General Studies Gold Request Form

Consult the General Studies Request FAQ for more information and quick answers.

New permanent numbered courses must be submitted to the workflow in Kuali CM before a General Studies request is submitted here. The General Studies Council will not review requests ahead of a new course proposal being sent to the Senate.

Submission Information

College/School	Department/School
Mary Lou Fulton Teachers College (CTE)	Division of Educational Leadership and Innovation (CEDGRAD)

Submission Type

Mandatory Review

ASU Request

Is this request for a permanent course or a topic?

Permanent Course

Subject Code	Course Number	Units/Credit Hours
SCN	307	3

Course Information

Enter the course catalog information, found in the web course catalog or Kuali CM.

Course Title

Biomimicry: Nature's Sustainable Solutions

Course Catalog Description

Introduces the interdisciplinary field of biomimicry, the study and the application of nature-inspired designs to address human challenges.

Enrollment Requirements (Prerequisites, Corequisites, and/or Antirequisites)

Prerequisite(s): minimum 15 hours OR ENG 101, 105 or 107 with C or better OR Visiting University Student

Is this a crosslisted course?

No

Is this course offered by (shared with) another academic unit?

No

If this course or topic already carries a different General Studies Gold (not Maroon) designation than the one being requested, please check this box.

General Studies Gold Designation Request

Requested Designation

Sustainability (SUST)

Attach a representative syllabus for the course, including course learning outcomes and descriptions of assignments and assessments.

SCN307 SUST Biomimicry - Nature's Sustainable Solutions F24.docx (1).pdf

Sustainability (SUST)
The Sustainability requirement will provide students with an interdisciplinary understanding of socio-ecological systems in relation to global challenges and opportunities. The learning objectives emphasize systems thinking, where human and non-human systems are understood as intimately connected, with human actions affecting all life on a planet with limits and boundaries. Students should also become familiar with how cultural, political, economic, social, and ethical beliefs, practices and systems are related to and impact planetary systems. Students will use course concepts and systems and futures thinking to address contemporary questions or challenges.

Instructions: In the fields below, state the assignment, project, or assessment that will measure each learning outcome, and provide a description. The description should provide enough detail to show how it measures the learning outcome. If needed, more than one can be identified.

The proposal does not need to include all course assessments that measure a given learning outcome. The provided assessment should include sufficient detail to allow the subcommittee to make their evaluation. When appropriate, the same assessment can be listed for more than one learning outcome (e.g., a culminating project).

You may provide links to a document (Google Drive or Dropbox) that includes the relevant details for the assessment. Do not provide links to Canvas shells.

SUST Learning Outcome 1: Demonstrate an understanding of the earth and its ecosphere, including the measures that indicate their capacities and limits.

1. Content Discussion Board: By documenting key understandings from the module's content, students are required to engage deeply with the subject matter, which includes concepts about the earth and its ecosphere. This process encourages students to synthesize their learning and reflect on how their new knowledge relates to the earth's capacities and limits.
2. Learning from Nature: Observation Assignment: Two aspects of this assignment align with this learning outcome: 1) Observation and Documentation: By repeatedly observing the same spot over time and documenting changes, students gain a deeper understanding of the dynamics of an

ecosystem. This helps them learn about natural processes, patterns, and the limits of environmental systems as they witness how elements such as weathering, animal activity, and plant growth affect their chosen location. 2) Sensory Engagement: The assignment encourages students to use all their senses to experience the environment. This sensory engagement helps them grasp the nuances of ecological interactions and the intricate balance within an ecosystem.
3. "AskNature Scavenger Hunt: The scavenger hunt requires students to explore the AskNature website, which is dedicated to biomimicry—leveraging nature's solutions to human problems. By investigating natural strategies and innovations, students learn about how ecosystems function and how these processes can inspire sustainable solutions. This activity helps students understand the capabilities and limits of natural systems and their relevance to solving contemporary challenges.
4. STEM Challenge: The design challenge requires students to consider how their product or system manages liquids, which inherently involves understanding the properties and behavior of fluids within environmental contexts. By re-designing a system to improve its efficiency, students are encouraged to think about the resource management and environmental impacts associated with their designs. For example, if students design a more efficient water filtration system, they are directly engaging with concepts related to the earth's water systems and their capacity for handling contaminants.
5. Case Study: Biomimetic Invention Research: By researching the biological organism or process that inspired the invention, students gain insight into how natural systems operate and how they solve problems within their own ecosystems. This component helps students understand how nature's designs are adapted to their environments and the capacities and limits of these biological systems.
Final Design Challenge: This assignment aligns in two ways: 1) Research Component: The Nature Card requires students to research and understand a natural item, including its identifying features, habitat, and adaptations. This aspect helps students gain insight into the earth's ecosphere and the specific roles and capacities of different organisms within it. By studying how nature solves problems through adaptation and survival strategies, students enhance their understanding of ecological systems and the limits and capacities of various natural processes. 2) Biomimicry Component: By using nature's strategies to inspire new designs, students are learning about natural processes and their efficiency. This ties directly to understanding how ecosystems function and the principles that sustain them.

