

Course Title: Recycling Marine Debris**Course Description:**

Recycling Marine Debris is a course designed for entrepreneurs, coastal community leaders, government representatives, recycling industry stakeholders, plastic manufacturing professionals, and educators who aim to turn marine debris challenges into sustainable opportunities. This interactive, field-oriented course provides an in-depth exploration of marine debris sources, hands-on experience with sorting and processing, insights into various recycling methods, and showcases innovative product development using recycled materials. Through guided facility tours, group discussions, and practical prototyping sessions, participants will gain the knowledge, skills, and confidence to integrate marine debris recycling into their operational workflows, ultimately contributing to environmental stewardship and community empowerment.

Key Learning Outcomes:

- Understand the origins and impacts of marine debris, focusing on the challenges facing coastal and island communities.
- Gain practical experience sorting, storing, and processing debris into a viable raw material suitable for recycling.
- Learn how to evaluate recycling methods and consider the implications of Life Cycle Assessment (LCA) for recycled products.
- Develop strategies for integrating recycled plastic into long-life infrastructure products and daily operations.
- Engage in product ideation and prototyping, turning collected marine debris into tangible, market-ready solutions.

Instructional Approach:

This course emphasizes hands-on learning, incorporating field excursions, facility tours, and active workshop sessions. Participants will benefit from short, focused lectures, interactive discussions, and group-based problem-solving activities. Key elements include examining real-world case studies, guided tours of the Kalihi Plastic Recycling Research Facility (PRRF) and a local waste-to-energy plant, beach debris collection, and subsequent material processing. By collaborating with peers, participants will refine their understanding of marine debris recycling, build valuable networks, and walk away with practical action plans suited to their local contexts.

Sample Course Activities & Topics

Activity Type	Sample Topics & Exercises	Learning Objectives
Foundational Learning	<ul style="list-style-type: none">- Defining key terms and concepts- Overview of marine debris challenges in Hawaii- Field and lab safety orientation- Participant introductions and goal setting	Gain a shared understanding of the local context, key terminology, and participant interests to guide learning experiences
Facility Visits & Operational Insights	<ul style="list-style-type: none">- Tour of the Plastic Recycling Research Facility (PRRF)- Observation of receiving, sorting, and storing logistics- Volunteer opportunities and Q&A sessions	Understand the logistics and real-world processes involved in marine debris recycling, building practical awareness, and forging potential partnerships
Recycling Methods & Life Cycle Assessments	<ul style="list-style-type: none">- Examination of various recycling methods (mechanical, chemical, etc.)- Discussion of benefits, challenges, and feasibility- Introduction to LCAs for evaluating environmental impacts	Evaluate different approaches to recycling, appreciate trade-offs, and understand how LCAs inform decision-making for sustainable practices and how to conduct them.
Waste-to-Energy Perspectives	<ul style="list-style-type: none">- waste-to-energy plant tour- Exploration of incineration vs. recycling trade-offs- Applying lessons to participants' own regions	Gain exposure to energy recovery methods, learn about policy and technology considerations, and contextualize these options within participants' home communities

Stakeholder Engagement & Infrastructure

- Lab tours and meetings with stakeholders (e.g., HDOT)
- Understanding infrastructural applications of recycled materials
- Insights into policy, regulation, and community involvement

Recognize the roles of various stakeholders, explore how recycled materials fit into infrastructure, and understand how to influence or adapt to policy contexts

Field Collection & Material Processing

- Hands-on beach debris collection
- Sorting and categorizing materials for processing
- Reflecting on marine debris supply chains

Develop practical field skills in identifying and collecting debris, understand initial processing steps, and appreciate how raw materials move through the recycling stream

Product Innovation & Market Feasibility

- Brainstorming sessions for new products made from recycled marine debris
- Discussing market feasibility and community benefits
- Exploring long-life infrastructure products and local implementation

Foster creativity and entrepreneurial thinking, envisioning how recycled materials can be turned into meaningful, market-ready products that benefit local communities

Prototyping & Action Planning

- Hands-on prototyping (if equipment is available)
- Presenting concepts and receiving feedback
- Reflecting on next steps, action plans, and networking opportunities

Transform ideas into tangible outcomes, practice communication and presentation skills, and leave the course with actionable strategies and industry connections