

Department of Earth Sciences Courses List (2012-2022) – Master Program

Note :

1. The number with the break () indicates the credits.
2. Color Code: **Eligible Course**, **Astronomy**, **Atmospheric Science**, **Geology**, **Geophysics**, **Ocean**, **Sci. Edu.**, **Integrated Course**.
3. Course with “*” are Undergraduate-Master Joint Courses; course with “#” are Master-Doctoral Joint Courses; courses in bold and italic are taught in English in the corresponding semester.

101-1 (2012 Fall)	Required	Selected
ASTRONOMY	Seminar(I)(1) Seminar(III)(1)	Advanced Astronomical Observations(3)# Advanced Astrophysics(3)# Interstellar Medium(3)# <i>Tools for Modern Astronomy(3)#</i>
ATMOSPHERIC SCIENCES		Climatology(3)* Synoptic Meteorology(3)* Boundary Layer Meteorology(3) Research Methodologies in Atmospheric Sciences(3)#
GEOLOGY		Geodynamics(3) * Mineralogy(including Lab.)(3)* <i>Planetary Geology(3) *</i> Advanced Petroleum Geology(3)# Core-Log Integration(3)# Earth Sciences and Archaeology(3)#
GEOPHYSICS		Earth Science Data Processing(3) * Gravity and Geomagnetism(2)# Gravity and Geomagnetism Laboratory(1)# Inverse Theory(3)# The Dynamics of Fault Zone(3)#
OCEANOGRAPHY		Introduction to Marine Chemistry(3) * Physical Oceanography(3) *
EDUCATION		Curriculum Design in Earth Sciences(3) *
101-2 (2013 Spring)	Required	Selected
ASTRONOMY	Seminar(II)(1) Seminar(IV)(1)	Active Galaxies(3)* Radio Astronomy(3) * <i>High Energy Astrophysics(3)#</i> <i>Introduction to Modern Cosmology(3)#</i>
ATMOSPHERIC SCIENCES		Meteorological Statistics(3)* Advanced Synoptic Meteorology(3)# Topics in Monsoon Dynamics(3)#
GEOLOGY		Advanced Field Geological Techniques(3) * Field Geology(including Lab.)(3) * <i>Geochemistry(3) *</i> Petrology(including Lab.)(3) * Stable Isotope Geology(3) *

		Regional Geology(3)#
GEOPHYSICS		Earthquakes of the Week(3) * Geophysical Methods(3) * Paleomagnetism(3) * Seismic Stratigraphy(2)# Seismic Stratigraphy Laboratory(1)#
OCEANOGRAPHY		Satellite Remote Data Analysis (I) (3)# Applied Numerical Methods in Oceanography (3)#
102-1 (2013 Fall)	Required	Selected
ASTRONOMY	Seminar(I)(1) Seminar(III)(1)	Advanced Astrophysics(3)# Advanced Astronomical Observations(3)# Interstellar Medium(3)# <i>Tools for Modern Astronomy(3)#</i>
ATMOSPHERIC SCIENCES		Climatology(3)* Synoptic Meteorology(3)* Meso-scale Meteorology# Advanced Dynamic Meteorology(3)# Research Methodologies in Atmospheric Sciences(3)# Topics in Numerical Weather Prediction(3)#
GEOLOGY		Mineralogy(including Lab.)(3)* Structural Geology(including Lab.)(3)* <i>Continent and Supercontinent Evolution(3)*</i> <i>Geo-technical Writing(3)#</i> <i>Micro-Structural Geology(3)#</i> Advanced Geothermics(3)#
GEOPHYSICS		<i>Earth Science Data Processing(3)*</i> Engineering Geophysics(3)#
OCEANOGRAPHY		Ocean Circulation(3)* Numerical Ocean Circulation Modeling (3)#
102-2 (2014 Spring)	Required	Selected
ASTRONOMY	Seminar(II)(1)	NA
ATMOSPHERIC SCIENCES	Seminar(IV)(1)	Meteorological Statistics(3)* Tropical Meteorology(3)* Boundary Layer Meteorology(3)
GEOLOGY		Field Geology(including Lab.)(3)* <i>Geochemistry(3)*</i> Geological Survey(3)* Petrology(including Lab.)(3)* Sedimentology and Stratigraphy(3)* Petrographic Methods(3)# Strain Analysis(3)# <i>Stress Regimes in Lithosphere(3)#</i>
GEOPHYSICS		Earthquakes of the Week(3)* Paleomagnetism(3)* Seismotectonics(3)*

