Graduation Requirements

Students must complete the following in order to graduate with a BAS degree in Sustainability Science Management:

1. Meet all lower division requirements in the SSM Program Map or in paragraph 1a-f.
2. Complete all required upper division coursework on the SSM Program Map, with grade C or better in each required course and with a cumulative GPA of 2.5 for all SSM program requirements. Upper division electives may be any SSM upper division course, or other 300-level or higher course as approved by the program coordinator. Not less than 6 credits of upper division elective credits must be 400+ level courses.
3. A minimum of 30 credits shall be taken at UHMC.
4. Complete six credits of capstone courses (SSM 495-496) over not less than two semesters with grade C or better.
5. Complete not less than 15 credits of writing intensive (WI) courses with grade C or better and at least 6 credits shall be in courses of 300-level or higher.
6. All SSM alpha required courses, except SSM 393v, must be taken for a letter grade. A maximum of 6 credits in other coursework may be achieved via Prior Learning Assessment.
7. Complete not less than 124 credit hours of coursework in support of the BAS degree. Only courses numbered 100 and above may apply to this degree **requirement**.
8. Submission of a completed Application for Graduation from UHMC.

Sustainable Science Management

The Sustainable Science Management (SSM) program, leading to a baccalaureate degree, provides a variety of options to students seeking employment in the rapidly expanding field of sustainability. Coursework covers important contemporary topics including but not limited to energy, ecology, business and management, water and wastewater, agriculture, waste-management, economics, policy, the built environment, and social science; all in the context of case studies in the larger interdisciplinary field of sustainability. Students develop systems thinking and analytical skills, which will enable graduates to apply learned principles to the changing and complex issues of the future. The program is designed to equip students with the fundamental skills necessary to bridge disciplines and to facilitate sustainable solutions and operations for any organization or community.

✋ Contact the program coordinator, Tim Botkin, at 984-3322 or by email at botkin@hawaii.edu for more information.

Full-time lower division students would take this sequence:

First Semester (Fall)	Credits	Second Semester (Spring)	Credits
SSM 101 Principles of Sustainability	3	ECON 130 or 131	3
BUSN 150 or ICS 101	3	ENRG 103⁶ Energy Production SSM 275	3
CHEM 151 or CHEM 161/161L	4	FG course ³	3
PSY 100 Survey of Psychology	3	CHEM 162 and 162L, or GIS 150	4
ENG 100 Composition I	<u>3</u>	MATH 115 ¹ Statistics	<u>3</u>
	16		16
Third Semester (Fall)	Credits	Fourth Semester (Spring)	Credits
BIO 171 and 171L Intro Biology I	4	COM 215/PSY 253 Conflict Resolution	3
MATH 135 Elementary Functions	3	ENG 210 Research Writing	3
SSM 201, or OCN 201 and 201L ²	3-4	BLAW 200, or MATH 203 or 205 ⁴	3
HWST 107 or 207, or HIST 284	3	SSM 202 Sustainable Island Communities	3
ACC 201 Financial Accounting	<u>3</u>	ZOOL 200 Marine Biology	<u>4</u>
	16-17		16

Upper division requirements for SSM Bachelor of Applied Science (BAS) Degree: 60 credits

Sustainable Science Management 301(3), 302(3), 375(3), 393v(3), 401(3), 402(3), 403(3), 422(3), 495(3), 496(3)	Communication 459(3)
Management 310(3)	English 316(3)
Philosophy 323(3)	Upper division program electives(3,3,3) ⁵
Aqua 362(3)	Any upper division SSM course not already required;
Biology 424(3)	AQUA 466; OCN 351; or other elective approved
Humanities 400(3)	by program coordinator

Full-time upper division students would take courses in this sequence:

Junior Year (Fall)	Credits	Junior Year (Spring)	Credits
SSM 302 Environmental Health	3	SSM 301 Sustainable Organizations	3
SSM 375 Renewable Energy Conversions or Elective	3	SSM 393v Internship	3
MGT 310 Principles of Management	3	SSM 402 Water Resources Management	3
ENG 316 Advanced Research Writing	3	PHIL 323 Professional Ethics	3
AQUA 362 Aquaculture and Mariculture	<u>3</u>	Upper division program elective ⁵	<u>3</u>
	15		15
Senior Year (Fall)	Credits	Senior Year (Spring)	Credits
SSM 422 Sustainable Systems Thinking	3	SSM 401 Environmental Law, Policy, and Justice	3
SSM 495 Capstone I	3	SSM 403 Renewable Energy Integration, or elective	3
HUM 400 Changes & Choices	3	SSM 496 Capstone II	3
Upper division program elective ⁵	3	BIOL 424 Protected Species Management	3
Upper division program elective ⁵	<u>3</u>	COM 459 Intercultural Communication II	<u>3</u>
	15		15

Tuition and Fees: A tuition differential exists for upper division courses numbered 300 or higher. See *Tuition and Fees* section.

