

SUSTAINABILITY SCIENCE AND PRACTICE

Courses offered by the Sustainability Science and Practice program are listed under the subject code SUST on the Stanford Bulletin's ExploreCourses (<https://explorecourses.stanford.edu/>) website.

Mission of the Coterminal Program in Sustainability Science and Practice

The Sustainability Science and Practice program (SUST for short) is an interdisciplinary coterminal master's program hosted by the School of Earth, Energy and Environmental Sciences (<http://exploreddegrees.stanford.edu/schoolofearthsciences/>). The goal of the program is to prepare leaders to radically accelerate the transition to a more sustainable and just society. As the global human population climbs toward 11 billion, consumption demands increase, and disparities in wealth and opportunity persist, society must learn to equitably meet existing human needs in ways that do not forgo possibilities for future generations. These sustainability challenges are marked by extreme complexity, urgency, conflicting demands, and often a paucity of resources or political will to address them. Transforming these challenges into powerful opportunities requires a new kind of leader — one who can both envision a prosperous future for all and who can design practices and cultivate partnerships essential to building that future. The SUST program equips students with the theoretical and conceptual knowledge and the mindsets and practical skills needed to advance sustainability, securing human well-being around the world and across generations.

The curriculum covers three main elements:

Element 1: Understanding complex social-environmental systems

Students develop a “systems perspective”, deepening their awareness of the dynamic and interrelated nature of social-environmental systems. They explore tools to measure, map, and model five capital assets — social, natural, human, manufactured, and knowledge capital — and their complex interactions in order to recognize potential feedbacks, thresholds, and unintended consequences, as well as to identify leverage points and opportunities for interventions that can have transformative impact.

Element 2: Understanding decision making and developing strategies for change

Students examine the roles of diverse actors who influence change in social-environmental systems and explore strategies to align decision making and behavior with sustainability. They explore mindsets and approaches of transformative leaders and examine effective strategies for advancing sustainability across sectors. Students develop skills in decision making in complex and uncertain contexts, use metrics and evaluation approaches aligned with sustainability goals, cultivate leadership orientations, and practice effective communications and storytelling approaches.

Element 3: Designing innovations with impact at scale

Students develop understanding of how to intervene in complex systems for transformative impact by exploring frameworks and tools from systems thinking, design thinking, social cognitive theory, behavioral economics, and partnership strategies. They develop practical skills in mapping complex systems and designing creative, high-leverage interventions that realign systems with the goal of intergenerational well-being.

Sustainability Leadership Practicum

To integrate and internalize core lessons from the SUST curriculum, each student completes a 120-hour practicum project of their own design, collaborating on a complex sustainability challenge with an outside partner and working through the types of constraints often faced by decision makers and leaders. Students apply the leadership mindsets, knowledge, and skills from the curriculum to this practical experience and present their final analysis and reflections to faculty and peers.

Learning Outcomes

The Sustainability Science and Practice program integrates theoretical and conceptual knowledge, mindsets, and practical skills to enable students to understand and manage complex systems, understand decision making and develop strategies for change, and cultivate partnerships and design innovations with potential for impact at scale.

The program prepares students to become effective participants and agents of change as individuals and within organizations across all sectors of society, contributing to the advancement of the goal of sustainability, i.e., the well-being of people around the world and across generations. Using a conceptual framework that connects human well-being with key underlying assets, students learn how social-environmental systems work, how decisions can be made to influence system dynamics in a way that supports sustainability goals, and how to engage with others to design new ways of managing these systems.

Master of Arts in Sustainability Science and Practice

University requirements for master's degrees are described in the “Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees/#masterstext>)” section of this bulletin.

The Sustainability Science and Practice program offers current Stanford undergraduates the opportunity to apply to a one-year coterminal master's program. Students can pursue either a coterminal Master of Arts (M.A.) degree or a coterminal Master of Science (M.S.) degree.