		Inverse Theory(3)#
OCEANOGRAPHY		Innovation Trends in Oceanography(3)* Satellite Remote Data Analysis (I)(3)# Climatic and Oceanic Variability(3)#
EDUCATION		Historical Perspectives on Science Development(3)*
103-1 (2014 Fall)	Required	Selected
ASTRONOMY	Seminar(I)(1) Seminar(III)(1)	Open Cluster(3) Advanced Astrophysics(3)# Advanced Astronomical Observations(3)# <i>Interstellar Medium(3)#</i>
ATMOSPHERIC SCIENCES		Climatology(3)* Numerical Weather Prediction(3)* Synoptic Meteorology(3)* Climate Change(3)# Research Methodologies in Atmospheric Sciences(3)#
GEOLOGY		Geodynamics(3)* <i>Planetary Geology(3)*</i> Stable Isotope Geology(3)* Structural Geology(including Lab.)(3)* Advanced Marine Geology(3)# Core-Log Integration(3)# Earth Sciences and Archaeology(3)#
GEOPHYSICS		Sesimomagnetism(II)(3)#
OCEANOGRAPHY		Introduction to Marine Chemistry(3)* Introduction to Marine Physics(3)* Applied Numerical Methods in Oceanography (3)#
103-2 (2015 Spring)	Required	Selected
ASTRONOMY	Seminar(II)(1) Seminar(IV)(1)	Active Galaxies(3)* Radio Astronomy(3)* <i>High Energy Astrophysics(3)#</i>
ATMOSPHERIC SCIENCES		Atmospheric Dynamics(II)(3)* Meteorological Statistics(3)* Tropical Meteorology(3)* Advanced Synoptic Meteorology(3)# Topics in Meteorological Phenomena in Eastern Asia(3)#
GEOLOGY		Advanced Field Geological Techniques(3)* Paleomagnetism(3)* Petrology(including Lab.)(3)* Petrographic Methods(3)# Regional Geology(3)# Stress Regimes in Lithosphere(3)#
GEOPHYSICS		Advanced Geophysics (3)# Theoretical Geophysics (3)#
OCEANOGRAPHY		Satellite Remote Data Analysis (I) (3)#
EDUCATION		Historical Perspectives on Science Development(3)*