¹Note: Statistics requirement may be met by BUS 310 or OCN 250 upon approval of program coordinator.

²Note: OCN 201 and 201L is required for students focusing on marine studies in their upper division coursework.

³Note: Foundations Global Multicultural Perspectives: Choose one course (3 credits) from either of two groups (FGA, FGC).

⁴Note: Calculus is a prerequisite for SSM 403 and other upper level courses.

⁵Note: At least 6 credits of electives shall be 400-level courses. Select upper division elective credits to achieve at least 12-4 credits total for the degree, not less than 60 of which must be in upper division.

⁶Note: Check with SSM coordinator for pertinent SSM course option.

Bachelor of Applied Science: Sustainable Science Management

The BAS in Sustainable Science Management (SSM) comprises a core curriculum emphasizing basic and applied science related to energy and sustainability, as well as communications and business fundamentals. Courses explore specific sustainability topics and recognize the inter-relatedness of topics through the use of systems thinking and dynamics models, as well as monitoring progress **through** the use of sustainability indicators.

The BAS degree is granted to students completing a four-year program. Only courses numbered 100 and above can be applied toward the degree.

SSM Admission Requirements

Students applying for admission to the SSM program must first meet the UH Maui College admission requirements. In order to declare as an SSM major, students must also complete the following:

1. ENG 100 with grade C or better;
2. MATH 103 with grade C or better or placement at MATH 135 or above;
3. ICS 101 with grade C or better, or consent;
4. SSM 101 with grade C or better.

SSM Lower Division Requirements

Prior to enrolling in upper division (300+ level) SSM courses, students should first complete lower division requirements that may be accomplished in a number of ways.

New Students - Base Program Path

Students starting at UH Maui College follow the SSM Program Map. While this path is unique to the SSM program, it also meets the requirements of Liberal Arts AA degree pathway.

Transfer & Other Non-New Students

1. All non-new students
All transferring and non-new students are required to meet the SE lower division requirements in order to qualify for upper division coursework in the SSM program:
 - a. MATH 115 or OCN 250; and MATH 135 or higher, both with grade C or better;
 - b. College chemistry with lab (minimum 4 credits) with grade C or better;
 - c. Biology with lab (minimum 4 credits) with grade C or better;
 - d. **SSM 275 or equivalent with grade C or better.**
 - e. ~~SSM 201 or OCN 201/201L, or SSM 275~~ either with grade C or better;
 - f. SSM 101 and 202 with grade C or better.
 - g. Minimum 62 credits in 100+ level coursework.

Note: Students should review and complete upper division SSM prerequisites early in their program.

2. UHMC degree graduates
Students who have graduated with a UHMC two-year degree in Natural Science (ASNS), AA Liberal Arts, or AA Hawaiian Studies, and have applied as an SSM major may take one SSM upper division course per semester for up to three semesters, as long as enrolled in 1a-f coursework.
3. Other degree graduates
Students holding a two or four year degree from an accredited institution must have a cumulative GPA of 2.5 or higher in their degree work, must have at least 40 hours of transferrable credit, and must meet the requirements of 1a-f above in order to take upper division coursework in the SSM program.
4. Non-degree students
Students who have completed 62 or more credits of 100+ coursework at an accredited institution may apply to take SSM upper division coursework. Non-degree students shall have a) substantially met the SSM lower division requirements set forth in the SSM Program Map, b) achieved grade C or better in all SSM program requirements with a cumulative 2.5 GPA on all transferring credits, and c) met all requirements of paragraph 1a-f.

SSM Graduation Requirements

Students must complete the following in order to graduate with a BAS degree in Sustainability Science Management:

1. Meet all lower division requirements in the SSM Program Map or in paragraph 1a-f.
2. Complete all required upper division coursework on the SSM Program Map, with grade C or better in each required course and with a cumulative GPA of 2.5 for all SSM program requirements. Upper division electives may be any SSM upper division course, or other 300-level or higher course as approved by the program coordinator. Not less than 6 credits of upper division elective credits must be 400+ level courses.
3. A minimum of 30 credits shall be taken at UHMC.
4. Complete six credits of capstone courses (SSM 495-496) over not less than two semesters with grade C or better.
5. Complete not less than 15 credits of writing intensive (WI) courses with grade C or better and at least 6 credits shall be in courses of 300-level or higher.
6. All SSM alpha required courses, except SSM 393v, must be taken for a letter grade. A maximum of 6 credits in other coursework may be achieved via Prior Learning Assessment.
7. Complete not less than 124 credit hours of coursework in support of the BAS degree. Only courses numbered 100 and above may apply to this degree **requirement**.
8. Submission of a completed Application for Graduation from UHMC.