Application and Admission

The Sustainability Science and Practice program has two coterminal degree application deadlines: October 27, 2020 and February 23, 2021. To apply, students should submit all of the following application materials via the University's online application portal:

- The online Stanford coterminal application (<https://www.applyweb.com/stanterm/>).
- A statement of purpose, about one page in length, that describes the applicant's sustainability interests, the experiences that have influenced the student and motivated them to apply, and what the applicant hopes to learn from and contribute to the program. The statement should provide a clear picture of who the applicant is and what matters to them.
- A current resume.
- A current Stanford unofficial transcript.
- Two letters of recommendation from Stanford faculty who know the applicant well and can speak to their qualifications and fit for the program. At least one of the faculty writers must be an Academic Council Member (i.e., professor, associate professor, or assistant professor; if unsure whether a faculty member is on Academic Council, please contact the SUST program before applying). An optional third letter of recommendation may also be submitted for consideration. The online application includes an entry field where the applicant should indicate the name and email address of each person who will be providing a recommendation. Once the applicant submits this information, each recommender will receive an automated email with instructions and a link to the application form.

- Prior to applying to the SUST program, the applicant must identify a faculty member who agrees to serve as the student's master's advisor. Potential advisors include those faculty members listed on the SUST website (<https://earth.stanford.edu/sust/people/>).
- Course Proposal form (<https://stanford.box.com/s/0md25lmqniinzlmvtkl7dfjzepam2jm/>) reviewed and signed by the SUST student services officer and the applicant's master's advisor. The Course Proposal form lists the courses that the applicant intends to take to fulfill degree requirements. The advisor's signature of approval on the completed Course Proposal form is required at the time of application.

Applications must be submitted no later than the quarter prior to the expected completion of the bachelor's degree and within application deadlines. An application fee is assessed by the Registrar's Office for coterminal applications once a student matriculates into the program.

Students applying to the coterminal master's program must have completed a minimum of 120 units towards graduation with a recommended minimum overall Stanford GPA of 3.4.

All applicants must devise a program of study that includes a set of courses appropriate to the master's level, and determined in consultation with the master's advisor.

Students without prior coursework in Earth systems or sustainability may want to consider taking EARTHSYS 10 Introduction to Earth Systems prior to applying.

The student has the option of receiving the bachelor's degree after completing the degree's requirements, or receiving the bachelor's and master's degrees concurrently upon the completion of the master's program.

University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (<http://exploreddegrees.stanford.edu/cotermdegrees/>)" section. University requirements for the master's degree are described in the "Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees/#masterstext>)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate advisor be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

Degree Requirements

The following are required of all M.A. students:

- A minimum of 45 units of course work.
- At least 34 units of the student's course work for the master's program must be at the 200 level or above.
- All remaining course work must be at the 100 level or above.
- All courses for the master's program must be taken for a letter grade, if a letter grade is offered. Exceptions to this requirement must be approved by the program.
- A minimum overall GPA of 3.4 must be maintained.
- The majority of the student's 45 units must be designated as "arts" units. Arts and science designations for courses can be viewed on the SUST Course Spreadsheet (<https://stanford.app.box.com/v/sust-courses/>).
- Elective courses for the master's program must be selected from the program's pre-approved list, which is available on the SUST Course Spreadsheet. (<https://stanford.app.box.com/file/124238118535/>) Students may request approval for other elective courses via the program's course petition process.
- If courses required for the master's degree have been taken in the undergraduate career, students may pursue additional electives to fulfill the 45 units required for degree completion.

Required Courses

		Units
SUST Core		
Courses required for all SUST coterminals:		
SUST 210	Pursuing Sustainability: Managing Complex Social Environmental Systems	3
SUST 220	Case Studies in Leading Change for Sustainability	3
SUST 297	Introduction to Systems Transformation (Topic: Introduction to Systems Transformation, a two-day immersive short course, Winter Quarter)	1
SUST 240	Sustainability Leadership Practicum	1-4
Change in the Earth System		
Courses required for all SUST coterminals:		
EARTHSYS 212	Human Society and Environmental Change	4
EARTHSYS 217	Biology and Global Change	4
Psychology / Understanding Behavior		
One of the following:		
PSYCH 215	Mind, Culture, and Society	3
PSYCH 216	Public Policy and Social Psychology: Implications and Applications	4
PSYCH 265	Social Psychology and Social Change (Must be taken for 3 units)	3
PSYCH 238	Wise Interventions	4
Decision Making		
One of the following:		
LAW 7508	Problem Solving and Decision Making for Public Policy and Social Change	4
GSBGEN 367	Problem Solving for Social Change (Limited Enrollment-Check course description for details)	3
SUST 261	Art and Science of Decision Making	3-4
EARTHSYS 227	Decision Science for Environmental Threats	3-5
ENVRES 240	Environmental Decision-Making and Risk Perception (Must be taken for 3 units)	3
Design and Innovation		
Two of the following or approved alternatives:		