		Cognition and Instruction(3)#
104-1 (2015 Fall)	Required	Selected
ASTRONOMY	Seminar(I)(1) Seminar(III)(1)	The structure and Kinematics of the Galaxy(3) Advanced Astrophysics(3)# AdvancedAstronomical Observations(3)# <i>Interstellar Medium(3)#</i>
ATMOSPHERIC SCIENCES		Climatology(3)* Synoptic Meteorology(3)* Meso-scale Meteorology(3)# Research Methodologies in Atmospheric Sciences(3)# Statistical Analysis in Climate Research(3)# Topics in Monsoon Dynamics(3)# Topics in Numerical Weather Prediction(3)#
GEOLOGY		<i>Geochemistry(3)*</i> <i>Stable Isotope Geology(3)*</i> Structural Geology(including Lab.)(3)*
GEOFYSICS		Engineering Geophysics(3)#
OCEANOGRAPHY		Introduction to Marine Chemistry(3)* Introduction to Marine Physics(3)* Marine Environmental Education (3)# Ocean Dynamics (3)#
104-2 (2016 Spring)	Required	Selected
ASTRONOMY	Seminar(II)(1) Seminar(IV)(1)	Radio Astronomy(3)* <i>Tools for Modern Astronomy(3)#</i>
ATMOSPHERIC SCIENCES		Atmospheric Dynamics(II)(3)* Meteorological Statistics(3)* Advanced Synoptic Meteorology(3)# Geophysical Fluid Dynamics(3)#
GEOLOGY		<i>Continent and Supercontinent Evolution(3)*</i> Field Geology(including Lab.)(3)* 、 <i>Geological Survey(3)*</i> <i>Stress Regimes in Lithosphere(3)#</i>
GEOFYSICS		Earthquakes of the Week(3)* Paleomagnetism(3)* Seismotectonics(3)* Time Series Analysis (3)#
OCEANOGRAPHY		Ocean Circulation(3)* Applied Numerical Methods in Oceanography (3)# Climatic and Oceanic Variability (3)#
EDUCATION		Historical Perspectives on Science Development(3)*
105-1 (2016 Fall)	Required	Selected
ASTRONOMY	Seminar(I)(1) Seminar(III)(1)	Active Galaxies(3)* Advanced Astrophysics(3)# Advanced Astronomical Observations(3)# <i>Interstellar Medium(3)#</i>
ATMOSPHERIC		Climatology(3)*

SCIENCES		Numerical Weather Prediction(3)* Synoptic Meteorology(3)* Meso-scale Meteorology(3)# Geophysical Fluid Dynamics(3)#
GEOLOGY		<i>Economic Geology(3)*</i> Petrology(including Lab.)(3)* <i>Stable Isotope Geology(3)*</i> <i>Core-Log Integration(3)#</i> Earth Sciences and Archaeology(3)# <i>Micro-Structural Geology(3)#</i>
GEOFYSICS		Topics on Seismology (3)#
OCEANOGRAPHY		Introduction to Marine Chemistry(3)* Introduction to Marine Physics(3)* Numerical Ocean Circulation Modeling(3)# Satellite Remote Data Analysis (I)#
EDUCATION		Historical Perspectives on Science Development(3)*
105-2 (2017 Spring)	Required	Selected
ASTRONOMY	Seminar(II)(1) Seminar(IV)(1)	Active Galaxies(3)* <i>Molecular Astrophysics(3)</i>
ATMOSPHERIC SCIENCES		Atmospheric Dynamics (II)(3)* Tropical Meteorology(3)* Advanced Synoptic Meteorology(3)# Research Methodologies in Atmospheric Sciences(3)# Statistical Analysis in Climate Research(3)# Boundary Layer Meteorology(3)
GEOLOGY		<i>Advanced Field Geological Techniques(3)*</i> Geology of Taiwan(3)* Mineralogy (including Lab.)(3)* <i>Geo-technical Writing(3)#</i> <i>Stress Regimes in Lithosphere(3)#</i>
GEOFYSICS		Earthquakes of the Week(3)* Seismotectonics(3)* Advanced Geophysics(3)#
OCEANOGRAPHY		Ocean Dynamics(3)* Satellite Oceanography(3)* Satellite Remote Data Analysis(I)(3)#
106-1 (2017 Fall)	Required	Selected
ASTRONOMY	Seminar(I)(1) Seminar(III)(1)	<i>Advanced Astronomical Observations(3)#</i> <i>Advanced Astrophysics(3)#</i>
ATMOSPHERIC SCIENCES		Synoptic Meteorology(3)* Geophysical Fluid Dynamics(3)# Meso-scale Meteorology(3)# Research Methodologies in Atmospheric Sciences(3)# Topics in Numerical Weather Prediction(3)#
GEOLOGY		<i>Geochemistry(3)*</i>

