

CLIMATE SYSTEM SCIENCE AND ENGINEERING (COURSE 1-12)

Climate System Science and Engineering (<https://catalog.mit.edu/interdisciplinary/undergraduate-programs/degrees/climate-system-science-engineering>)

Bachelor of Science in Climate System Science and Engineering

General Institute Requirements (GIRs)

The General Institute Requirements include a Communication Requirement that is integrated into both the HASS Requirement and the requirements of each major; see details below.

Summary of Subject Requirements	Subjects
Science Requirement	6
Humanities, Arts, and Social Sciences (HASS) Requirement; at least two of these subjects must be designated as communication-intensive (CI-H) to fulfill the Communication Requirement.	8
Restricted Electives in Science and Technology (REST) Requirement [can be satisfied with 18.03 and 12.003 in the departmental program]	2
Laboratory Requirement (12 units) [Laboratory Requirement (12 units) [can be satisfied with 1.108 in the Departmental Program]]	1
Total GIR Subjects Required for SB Degree	17

Physical Education Requirement

Swimming requirement, plus four physical education courses for eight points.

Departmental Program

Choose at least two subjects in the major that are designated as communication-intensive (CI-M) to fulfill the Communication Requirement.

Foundational Analytical and Computational Requirements	Units
1.010A Probability: Concepts and Applications & 1.010B and Causal Inference for Data Analysis or 6.3700 Introduction to Probability	12
1.073 Introduction to Environmental Data Analysis or 1.074 Multivariate Data Analysis	6
6.100A Introduction to Computer Science Programming in Python	6

or 6.100L	Introduction to Computer Science and Programming	
6.100B	Introduction to Computational Thinking and Data Science	6
or CSE.C20[J]	Introduction to Computational Science and Engineering	
18.03	Differential Equations	12
Core Climate Requirements		
<i>Atmosphere, Ocean and Climate Dynamics</i>		
12.003	Introduction to Atmosphere, Ocean, and Climate Dynamics	12
<i>Computational Methods for Sustainability</i>		
1.020	Modeling and Decision-Making for Sustainability	12
<i>Physics of Low Carbon Energy Systems</i>		
1.086	Physics and Engineering of Renewable Energy Systems	12
<i>Climate Policy (choose one)</i>		
1.067[J]	Energy Systems for Climate Change Mitigation	
12.385	Science, Politics, and Environmental Policy	
11.169	Global Climate Policy and Sustainability	
14.42	Environmental Policy and Economics	
11.165	Urban Energy Systems and Policy	
14.44[J]	Energy Economics and Policy	
15.0201[J]	Economics of Energy, Innovation, and Sustainability	
<i>Global Carbon Cycle & Climate Science (choose one)</i>		
12.349	Mechanisms and Models of the Global Carbon Cycle	12
1.076	Carbon Management	
12.301	Climate Science	
<i>Group Design</i>		
1.108	Climate and Sustainability Lab (CI-M)	12
<i>CI-M Lab (choose one)</i>		
12.307	Weather and Climate Laboratory (CI-M)	
12.335	Experimental Atmospheric Chemistry (CI-M)	
1.101 & 1.102	Introduction to Civil and Environmental Engineering Design and Introduction to Civil and Environmental Engineering Design II (CI-M)	
1.106 & 1.107	Environmental Fluid Mechanics Lab and Water and Air Quality Laboratory (CI-M)	

Restricted Electives

Select at least 42 units from the list below.	42
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Units in Major	168
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Unrestricted Electives	48
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Units in Major That Also Satisfy the GIRs	(36)
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Total Units Beyond the GIRs Required for SB Degree	180
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The units for any subject that counts as one of the 17 GIR subjects cannot also be counted as units required beyond the GIRs.

Restricted Electives**Humanities, Social Science, and Economics***Policy*

11.003[J]	Methods of Policy Analysis
11.148	Environmental Justice: Law and Policy
11.165	Urban Energy Systems and Policy
11.169	Global Climate Policy and Sustainability
12.385	Science, Politics, and Environmental Policy
14.42	Environmental Policy and Economics
14.44[J]	Energy Economics and Policy
17.30[J]	Making Public Policy
17.181	Sustainability: Political Economy, Science, and Policy
IDS.055[J]	Science, Technology, and Public Policy
IDS.060[J]	Environmental Law, Policy, and Economics: Pollution Prevention and Control
IDS.062[J]	Global Environmental Negotiations
IDS.063[J]	People and the Planet: Environmental Governance and Science

Ethics

1.082	Ethics for Engineers
24.03	Good Food: The Ethics and Politics of Food
24.191	Being, Thinking, Doing (or Not): Ethics in Your Life
24.233	The Ethics of Climate Change

Climate in the Humanities

3.982	The Ancient Andean World
3.983	Ancient Mesoamerican Civilization
4.211[J]	The Once and Future City
11.011	The Art and Science of Negotiation
12.386[J]	Environment and History

21A.155	Food, Culture, and Politics
21A.303[J]	The Anthropology of Biology
21A.312	Planetary Change and Human Health
21A.407[J]	Gender, Race, and Environmental Justice
21A.410	Environmental Struggles
21H.186	Nature and Environment in China
21H.187	US Environmental Governance: from National Parks to the Green New Deal
21H.383	Technology and the Global Economy, 1000-2000
21L.449	The Wilds of Literature
21W.012	Writing and Rhetoric: Food for Thought
21W.036	Science Writing and New Media: Writing and the Environment
21W.775	Writing about Nature and Environmental Issues
22.04[J]	Social Problems of Nuclear Energy
CMS.374[J]	Transmedia Art, Extraction, and Environmental Justice
CMS.375	Reading Climate Through Media
EC.701[J]	D-Lab: Development
STS.021[J]	Science Activism: Gender, Race, and Power
STS.034	Science Communication: A Practical Guide