SUST 230	Innovating Large Scale Sustainable Transformations/Collaborating for the Future	3-4
SUST 231	FEED Lab: Food System Design & Innovation	3-4
SUST 232	Design for Sustainable Impact	3-4
ME 206A & ME 206B	Design for Extreme Affordability and Design for Extreme Affordability	8
BIOE 177	Inventing the Future	4
ME 377	Design Thinking Studio	4
LAW 806Y	Policy Practicum: Justice By Design: Eviction	2-4
FEMGEN 344F	Intersectional Design: Innovations and Inclusive Design in Tech	4-5
DESINST 250	Oceans by Design	3
DESINST 200	Forget all the Jargon, Let's Innovate	4
DESINST 203	Designing the Taboo	3
DESINST 220	Designing Futures of Work	3
DESINST 225	Designing Courageous Conversations For Impact	4
PEDS 219	Designing Healthcare For Social Justice	3

Ethics Course Requirement

All Sustainability Science and Practice students must complete at least one ethics course during their time at the University. Students who have satisfied the Ways-Ethical Reasoning undergraduate requirement are not required to take an additional ethics course. Those who have not yet satisfied this requirement are encouraged to consider one of the recommended ethics courses listed below.

		Units
PUBLPOL 234	Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals	3
ETHICSOC 136R	Introduction to Global Justice	4
ETHICSOC 278M	Introduction to Environmental Ethics	4-5

Master of Science in Sustainability Science and Practice

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- A current resume.
- A current Stanford unofficial transcript.
- Two letters of recommendation from Stanford faculty who know the applicant well and can speak to their qualifications and fit for the program. At least one of the faculty writers must be an Academic Council Member (i.e., professor, associate professor, or assistant professor; if unsure whether a faculty member is on Academic Council, please contact the SUST program before applying). An optional third letter of recommendation may also be submitted for consideration. The online application includes an entry field where the applicant should indicate the name and email address of each person who will be providing a recommendation. Once the applicant submits this information, each recommender will receive an automated email with instructions and a link to the application form.
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University Coterminal Requirements

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After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

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No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

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- All remaining coursework must be at the 100 level or above.
- All courses for the master's program must be taken for a letter grade, if a letter grade is offered. Exceptions to this requirement must be approved by the program.
- A minimum overall GPA of 3.4 must be maintained.
- The majority of the student's 45 units must be designated as "science" units. Arts and science designations for courses can be viewed on the SUST Course Spreadsheet (<https://stanford.app.box.com/v/sust-courses/>).
- Elective courses for the master's program must be selected from the program's pre-approved list, which is available on the SUST Course Spreadsheet (<https://stanford.app.box.com/v/sust-courses/>). Students may request approval for other elective courses via the program's course petition process.
- If courses required for the master's degree have been taken in the undergraduate career, students may pursue additional electives to fulfill the 45 units required for degree completion.

Mathematics and Statistics Prerequisites

The Master of Science in Sustainability Science and Practice requires additional coursework in mathematics and statistics. Although students are encouraged to complete these courses prior to applying to SUST, the coursework may be taken after admission to the program. The mathematics and statistics coursework may not be counted toward the 45 units required for master's degree completion. These courses do not have to be taken for a letter grade.

		Units
Mathematics		
One of the following:		
MATH 51	Linear Algebra, Multivariable Calculus, and Modern Applications	5
CME 100	Vector Calculus for Engineers	5
Statistics		
One of the following:		
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
STATS 110	Statistical Methods in Engineering and the Physical Sciences	5
STATS 116	Theory of Probability	4
MS&E 120	Introduction to Probability	4

CS 109	Introduction to Probability for Computer Scientists	3-5
EE 178	Probabilistic Systems Analysis	3-4