SUST Learning Outcome 2: Trace historical impacts of a range of socio-economic, political or cultural choices on integrated human-environmental wellbeing.

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1. Content Discussion boards: The assignment encourages students to raise burning questions and reflect on their learning. This reflection includes considerations of historical impacts on human-environmental well-being as students question and discuss how past decisions have shaped current environmental issues and sustainability practices. This aspect of the assignment helps students connect historical context to contemporary sustainability challenges.
2. Learning from Nature: Observation Assignment: Two aspects of this assignment align with this learning outcome: 1) Historical Context: By observing changes over time, students can infer how past socio-economic or cultural practices might have impacted their chosen location. For instance, noticing changes due to human activity, like pollution or land use changes, allows them to trace historical influences on the environment. 2) Observation of Impact: The assignment reveals how different factors, including human activities, have shaped or altered the natural processes in their spot, thus linking socio-economic influences with environmental changes.
3. Case Study: Biomimetic Invention Research: By examining the history of a biomimetic invention, including who created it and when, students learn about the socio-economic and technological

contexts in which the invention was developed. This helps them trace the impacts of such innovations on human-environmental interactions over time.

SUST Learning Outcome 3: Envision pathways toward futures characterized by integrated human-environmental wellbeing.

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1. Content Discussion boards: By discussing key understandings and asking questions about module content, students engage in critical thinking about possible futures. The assignment promotes envisioning solutions and pathways for achieving integrated human-environmental wellbeing through the reflection and discussion of sustainability concepts. The final summary, where students encapsulate the discussions, supports envisioning how different perspectives contribute to future sustainability strategies.
2. Learning from Nature: Observation Assignment: Two aspects of this assignment align with this learning outcome: 1) Pattern Recognition: As students identify patterns and relationships within their natural spot, they begin to envision how sustainable practices or conservation efforts might influence the future of their environment. For example, seeing how specific plants or animals thrive or struggle helps them understand the potential impacts of different environmental management strategies. 2) Critical Thinking: By reflecting on changes and the hardest parts of observation, students develop ideas about how to improve human-environment interactions and promote integrated wellbeing.
3. "AskNature Scavenger Hunt: The assignment encourages students to reflect on how the biomimicry innovations they discover apply to real-world situations. This reflection fosters an understanding of how integrating nature-inspired solutions contributes to sustainable development and enhances human-environmental well-being. By engaging with examples of successful biomimicry, students envision future scenarios where human innovations are harmoniously integrated with natural systems.
4. Discussion (SHARE, REFLECT, ENGAGE) - ALL STEM Challenges: In the redesign process, students are tasked with innovating and improving existing systems or creating new ones. This requires them to envision how their designs contribute to a more sustainable future by addressing current inefficiencies and potential environmental impacts. The discussion component of the assignment encourages students to reflect on the broader implications of their designs and consider how they might positively affect human-environmental interactions.
5. Case Study: Biomimetic Invention Research: Assessing the effectiveness and sustainability of the design, along with proposing improvements, encourages students to envision how biomimetic innovations contribute to integrated human-environmental wellbeing. This fosters critical thinking about how innovations can address current challenges and contribute to a sustainable future.

SUST Learning Outcome 4: Articulate an approach to addressing contemporary questions or challenges that employs concepts or practices of sustainability.

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1. Content Discussion boards: The assignment’s structure, including posing burning questions and engaging in peer responses, facilitates the articulation of approaches to contemporary sustainability challenges. By reflecting on and discussing module content, students develop and articulate strategies or ideas that employ sustainability concepts to address current issues, fulfilling this learning outcome.
2. Learning from Nature: Observation Assignment: Two aspects of this assignment align with this learning outcome: 1) Detailed Analysis: The assignment prompts students to consider various environmental factors and their implications. This analysis helps them articulate sustainable practices by understanding the direct effects of natural and human-induced changes on their

environment.Pattern Recognition: As students identify patterns and relationships within their natural spot, they begin to envision how sustainable practices or conservation efforts might influence the future of their environment. For example, seeing how specific plants or animals thrive or struggle helps them understand the potential impacts of different environmental management strategies. 2) Creative Solutions: Through narrative descriptions and sketches, students can creatively express their observations and propose solutions or strategies to address observed challenges, such as mitigating erosion or enhancing biodiversity.
3. "AskNature Scavenger Hunt: The scavenger hunt and subsequent discussion prompt students to articulate how the strategies and innovations they find address contemporary challenges. By engaging in a dialogue about the practical applications of biomimicry, students demonstrate their ability to use sustainability concepts to address real-world issues, thereby showcasing their understanding of sustainable practices and solutions.
4. Discussion (SHARE, REFLECT, ENGAGE) - ALL STEM Challenges: The assignment engages students in a practical application of sustainability concepts by challenging them to rethink and redesign systems related to liquid management. This process involves applying sustainability principles to real-world problems, such as reducing waste, improving resource efficiency, or minimizing environmental impacts. The discussion component further supports this by asking students to articulate how their designs address contemporary issues and propose improvements.
5. Case Study: Biomimetic Invention Research: Proposing modifications to enhance the biomimetic design involves addressing contemporary challenges related to sustainability. This component encourages students to apply concepts of sustainability to real-world problems, considering both the current effectiveness of the invention and potential improvements.
6. Final Design Challenge: This assignment aligns in two ways: 1) Design Challenge: The challenge asks students to create environmentally friendly and efficient designs based on biomimicry. This directly involves employing concepts of sustainability by integrating natural solutions into product design. By focusing on creating designs that solve real-world problems while promoting sustainability, students apply sustainable practices and conceptual frameworks to their solutions. 2) Outcome Identification: Students are required to describe the outcomes their designs should achieve, emphasizing sustainability goals. This process involves articulating how their designs contribute to environmental well-being and solve contemporary issues.