Sustainable Science Management

The Sustainable Science Management (SSM) program, leading to a baccalaureate degree, provides a variety of options to students seeking employment in the rapidly expanding field of sustainability. Coursework covers important contemporary topics including but not limited to energy, ecology, business and management, water and wastewater, agriculture, waste-management, economics, policy, the built environment, and social science; all in the context of case studies in the larger interdisciplinary field of sustainability. Students develop systems thinking and analytical skills, which will enable graduates to apply learned principles to the changing and complex issues of the future. The program is designed to equip students with the fundamental skills necessary to bridge disciplines and to facilitate sustainable solutions and operations for any organization or community.

✋ Contact the program coordinator, Tim Botkin, at 984-3322 or by email at botkin@hawaii.edu for more information.

Full-time lower division students would take this sequence:

First Semester (Fall)	Credits	Second Semester (Spring)	Credits
SSM 101 Principles of Sustainability	3	ECON 130 or 131	3
BUSN 150 or ICS 101	3	ENRG 103 ⁶ Energy Production Systems	3
CHEM 151 or CHEM 161/161L	4	FG course ³	3
PSY 100 Survey of Psychology	3	CHEM 162 and 162L, or GIS 150	4
ENG 100 Composition I	3	MATH 115 ¹ Statistics	3
	16		16

Third Semester (Fall)	Credits	Fourth Semester (Spring)	Credits
BIO 171 and 171L Intro Biology I	4	COM 215/PSY 253 Conflict Resolution	3
MATH 135 Elementary Functions	3	ENG 210 Research Writing	3
SSM 201, or OCN 201 and 201L ²	3-4	BLAW 200, or MATH 203 or 205 ⁴	3
HWST 107 or 207, or HIST 284	3	SSM 202 Sustainable Island Communities	3
ACC 201 Financial Accounting	3	ZOOL 200 Marine Biology	4
	16-17		16

Upper division requirements for SSM Bachelor of Applied Science (BAS) Degree: 60 credits

Sustainable Science Management 301(3), 302(3), 375(3), 393v(3), 401(3), 402(3), 403(3), 422(3), 495(3), 496(3)	Communication 459(3)
Management 310(3)	English 316(3)
Philosophy 323(3)	Upper division program electives(3,3,3) ⁵
Aqua 362(3)	Any upper division SSM course not already required;
Biology 424(3)	AQUA 466; OCN 351; or other elective approved
Humanities 400(3)	by program coordinator

Full-time upper division students would take courses in this sequence:

Junior Year (Fall)	Credits	Junior Year (Spring)	Credits
SSM 302 Environmental Health	3	SSM 301 Sustainable Organizations	3
SSM 375 Renewable Energy Conversions or Elective	3	SSM 393v Internship	3
MGT 310 Principles of Management	3	SSM 402 Water Resources Management	3
ENG 316 Advanced Research Writing	3	PHIL 323 Professional Ethics	3
AQUA 362 Aquaculture and Mariculture	3	Upper division program elective ⁵	3
	15		15
Senior Year (Fall)	Credits	Senior Year (Spring)	Credits
SSM 422 Sustainable Systems Thinking	3	SSM 401 Environmental Law, Policy, and Justice	3
SSM 495 Capstone I	3	SSM 403 Renewable Energy Integration, or elective	3
HUM 400 Changes & Choices	3	SSM 496 Capstone II	3
Upper division program elective ⁵	3	BIOL 424 Protected Species Management	3
Upper division program elective ⁵	3	COM 459 Intercultural Communication II	3
	15		15

Tuition and Fees: A tuition differential exists for upper division courses numbered 300 or higher. See *Tuition and Fees* section.

¹Note: Statistics requirement may be met by BUS 310 or OCN 250 upon approval of program coordinator.

²Note: OCN 201 and 201L is required for students focusing on marine studies in their upper division coursework.

³Note: Foundations Global Multicultural Perspectives: Choose one course (3 credits) from either of two groups (FGA, FGC).

⁴Note: Calculus is a prerequisite for SSM 403 and other upper level courses.

⁵Note: At least 6 credits of electives shall be 400-level courses. Select upper division elective credits to achieve at least 124 credits total for the degree, not less than 60 of which must be in upper division.

⁶Note: Check with SSM coordinator for pertinent SSM course option.