Foundational Science*Earth Science*

1.018[J]	Fundamentals of Ecology
1.080	Chemicals in the Environment
1.089	Environmental Microbial Biogeochemistry
12.001	Introduction to Geology
12.002	Introduction to Geophysics and Planetary Science
12.007	Geobiology: History of Life on Earth
18.352[J]	Nonlinear Dynamics: The Natural Environment

Climate and Atmospheric Chemistry

1.071[J]	Global Change Science
1.085[J]	Air Pollution and Atmospheric Chemistry
12.306	Atmospheric Chemistry Models & Climate
12.377	The History of Earth's Climate

Modeling & Computation

12.086	Modeling Environmental Complexity
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4.432	Modeling Urban Energy Flows for Sustainable Cities and Neighborhoods	6.1220[J]	Design and Analysis of Algorithms
6.C01	Modeling with Machine Learning: from Algorithms to Applications	6.1020	Software Construction
1.C01	Machine Learning for Sustainable Systems	6.1040	Software Design
15.8731	System Dynamics: Tools for Solving Complex Problems	6.1060	Software Performance Engineering
6.3400	Introduction to EECS via Communication Networks	6.1100	Computer Language Engineering
6.9010	Introduction to EECS via Interconnected Embedded Systems	6.1920	Constructive Computer Architecture
6.9080	Introduction to EECS via Robotics	6.4200[J]	Robotics: Science and Systems
6.1200[J]	Mathematics for Computer Science	6.4550[J]	Interactive Music Systems
6.1910	Computation Structures	6.5081	Multicore Programming
6.3700	Introduction to Probability	Climate Mitigation and Adaptation	
6.3800	Introduction to Inference	<i>Greenhouse Gas Emissions and Energy</i>	
6.4100	Artificial Intelligence	2.60[J]	Fundamentals of Advanced Energy Conversion
18.200	Principles of Discrete Applied Mathematics	2.652[J]	Applications of Energy in Global Development
18.200A	Principles of Discrete Applied Mathematics	3.002	Materials for Energy and Sustainability
18.211	Combinatorial Analysis	3.18	Materials Science and Engineering of Clean Energy
6.1210	Introduction to Algorithms	5.371	Continuous Flow Chemistry: Sustainable Conversion of Reclaimed Vegetable Oil into Biodiesel
6.1010	Fundamentals of Programming	5.372	Chemistry of Renewable Energy
6.1220[J]	Design and Analysis of Algorithms	8.21	Physics of Energy
6.1400[J]	Computability and Complexity Theory	10.04	A Philosophical History of Energy
6.1800	Computer Systems Engineering	10.05	Foundational Analyses of Problems in Energy and the Environment
6.3730[J]	Statistics, Computation and Applications	12.021	Earth Science, Energy, and the Environment
6.3900	Introduction to Machine Learning	14.43[J]	Economics of Energy, Innovation, and Sustainability
6.4120[J]	Computational Cognitive Science	22.081[J]	Introduction to Sustainable Energy
6.4400	Computer Graphics	EC.711[J]	Introduction to Energy in Global Development
6.4530[J]	Principles and Practice of Assistive Technology	IDS.065[J]	Energy Systems for Climate Change Mitigation
6.5151	Large-scale Symbolic Systems	<i>Design</i>	
6.5831	Database Systems	1.005	Experiential Sustainability
6.8301	Advances in Computer Vision	1.006	Tools for Sustainable Design
6.8371	Digital and Computational Photography	1.013	Senior Civil and Environmental Engineering Design
6.8611	Quantitative Methods for Natural Language Processing	1.103[J]	Infrastructure Design for Climate Change
6.8701[J]	Computational Biology: Genomes, Networks, Evolution	4.657	Design: The History of Making Things
6.8711[J]	Computational Systems Biology: Deep Learning in the Life Sciences	10.496[J]	Design of Sustainable Polymer Systems
18.404	Theory of Computation	22.033	Nuclear Systems Design Project

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1.UAR[J]	Climate and Sustainability Undergraduate Advanced Research
EC.713[J]	D-Lab Schools: Building Technology Laboratory
EC.720[J]	D-Lab: Design
<i>Water & Hydrology</i>	
1.061	Transport Processes in the Environment
or 1.061A	Transport Processes in the Environment I
1.070A[J]	Introduction to Hydrology and Water Resources
1.070B[J]	Introduction to Hydrology Modeling
12.104	Geochemistry of Natural Waters
12.372	Elements of Modern Oceanography
12.390	Fluid Dynamics of the Atmosphere and Ocean
EC.715	D-Lab: Water, Sanitation and Hygiene
EC.719	D-Lab: Climate Change and Planetary Health
<i>Structures & Materials</i>	
1.035	Mechanics of Materials
3.081	Industrial Ecology of Materials
3.094[J]	Materials in Human Experience
3.19	Sustainable Chemical Metallurgy
4.218	Disaster Resilient Design
4.401	Environmental Technologies in Buildings
11.123	Big Plans and Mega-Urban Landscapes
<i>Transportation & Supply Chain</i>	
11.149	Decarbonizing Urban Mobility
11.158	Behavioral Science, AI, and Urban Mobility
EC.733[J]	D-Lab: Supply Chains
<i>Business & Innovation</i>	
1.004	Startup Sustainable Tech