

ESM 282: Pollution Prevention

Syllabus, Spring 2025

Time & Place: Mon & Wed, 3:30-4:45pm, BH 1424 (no class 5/26)
Reading Quizzes: 6, unannounced.
Assignments: 2, see schedule below for start and submission dates.
Term Paper: Is due on Friday, June 6, 11:59pm.
Instructor: Roland Geyer, rgeyer@ucsb.edu
Grading: 6 reading quizzes (6 x 6%), 2 assignments (2 x 17%), 1 term paper (30%)

Course Book:

The Business of Less: The Role of Companies and Households on a Planet in Peril,
Roland Geyer, 2021, Routledge, London, UK

Access via: <https://reserves.library.ucsb.edu/ares/ares.dll?Action=10&Form=50&Value=117983>

| Date | Topics & Readings |
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| Session 1: Introduction | |
| Mon, 3/31 | Topics: <ul style="list-style-type: none">Industrial ecologyPollution control versus pollution prevention |
| Session 2: Why less? | |
| Wed, 4/2 | Topics: <ul style="list-style-type: none">Global fossil CO2 emissionsGlobal material productionGlobal gross domestic product Reading: <ul style="list-style-type: none">The Business of Less, Chapter 1 |
| Session 3: A brief history of business and the environment | |
| Mon, 4/7 | Topics: <ul style="list-style-type: none">The story of leaded gasolineThe modern environmental movementThe birth of corporate sustainability Reading: <ul style="list-style-type: none">The Business of Less, Chapter 2 |
| Session 4: It's not easy being green when you're color blind | |
| Wed, 4/9 | Topics: <ul style="list-style-type: none">What is a green product?What is a green company? Reading: <ul style="list-style-type: none">The Business of Less, Chapter 3 |

| Session 5: The problem with eco-efficiency | |
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| Mon, 4/14 | <p>Topics:</p> <ul style="list-style-type: none"> • The rebound effect • Absolute vs. relative decoupling <p>Reading:</p> <ul style="list-style-type: none"> • The Business of Less, Chapter 4 |
| Session 6: Life cycle assessment (LCA) | |
| Wed, 4/16 | <p>Topics:</p> <ul style="list-style-type: none"> • Environmental intensities, environmental assessments • System boundaries <p>Reading:</p> <ul style="list-style-type: none"> • White & Chester (2014) Framework of Life Cycle Assessment, Chapter 1 in: Environmental Life Cycle Assessment – Measuring the Environmental Performance of Products, Schenck & White, Editors (Eds.), American Center for Life Cycle Assessment. <p><i>Start first assignment</i></p> |
| Session 7: Material flow analysis (MFA) | |
| Mon, 4/21 | <p>Topics:</p> <ul style="list-style-type: none"> • Stocks, flows, processes • Use phase modeling • End-of-life modeling <p>Reading:</p> <ul style="list-style-type: none"> • Geyer (2020) A Brief History of Plastics, Chapter 2 in: Mare Plasticum – The Plastic Sea, Streit-Bianchi, Cimadevila & Trettnak (Eds.), Springer, Berlin, Germany. |
| Session 8: Why win-win won't work | |
| Wed, 4/23 | <p>Topics:</p> <ul style="list-style-type: none"> • Cost savings and indirect rebound • Making versus maximizing profit <p>Reading:</p> <ul style="list-style-type: none"> • The Business of Less, Chapter 5 <p><i>Submit first assignment</i></p> |
| Session 9: Net green | |
| Mon, 4/28 | <p>Topics:</p> <ul style="list-style-type: none"> • Car sharing case study • Net green analysis <p>Reading:</p> <ul style="list-style-type: none"> • The Business of Less, Chapter 6 <p><i>Start term paper</i></p> |

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| Session 10: Again – Part 1 | |
| Wed, 4/30 | <p>Topics:</p> <ul style="list-style-type: none"> • Circular economy / reuse and recycling / supply loops • Supply loop constraints <p>Reading:</p> <ul style="list-style-type: none"> • The Business of Less, Chapter 7 |
| Session 11: Again – Part 2 | |
| Mon, 5/5 | <p>Topics:</p> <ul style="list-style-type: none"> • Circular economy indicators • Circular economy rebound • Closed-loop versus open-loop recycling <p>Reading:</p> <ul style="list-style-type: none"> • Geyer, Kuczenski, Zink & Henderson (2015) Common Misconceptions about Recycling, Journal of Industrial Ecology 20(5): 1010-1017. |
| Session 12: Different – Part 1 | |
| Wed, 5/7 | <p>Topics:</p> <ul style="list-style-type: none"> • Material, product, technology substitution <p>Reading:</p> <ul style="list-style-type: none"> • The Business of Less, Chapter 8 |
| Session 13: Different – Part 2 | |
| Mon, 5/12 | <p>Topics:</p> <ul style="list-style-type: none"> • Environmental burden shifting revisited • Net green substitutions <p>Reading:</p> <ul style="list-style-type: none"> • Geyer (2016) The Industrial Ecology of the Automobile, Chapter 18 in: Taking Stock of Industrial Ecology, Clift & Druckman (Eds.), Springer, Berlin, Germany. <p><i>Start second assignment</i></p> |
| Session 14: Less | |
| Wed, 5/14 | <p>Topics:</p> <ul style="list-style-type: none"> • Dematerializing passenger transportation • Less input per output versus less output • The case of aluminum <p>Reading:</p> <ul style="list-style-type: none"> • The Business of Less, Chapter 9 |

| Session 15: Labor, not materials | |
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| Mon, 5/19 | <p>Topics:</p> <ul style="list-style-type: none"> • Production inputs (energy, materials, labor) • Reverse rebound effect • Ecological tax reform <p>Reading:</p> <ul style="list-style-type: none"> • The Business of Less, Chapter 10 <p><i>Submit second assignment</i></p> |
| Session 16: Policy for pollution prevention | |
| Wed, 5/21 | <p>Topics:</p> <ul style="list-style-type: none"> • Extended producer responsibility • Bans, mandates, incentives • Case study: Plastics <p>Reading:</p> <ul style="list-style-type: none"> • Pottinger, Geyer, Biyani, Martinez, Nathan, Morse, Liu, Hu, de Bruyn , Boettiger, Baker, McCauley (2024) Pathways to reduce global plastic waste mismanagement and greenhouse gas emissions by 2050, Science, 386(6726), 1168-1173. |
| Session 17: Net green for companies | |
| Wed, 5/28 | <p>Topics:</p> <ul style="list-style-type: none"> • Net green for households <p>Reading:</p> <ul style="list-style-type: none"> • The Business of Less, Chapter 11 |
| Session 18: Guest lecture | |
| Mon, 6/2 | <p>Decarbonization approaches in Google hardware Dr. Joe Palazzo Technical Program Manager - Environmental Sustainability, Google</p> |
| Session 19: Net green for households | |
| Wed, 6/4 | <p>Topics:</p> <ul style="list-style-type: none"> • Net green for households <p>Reading:</p> <ul style="list-style-type: none"> • The Business of Less, Chapter 12 |