List all course-specific learning outcomes. Where appropriate, identify the associated SUST learning outcome(s) in brackets (see below for example). Note: It is expected that a majority of course-specific learning outcomes will be associated with a SUST learning outcome.

Course Objectives:
1. Students will describe the three core elements of biomimicry—(re)connect, ethos, and emulate—demonstrating an understanding of the earth and its ecosphere, including their capacities and limits. (Aligned with SUST LO1)
2. Students will identify Life’s Principles and explain their importance in biomimicry, tracing the historical impacts of socioeconomic, political, or cultural choices on human-environmental well-being. (Aligned with SUST LO1 and LO2)
3. Students will provide diverse examples of global biomimetic applications and analyze their effectiveness as sustainable designs, envisioning pathways toward futures characterized by integrated human-environmental well-being. (Aligned with SUST LO2 and LO3)
4. Students will differentiate between biomimetics and bioinspiration and assess their contributions to human progress and sustainable living, articulating approaches to addressing contemporary sustainability challenges. (Aligned with SUST LO1 and LO4)

5. Students will apply the basic principles of the biomimicry thinking process to solve a design challenge, employing sustainability concepts and practices. (Aligned with SUST LO3 and LO4)
6. Students will develop environmental attitudes that enhance sensory perception and aesthetic sensitivity through reflective assignments and projects, fostering a deeper connection to nature and promoting sustainable living. (Aligned with SUST LO4)
7. Students will explain the development of a sense of place and describe its role in maintaining local and global ecosystems, envisioning sustainable futures. (Aligned with SUST LO3)
8. Students will articulate civic, social, and global responsibilities for environmental stewardship, demonstrating an approach to addressing contemporary questions or challenges using sustainability practices. (Aligned with SUST LO3 and LO4)
9. Students will trace the historical impacts of socioeconomic, political, or cultural choices on human-environmental well-being, demonstrating an understanding of the capacities and limits of the earth and its ecosphere. (Aligned with SUST LO1 and LO2)

Provost Use Only

Backmapped Maroon Approval

No Response

Form Submission - Proposer

Submitted for Approval | Proposer

Keirsty Vernon - October 2, 2024 at 5:19 PM (America/Phoenix)

Department Approval

Approved

Jill Koyama - October 3, 2024 at 8:46 AM (America/Phoenix)

Alana Lackore

GSC Coordinator Review

Approved

TJ Robedeau - October 9, 2024 at 3:28 PM (America/Phoenix)

April Randall

Assistant Vice Provost Review

Sent Back

Tamiko Azuma - October 9, 2024 at 5:45 PM (America/Phoenix)

For the course-specific learning outcomes, please provide the "course objectives" that are listed in the syllabus. They better reflect the course-specific learning outcomes than the individual module objectives.

Thank you. You can email me if you have any questions: azuma@asu.edu

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Form Submission - Proposer

Submitted for Approval | Proposer

Keirsty Vernon - October 10, 2024 at 2:51 PM (America/Phoenix)

Department Approval

Approved

Jill Koyama - October 11, 2024 at 6:25 AM (America/Phoenix)

Alana Lackore

GSC Coordinator Review

Approved

TJ Robedeau - October 11, 2024 at 10:28 AM (America/Phoenix)

April Randall

Assistant Vice Provost Review

Approved

Tamiko Azuma - October 11, 2024 at 11:53 AM (America/Phoenix)

All required components confirmed.

Pre-GSC Meeting

Approved

TJ Robedeau - October 11, 2024 at 12:06 PM (America/Phoenix)

April Randall

Sustainability (SUST) Committee

Acknowledgement Requested

Kevin Dooley

Jose Lobo - October 17, 2024 at 8:54 PM (America/Phoenix)

The subcommittee recommends revise and resubmit. The manner in which the LOs are evaluated needs to be more clearly explained and the assessments need to be clearly differentiated.

Evan Berry

Treavor Boyer

General Studies Council Meeting

Waiting for Approval

TJ Robedeau

April Randall

Proposer Notification

Notification

Keirsty Vernon

College Notification

Notification

Angelia Linder