Required Courses

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SUST 297	Introduction to Systems Transformation (Topic: Introduction to Systems Transformation, a two-day immersive short course, Winter Quarter)	1
SUST 240	Sustainability Leadership Practicum	1-4
Change in the Earth System		
Courses required for all SUST coterm:		
EARTHSYS 212	Human Society and Environmental Change	4
EARTHSYS 217	Biology and Global Change	4
Psychology / Understanding Behavior		
One of the following:		
PSYCH 215	Mind, Culture, and Society	3
PSYCH 216	Public Policy and Social Psychology: Implications and Applications	4
PSYCH 265	Social Psychology and Social Change (Must be taken for 3 units)	3
PSYCH 238	Wise Interventions	4
Decision Making		
One of the following:		
LAW 7508	Problem Solving and Decision Making for Public Policy and Social Change	4
GSBGEN 367	Problem Solving for Social Change (Limited Enrollment-Check course description for details)	3
SUST 261	Art and Science of Decision Making	3-4
EARTHSYS 227	Decision Science for Environmental Threats	3-5
ENVRES 240	Environmental Decision-Making and Risk Perception (Must be taken for 3 units)	3
Design and Innovation		
Two of the following or approved alternatives:		
SUST 230	Innovating Large Scale Sustainable Transformations/Collaborating for the Future	3-4
SUST 231	FEED Lab: Food System Design & Innovation	3-4
SUST 232	Design for Sustainable Impact	3-4
ME 206A & ME 206B	Design for Extreme Affordability and Design for Extreme Affordability	8
BIOE 177	Inventing the Future	4
ME 377	Design Thinking Studio	4
LAW 806Y	Policy Practicum: Justice By Design: Eviction	2-4
FEMGEN 344F	Intersectional Design: Innovations and Inclusive Design in Tech	4-5
DESINST 250	Oceans by Design	3
DESINST 200	Forget all the Jargon, Let's Innovate	4
DESINST 203	Designing the Taboo	3

DESINST 220	Designing Futures of Work	3
DESINST 225	Designing Courageous Conversations For Impact	4
PEDS 219	Designing Healthcare For Social Justice	3

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		Units
PUBLPOL 234	Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals	3
ETHICSOC 136R	Introduction to Global Justice	4
ETHICSOC 278M	Introduction to Environmental Ethics	4-5

COVID-19 Policies

On July 30, the Academic Senate adopted grading policies effective for all undergraduate and graduate programs, excepting the professional Graduate School of Business, School of Law, and the School of Medicine M.D. Program. For a complete list of those and other academic policies relating to the pandemic, see the "COVID-19 and Academic Continuity (<http://exploreddegrees.stanford.edu/covid-19-policy-changes/#tempdeptemplatetabtext>)" section of this bulletin.

The Senate decided that all undergraduate and graduate courses offered for a letter grade must also offer students the option of taking the course for a "credit" or "no credit" grade and recommended that deans, departments, and programs consider adopting local policies to count courses taken for a "credit" or "satisfactory" grade toward the fulfillment of degree-program requirements and/or alter program requirements as appropriate.

Graduate Degree Requirements

Grading

The Sustainability Science and Practice program counts all courses taken in academic year 2020-21 with a grade of 'CR' (credit) or 'S' (satisfactory) towards satisfaction of graduate degree requirements that otherwise require a letter grade provided that the instructor affirms that the work was done at a 'B-' or better level.

For a statement of University policy on graduate advising, see the "Graduate Advising (<http://exploreddegrees.stanford.edu/graduatedegrees/#advisingandcredentialstext>)" section of this bulletin.

Graduate Advising Expectations

The Sustainability Science and Practice (SUST) program believes that a clear and productive relationship between the graduate advisor and graduate student is necessary for academic and professional success. Because the program sees itself as building leaders for the future of sustainability, it is committed to providing students with graduate advisors who embody such leadership and employ the knowledge, mindsets, and skills of the program in their role.

Acquiring an Advisor

- The SUST program website (<https://earth.stanford.edu/sust/people/>) includes a list of faculty members who are affiliated with the SUST program. Students research potential advisors with similar interests

and shared academic focus areas that they would like to emphasize in their own studies.

- Students contact the faculty member to ask for a meeting to explore whether the advising relationship is going to be a good fit for both parties.
- While the official advisor-of-record must be on the Academic Council (i.e., professor, associate professor, or assistant professor), students may ask a non-Academic Council member to serve as a co-advisor. Students should consult with the Change Leadership for Sustainability executive director or program director about co-advising relationships.

Advising Expectations

Faculty advisors are expected to serve as intellectual advisors and professional mentors, preparing students to be ready for, and successful in, their future careers.

A prospective faculty advisor meets with a student prior to application submission to:

- Discuss the student's motivation for applying to the program;
- Plan, review, and sign the student's course proposal; and
- Discuss what the advisor/advisee relationship will look like.