		Petrology(including Lab.)(3)* Stable Isotope Geology(3)* Structural Geology(including Lab.)(3)*
GEOPHYSICS		Theoretical Geophysics(3)#
OCEANOGRAPHY		Innovation Trends in Oceanography(3)* Introduction to Marine Physics(3)* Marine Environmental Education(3)#
EDUCATION		Cognition and Instruction(3)#
106-2 (2018 Spring)	Required	Selected
ASTRONOMY	Seminar(II)(1) Seminar(IV)(1)	Radio Astronomy(3)* Intergalactic Medium(3)#
ATMOSPHERIC SCIENCES		Atmospheric Dynamics(II)(3)* Climatology(3)* Meteorological Statistics(3)* Advanced Synoptic Meteorology(3)# Climate Change(3)#
GEOLOGY		Field Geology(including Lab.)(3)* Geological Survey(3)* Geology of Taiwan(3)* Mineralogy(including Lab.)(3)* Paleontology(including Lab.)(3)*
GEOPHYSICS		Paleomagnetism(3)* Seismotectonics(3)*
OCEANOGRAPHY		Satellite Remote Data Analysis (I)(3)#
INTEGRATED		Earth System and Comparative Planetology(3)*
107-1 (2018 Fall)	Required	Selected
ASTRONOMY	Seminar(I)(1) Seminar(III)(1)	Advanced Astrophysics(3)# Advanced Astronomical Observations(3)#
ATMOSPHERIC SCIENCES		Climatology(3)* Numerical Weather Prediction(3)* Synoptic Meteorology(3)* Geophysical Fluid Dynamics(3)# Simulation and Diagnosis of Mesoscale Weathers(2)# Statistical Analysis in Climate Research(3)#
GEOLOGY		Petrology(including Lab.)(3)* Planetary Geology(3)* Stable Isotope Geology(3)* Structural Geology(including Lab.)(3)* Core-Log Integration(3)# Earth Sciences and Archaeology(3)#
GEOPHYSICS		Earthquakes of the Week(3)*
OCEANOGRAPHY		Ocean Circulation(3)* Introduction to Marine Physics(3)* Marine Environmental Education(3)#
INTEGRATED		Scientific Field Expeditions of Earth Systems(3)*
107-2	Required	Selected

(2019 Spring)		
ASTRONOMY	Seminar(II)(1) Seminar(IV)(1)	Active Galaxies(3)* <i>Radio Astronomy(3)*</i> <i>Interstellar Medium(3)#</i>
ATMOSPHERIC SCIENCES		Tropical Meteorology(3)* Atmospheric Dynamics (II)(3)* Advanced Synoptic Meteorology(3)* <i>Research Methodologies in Atmospheric Sciences(3)#</i>
GEOLOGY		Petrology (including Lab.)(3)* Geodynamics(3)* Field Geology(including Lab.)(3)* Advanced Field Geological Techniques(3)* Sedimentology and Stratigraphy(3)* <i>Continent and Supercontinent Evolution(3)*</i> Principle of Geotechnical Engineering(3)* Geology of Taiwan(3)* <i>Stress Regimes in Lithosphere(3)#</i>
GEOPHYSICS		Topics in Geophysics(3)* Physics and Chemistry of the Earth's Interior(3)* Seismotectonics(3)*
OCEANOGRAPHY		Water Wave Theory(3)* Satellite Remote Data Analysis (I)(3)#
INTEGRATED		Earth System and Comparative Planetology(3)*
108-1 (2019 Fall)	Required	Selected
ASTRONOMY	Seminar(I)(1) Seminar(III)(1)	<i>Advanced Astrophysics(3)#</i> <i>Advanced Astronomical Observations(3)#</i>
ATMOSPHERIC SCIENCES		Climatology(3)* Synoptic Meteorology(3)* Topics in Meteorological Phenomena in Eastern Asia(3)# Geophysical Fluid Dynamics(3)# Research Methodologies in Atmospheric Sciences(3)#
GEOLOGY		<i>Geochemistry(3)*</i> Mineralogy (including Lab.)(3)* Structural Geology(including Lab.)(3)* Introduction to Petroleum Geology (3)* <i>Core-Log Integration(3)#</i>
GEOPHYSICS		Earth Science Data Processing(3)* Earthquakes of the Week(3)* <i>Theoretical Geophysics(3)#</i>
OCEANOGRAPHY		Ocean Circulation(3)* Introduction to Marine Physics(3)* Innovation Trends in Oceanography(3)* Marine Environmental Education(3)#
INTEGRATED		Earth Science Practicum(II)(3)*
108-2 (2020 Spring)	Required	Selected