Once admitted, the student and advisor should meet quarterly to:

- Review courses for that quarter;
- Discuss career goals and practicum ideas;
- Help connect the student with larger networks outside of Stanford for sustainability work;
- Engage the student in relevant research opportunities and projects;
- Review the student's practicum proposal and attend (if possible) the student's final practicum presentation. The program director is an additional resource for students, specifically for practicum planning, mentoring, and completion. Students are expected to talk with their advisor and the program director about this aspect of the program.

Meetings and Scheduling

The student is responsible for scheduling the quarterly advising meeting. In-person meetings are encouraged; however, meetings by phone or video conference are acceptable, if mutually agreed. If a student is on leave of absence, the program encourages him/her to check in with his/her advisor each quarter via email. If an advisor is on sabbatical, it is expected that planning for this would have been covered in an earlier meeting. Most faculty members on sabbatical continue the advising relationship with existing advisees, and meetings shift from in-person to phone or video conference.

Addressing Mental Health

Pursuing a master's degree at Stanford University is one of the many exciting but challenging tasks students may be taking on. The pressures of academic work, external projects, and family affairs can at times cause students mental, physical, and emotional stress. The program encourages academic advisors to provide resources to students who may show signs of struggling with mental health, including extreme levels of anxiety and depression, or battling issues such as grief.

Resources

- Counseling and Psychological Services (CAPS) offers crisis counseling. Walk-in appointments are available, and clinicians are always on call at (650) 723-3785.
- The Graduate Life Office is available during office hours at (650) 736-7078, or 24/7 at (650) 723-8222, pager ID number 25085.
- The Bridge Peer Counseling Center offers counseling by trained students 24/7 at (650) 723-3392.

- The Office for Religious Life offers spiritual guidance for students. Call (650) 723-1762 or visit the Round Room at Memorial Church.
- The Faculty and Staff Help Center, located in Kingscote Gardens, offers confidential help for Stanford faculty and staff.
- If you are aware of someone in distress, contact CAPS, the Department of Public Safety or the Office of the Dean of Students.

Program Staff:

Faculty Director: Pamela Matson

Co-Director: Julia Novy

Program Director: Shelley Ratay

Program Coordinator: Lauren Neville

Director of Graduate Studies: Pamela Matson and Julia Novy

Affiliated Faculty and Lecturers:

- Nicole M. Ardoin (Education)
- Inêz Azevedo (Energy Resources Engineering)
- Shilajeet Banerjee (Sustainability Science and Practice)
- William Barnett (Business)
- Sally Benson (Energy Resources Engineering)
- Paul Brest (Law)
- Marshall Burke (Earth System Science)
- Karen Casciotti (Earth System Science)
- Geoffrey Cohen (Psychology)
- Gretchen C. Daily (Woods Institute for the Environment)
- Jenna Davis (Civil and Environmental Engineering)
- Noah Diffenbaugh (Earth System Science)
- Sibyl Diver (Earth System Science)
- Rob Dunbar (Earth System Science)
- Scott Fendorf (Earth System Science)
- Zephyr Frank (History)
- Margot Gerritsen (Energy Resource Engineering)
- Lynn Hildemann (Civil and Environmental Engineering)
- Pamela Hinds (Management Science and Engineering)
- Rob Jackson (Earth System Science)
- James Holland Jones (Earth System Science)
- Jeffrey Koseff (Civil and Environmental Engineering)
- Eric Lambin (Earth System Science)
- James Leape (Woods Institute for the Environment)
- Susan Liataud (Law, Public Policy)
- David Lobell (Earth System Science)
- Hazel Markus (Psychology)
- Pamela Matson (Sustainability Science and Practice)
- Meagan Mauter (Civil and Environmental Engineering)
- Rosamond Naylor (Earth System Science)
- Julia Novy (Sustainability Science and Practice)
- Morgan O'Neill (Earth System Science)
- Hayagreeva Rao (Business)
- Deborah Rhode (Law)
- Burke Robinson (Management Science and Engineering)
- Lee Ross (Psychology)
- Matt Rothe (Sustainability Science and Practice and Earth Systems)
- Nikhil Sawe (Sustainability Science and Practice)
- Tina Seelig (Management Science and Engineering)
- Claude Steele (Psychology)
- Jenny Suckale (Geophysics)

- Barton Thompson (Law)
- Peter Vitousek (Biology)
- Jeremy Weinstein (Political Science)
- Mikael Wolfe (History)
- Gabrielle Wong-Parodi (Earth System Science)

Courses

SUST 210. Pursuing Sustainability: Managing Complex Social Environmental Systems. 3 Units.

This course provides a systems framework for understanding and managing social-environmental systems, with the ultimate goal of inclusive, equitable, intra- and intergenerational human well-being. It explores the roles of natural, human, social, technological and knowledge resources in supporting efforts toward sustainability, and examines the trade-offs, feedbacks, non-linearities and other interactions among different parts of complex systems that must be addressed to avoid unintended negative consequences for people and environment. Finally, it provides an overview of the tools, approaches, and strategies that assist with management of assets for sustainability goals. The course draws on readings from a variety of on-line sources as well as chapters and case studies provided in the required text. Priority given to SUST students. Enrollment open to seniors and graduate students only. Please contact program staff at rachelx@stanford.edu for permission code. Same as: ESS 230

SUST 220. Case Studies in Leading Change for Sustainability. 3 Units.

This course teaches essential leadership orientations and effective approaches for advancing sustainability globally. It examines case studies and examples of leading change in the private sector, and in cross-sector collaborations involving government, business and non-profit organizations. The course teaches students the Connect, Adapt and Innovate (CAN) orientations and other skills which enhance students' ability to cultivate resilience and well-being in their lives and to lead change in complex systems. Strategies and approaches studied include B Corporations, social entrepreneurship, indigenous community-business collaborations, biomimicry, circular economy, sharing economy, corporate sustainability strategy, the UN sustainable development goals, metrics of progress beyond GDP, and transformative multi-stakeholder partnerships. Through conceptual frameworks, hands-on exercises, class discussion, reflection and interactions with sustainability leaders, students practice decision-making under uncertainty, systems thinking, resilience thinking and transformative leadership. Working in teams, students will apply their learnings in collaborative class projects. To help cultivate a highly engaged course community, please send responses to the following questions to Julia Novy (julia3@stanford.edu); admitted students will receive a permission code to be used for course enrollment. 1. What is one of the most significant challenges you've faced and how did you approach it? 2. What would you like to get out of this course? 3. What will you contribute? 4. How can I create a welcoming, engaging, and meaningful online learning experience for you? Please share any best practices or tools you have used in other environments. Class will generally meet from 1:00-3:00PM PST once a week on Zoom, including time with guest sustainability leaders, but during some weeks, we will end by 2:30PM to leave time for group project work or asynchronous learning.

SUST 230. Innovating Large Scale Sustainable Transformations/ Collaborating for the Future. 3-4 Units.

The capacity to innovate system-level transformations is a crucial leadership modality in the face of complex systemic challenges. This class gives students the mindsets, theoretical framework, and hands-on experience in shaping innovative interventions that bring about scaled and profound transformations in the face of complex multi-factorial challenges. Students are immersed in the System Acupuncture Methodology, which combines systems thinking, strategy, design thinking, behavioral sciences, resilience theory, diffusion theory, decision theory, and a theoretical framework around scaled multi-stakeholder interventions. Tools and theories introduced in class will be used to structure large-scale transformations that simultaneously create sustainability and resilience on environmental, societal, and economic fronts. This project-based team-based class challenges students to find solutions for complex real-world challenges. Class meets in the spring quarter on Fridays 9:30am-4:20pm, weeks 1-9. Lunch will be provided. Final presentations on Friday of week 9, 3-7:30pm. Consent of instructor required. To be considered, please apply on the d.school website. Same as: ENVRES 380

SUST 231. FEED Lab: Food System Design & Innovation. 3-4 Units.

FEED Lab is a course in which entrepreneurial and motivated students, engaged industry-thought leaders, and deeply experienced and connected faculty work together to design solutions to some of the food system's most consequential problems. Whether you're passionate about transforming the food system, or merely curious explore it, all students in this course will leave with practical design skills, enhanced leadership abilities, and confidence that their work will leave a lasting impact on the organizations with whom we collaborate. Students who complete this course gain access to the broad network of the FEED Collaborative, whose mission is to equip and inspire the next generation of leaders in the food system, and to connect them to meaningful opportunities after Stanford. To learn more about the FEED Collaborative, visit <https://feedcollab.stanford.edu/>. This course requires an application, which can be found here: <https://forms.gle/5Rd93yVg8XjRCig26>. Same as: EARTHSYS 289

SUST 232. Design for Sustainable Impact. 3-4 Units.