ASTRONOMY	Seminar(II)(1) Seminar(IV)(1)	Intergalactic Medium (3)# <i>Open Cluster (3)</i>
ATMOSPHERIC SCIENCES		Advanced Synoptic Meteorology(3)# Climate Change(3)# Meteorological Statistics(3)* Atmospheric Dynamics (II) (3)*
GEOLOGY		Stable Isotope Geology(3)* Petrology (including Lab.) (3)* Field Geology (including Lab.) (3)* Geology of Taiwan(3)* Principle of Geotechnical Engineering(3)* <i>Economic Geology(3)*</i>
GEOFYSICS		Seismotectonics(3)* Paleomagnetism(3)* Geophysical Planetary Exploration(3)*
OCEANOGRAPHY		Water Wave Theory(3)* Satellite Remote Data Analysis (I)(3)#
INTEGRATED		Earth System and Comparative Planetology(3)*
109-1 (2020 Fall)	Required	Selected
ASTRONOMY	Seminar(I)(1) Seminar(III)(1)	Advanced Astronomical Observations(3)# Advanced Astrophysics(3)# High Energy Astrophysics(3)# Radio Astronomy(3)* <i>Statistics for Astronomy(3)#</i>
ATMOSPHERIC SCIENCES		Climatology(3)* Geophysical Fluid Dynamics(3)# Synoptic Meteorology(3)* Statistical Analysis in Climate Research(3)# Research Methodologies in Atmospheric Sciences(3)#
GEOLOGY		<i>Advanced Igneous Petrology(3)#</i> <i>Geochemistry (3)*</i> Introduction to Petroleum Geology(3)* <i>Micro-Structural Geology(3)#</i> Mineralogy (including Lab.)* Sedimentology and Stratigraphy(3)* Structural Geology (including Lab.) (3)*
GEOFYSICS		Earthquakes of the Week(3)* Earth Science Data Processing(3)* The Dynamics of Fault Zone(3)#
OCEANOGRAPHY		Innovation Trends in Oceanography(3)* Introduction to Marine Physics(3)* Marine Environmental Education(3)# Ocean Circulation(3)*
INTEGRATED		Earth Science Practicum (II) (3)* Introduction to Marine Geology(3)* Scientific Field Expeditions of Earth Systems) (3)*
109-2	Required	Selected