Addressing sustainability challenges involves purposefully designing system level transformations amidst complexity, uncertainty, severe constraints, and entrenched behaviors. This class will introduce students to techniques, tools, and mental models from the design world to address scaled sustainability challenges. The class will combine elements from Design Thinking, Systems Acupuncture, Behaviorally Informed Design, User Experience Design, and Game Design. The class will use the UN 2030 Sustainable Development Goals as an underlying framework to design interventions towards integrated sustainable outcomes. Students will form small teams and will participate in a structured design process, where they will co-create a system transformation with an emphasis on Behavior Change directed at Sustainable Impact. The class is aimed at giving students an exposure to the type of creative team processes that they would have to lead in their careers as sustainability minded leaders.

SUST 240. Sustainability Leadership Practicum. 1-4 Unit.

The Sustainability Leadership Practicum provides an opportunity for students in the SUST master's program to practice, integrate and internalize core lessons from the program curriculum. Students will independently complete a 120-hour Practicum project of their own design, collaborating on a complex sustainability challenge with an outside partner and working through the types of constraints often faced by decision makers and leaders. Through the Practicum experience, students reflect on and exercise the knowledge, mindsets and practical skills developed through their SUST coursework, including the foundational program concepts of complex social-environmental systems, change leadership, and systems innovation and transformation. Ultimately, the Practicum is designed to develop each student's identity and capacity as a transformative leader through practice. While the Practicum can be carried out and the units earned at any time during the master's program, students are encouraged to start the planning process early, allowing plenty of time to forge a relationship with a partner organization and develop a thoughtful and feasible proposal (to be approved by program leadership and the student's advisor) prior to carrying out their Practicum fieldwork. Deliverables include a reflection paper and a 15-minute final presentation. This course does not convene in a classroom setting. Instead, students are expected to attend Practicum presentation events that will be hosted quarterly. Enrollment is limited to students in the SUST cotermin master's program. (Cardinal Course certified by the Haas Center).

SUST 261. Art and Science of Decision Making. 3-4 Units.

Common-sense rules and decision-making tools to achieve clarity of action for important decisions, from personal choices to organizational decisions about business strategies and public policies. The art of qualitative framing and structuring as well as the science of quantitative modeling and analysis. The essential focus, discipline, and passion needed to make high-quality decisions, and thereby increase the probability of desired outcomes. Effective normative techniques and efficient management processes for both analyzing complex decisions and implementing them in the face of an uncertain future world. Lecture topics include practical ways to: interact collaboratively with stakeholders, craft an inspirational vision, create viable alternatives, assess unbiased probabilistic information, clarify tangible and intangible preferences, develop appropriate risk/reward and portfolio models, evaluate strategies and policies across a realistic range of uncertain scenarios, analyze key sensitivities, appraise the value of gathering additional information, and build widespread commitment to implementation plans. Student teams present insights from their analyses of real decisions currently being made by business, nonprofit, and government organizations. Case studies about: energy economics, mine remediation, ocean resource preservation, bison brucellosis, nuclear waste storage, hurricane seeding, electric power production, environmental risk management, venture capital investments, and oil & gas options trading.

SUST 290. Curricular Practical Training. 1 Unit.

CPT course required for international students completing degree.

SUST 297. Introduction to Systems Transformation. 1 Unit.

This immersive course exposes students in the Sustainability Science and Practice cotermin master's program to systems thinking and innovation approaches that are needed in order to bring about large-scale system transformation. Scaled and complex challenges embodied in the U.N. Sustainable Development Goals are multi-stakeholder, multifactorial, inter-related, and systemic, and can only be addressed through innovations at the systems level. This hands-on session provides an introduction to innovation approaches and the mindsets that are needed to transform system behavior at scale in the real world. Students will identify skills that they will need to acquire in order to lead change toward a resilient and sustainable future. Course enrollment limited to SUST students. Please contact program staff at lauren.neville@stanford.edu for permission code. Instructors: Banny Banerjee and Annette Zou.

SUST 801. TGR PROJECT. 0 Units.