(2021 Spring)		
ASTRONOMY	Seminar(II)(1) Seminar(IV)(1)	Active Galaxies(3)*
ATMOSPHERIC SCIENCES		Atmospheric Dynamics (II)(3)*
GEOLOGY		Continent and Supercontinent Evolution(3)* Earth Science Aspects of Renewable Energy(3)* Field Geology (including Lab.)(3)* Geodynamics(3)* Geology of Taiwan(3)* Petroleum Geochemistry(3)* Petrology (including Lab.)(3)* Principle of Geotechnical Engineering(3)* Regional Geology(3)* Strain Analysis(3)#
GEOPHYSICS		Geophysical Planetary Exploration(3)* Physics and Chemistry of the Earth's Interior(3)* Topics on Seismology(3)#
OCEANOGRAPHY		Satellite Data Analysis Techniques Applied to Oceanography(3)* Tropical Meteorology(3)*
INTEGRATED		Earth System and Comparative Planetology(3)*
110-1 (2021 Fall)	Required	Selected
ASTRONOMY	Seminar(I)(1) Seminar(III)(1)	Advanced Astronomical Observations(3)# Advanced Astrophysics (3)# Radio Astronomy(3)*
ATMOSPHERIC SCIENCES		Advanced Synoptic Meteorology(3)# Fluid Climatology(3)* Geophysical Fluid Dynamics(3)# Meso-scale Meteorology(3)# Research Methodologies in Atmospheric Sciences(3)#
GEOLOGY		Advanced Structural Geology(3)# Core-Log Integration(3)# Geochemistry(3)* Introduction to Petroleum Geology(3)* Mineralogy (including Lab.)(3)* Quaternary Geology and Environmental Changes(3)# Structural Geology (including Lab.)(3)* Sequence Stratigraphy(3)#
GEOPHYSICS		Earthquakes of the Week(3)* Earth Science Data Processing(3)* Theoretical Geophysics(3)# Time Series Analysis(3)*
OCEANOGRAPHY		Introduction to Marine Physics(3)* Innovation Trends in Oceanography(3)* Marine Environmental Education(3)# Marine Resources and Sustainable Development(3)*

		Ocean Circulation(3)*
INTEGRATED		NA
110-2 (2022 Spring)	Required	Selected
ASTRONOMY	Seminar(II)(1) Seminar(IV)(1)	
ATMOSPHERIC SCIENCES		Meteorological Statistics(3)* Planetary Geology(3)* Atmospheric Dynamics (II)(3)* Statistical Analysis in Climate Research(3)# <i>Climate Change(3)#</i>
GEOLOGY		<i>Stable Isotope Geology(3)*</i> Petrology (including Lab.)(3)* Field Geology (including Lab.)(3)* <i>Planetary Geology(3)*</i> Sedimentology and Stratigraphy(3)* Geological Survey(3)* Geology of Taiwan(3)* Principle of Geotechnical Engineering(3)* Petroleum Geochemistry(3)* Earth Science Aspects of Renewable Energy(2)* <i>Geo-technical Writing(3)#</i> <i>Stress Regimes in Lithosphere(3)#</i>
GEOFYSICS		Geophysical Planetary Exploration(3)*
OCEANOGRAPHY		Satellite Data Analysis Techniques Applied to Oceanography(3)*
INTEGRATED		Introduction to Marine Geology(3)* Earth System and Comparative Planetology(3)* Inquiry and Practical Work in Science(2)*
111-1 (2022 Fall)	Required	Selected
ASTRONOMY	Seminar(I)(1) Seminar(III)(1)	Radio Astronomy(3)* Advanced Astrophysics(3)# Advanced Astronomical Observations(3)#
ATMOSPHERIC SCIENCES		Numerical Weather Prediction(3)* Synoptic Meteorology(3)* Meso-scale Meteorology(3)# Research Methodologies in Atmospheric Sciences(3)# Geophysical Fluid Dynamics(3)# Special Topic on Mei-Yu in Taiwan(2)#
GEOLOGY		Geodynamics(3)* Mineralogy (including Lab.)(3)* Structural Geology (including Lab.)(3)* Introduction to Petroleum Geology(3)* Petrographic Methods(3)# Earth Sciences and Archaeology(3)# <i>Core-Log Integration(3)#</i>
GEOFYSICS		Time Series Analysis(3)*

OCEANOGRAPHY
INTEGRATED

Earth Science Data Processing(3)* <i>Earthquakes of the Week(3)*</i>
Innovation Trends in Oceanography(3)* Introduction to Marine Physics(3)* Marine Resources and Sustainable Development(3)* Marine Environmental Education(3)#
Earth Science Practicum (II)(3)* Earth System Sciences and Disaster Risk Assessment(3)*