

# ATMOSPHERIC SCIENCES (ATM SCI)

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## ATM SCI 100 Survey of Meteorology

3 cr. Undergraduate.

Concepts and principles of meteorology; cyclones, fronts, thunderstorms, tornadoes, air pollution, and climate. Interpretation of weather maps, charts, and forecasts. 2 hrs lec, 2 hrs lab-dis.

**Prerequisites:** none.

**Course Rules:** Counts as repeat of 3 cr Atm Sci 100 taken for 4 cr.

**General Education Requirements:** NS+

**Last Taught:** Spring 2020, Fall 2019, Spring 2019, Fall 2018.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

## ATM SCI 106 Principles and Forecasting of the Weather

3 cr. Undergraduate.

What makes the weather, general circulation of the atmosphere, analysis of meteorological data and their use in predicting the weather.

**Prerequisites:** none.

**General Education Requirements:** NS

**Last Taught:** UWinteriM 2013, Summer 2012, UWinteriM 2012, Summer 2011.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

## ATM SCI 108 Rain and Snow

3 cr. Undergraduate.

Study of precipitation properties and processes in the atmosphere. Structure of precipitating systems ranging from small to large scale.

**Prerequisites:** none.

**General Education Requirements:** NS

**Last Taught:** Fall 1998, Fall 1997, Summer 1997, Spring 1997.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

## ATM SCI 109 Thunderstorms, Tornadoes and Hurricanes

3 cr. Undergraduate.

The study of basic processes that lead to dry and moist convection. Characteristic atmospheric structure and cloud microphysical processes that produce thunderstorms, tornadoes and hurricanes.

**Prerequisites:** none.

**General Education Requirements:** NS

**Last Taught:** Summer 2020, Spring 2020, UWinteriM 2020, Fall 2019.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

## ATM SCI 110 The Origin, Composition, and Structure of the Planetary Atmospheres

3 cr. Undergraduate.

Origin of the solar system, its planets, and planetary atmospheres.

**Prerequisites:** none.

**General Education Requirements:** NS

**Last Taught:** Summer 2020, Spring 2020, Fall 2019, Summer 2019.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

## ATM SCI 194 First-Year Seminar:

3 cr. Undergraduate.

Specific topics are announced in the Schedule of Classes each time the class is offered.

**Prerequisites:** none.

**Course Rules:** Open only to freshmen. Students may earn cr in just one L&S First-Year Sem (course numbers 192, 193, 194).

**General Education Requirements:** NS

**Last Taught:** Spring 2019, Fall 2016, Fall 2014, Fall 2012.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

## ATM SCI 199 Independent Study

1-3 cr. Undergraduate.

For further information, consult dept chair.

**Prerequisites:** 2.0 GPA; consent of instructor, department chair, and Assistant Dean for Student Academic Services.

**Course Rules:** May be retaken to 6 cr max.

**Last Taught:** Fall 2013, Spring 2013, Spring 2006, Fall 2005.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

## ATM SCI 240 Introduction to Meteorology

3 cr. Undergraduate.

Quantitative approach to understanding fundamental concepts in meteorology. Radiation, heat balance of the atmosphere, thermodynamics, horizontal motion, general circulation, atmospheric observations, clouds, weather map analysis.

**Prerequisites:** Physics 209(P) & 214(P); Math 232(C).

**Course Rules:** Not open for cr to students with Atm Sci 201.

**Last Taught:** Spring 2020, Spring 2019, Spring 2018, Spring 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

## ATM SCI 289 Internship in Atmospheric Sciences, Lower Division

1-6 cr. Undergraduate.

Application of basic knowledge of Atmospheric Sciences in business, organizational, educational, political or other appropriate setting.

**Prerequisites:** soph st.; 2.50 gpa; cons supervising faculty member.

**Course Rules:** One cr earned for academic work based on 40 hrs in internship. May be retaken to 6 cr max.

**Last Taught:** Spring 2015, Fall 2013, Fall 2012, Fall 2011.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

## ATM SCI 297 Study Abroad:

1-12 cr. Undergraduate.

Designed to enroll students in UWM sponsored program before course work level, content, and credits are determined and/or in specially prepared course work.

**Prerequisites:** acceptance for Study Abroad Prog.

**Course Rules:** May be retaken w/chg in topic.

**General Education Requirements:** NS

**Last Taught:** UWinteriM 2019, UWinteriM 2018, UWinteriM 2015, UWinteriM 2014.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

## ATM SCI 299 Ad Hoc:

1-6 cr. Undergraduate.

Course created expressly for offering in a specified enrollment period.

Requires only dept & assoc dean approval. In exceptional circumstances, can be offered in one add'l sem.

**Prerequisites:** none; add'l prereqs may be assigned to specific topic.

**Course Rules:** May be retaken w/chg in topic.

**Last Taught:** Spring 2019, Fall 2013, Fall 1994, Fall 1992.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 330 Air-Pollution Meteorology**

3 cr. Undergraduate/Graduate.

Pollutant sources and sinks, fundamental pollutant chemistry, monitoring techniques, averaging boundary layers and turbulence, diffusion theories, diffusion models, regional and global-scale pollution problems.

**Prerequisites:** Atm Sci 240(P); Chem 102(P); stats course recom.

**Last Taught:** Fall 2019, Fall 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 330G Air-Pollution Meteorology**

3 cr. Undergraduate/Graduate.

Pollutant sources and sinks, fundamental pollutant chemistry, monitoring techniques, averaging boundary layers and turbulence, diffusion theories, diffusion models, regional and global-scale pollution problems.

**Prerequisites:** Atm Sci 240(P); Chem 102(P); stats course recom.

**Last Taught:** Fall 2019, Fall 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 350 Atmospheric Thermodynamics**

3 cr. Undergraduate/Graduate.

Radiant energy, sensible heat, and atmospheric thermodynamics; the gas laws; hydrostatic and psychrometric equations; dry and moist convection; clouds and their physical and energy relations. Optional field exercise.

**Prerequisites:** jr st; Physics 210(P); Math 232(P); Atm Sci 240(P).

**Last Taught:** Fall 2019, Fall 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 350G Atmospheric Thermodynamics**

3 cr. Undergraduate/Graduate.

Radiant energy, sensible heat, and atmospheric thermodynamics; the gas laws; hydrostatic and psychrometric equations; dry and moist convection; clouds and their physical and energy relations. Optional field exercise.

**Prerequisites:** jr st; Physics 210(P); Math 232(P); Atm Sci 240(P).

**Last Taught:** Fall 2019, Fall 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 351 Dynamic Meteorology I**

3 cr. Undergraduate/Graduate.

The role of dynamics in atmospheric physics; equations of motion; symmetric circulation models; gravity waves; Rossby waves, quasi-geostrophy; introduction to instability of atmospheric flows.

**Prerequisites:** jr st; Atm Sci 240(P); Math 233(P).

**Last Taught:** Fall 2018, Fall 2016.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 351G Dynamic Meteorology I**

3 cr. Undergraduate/Graduate.

The role of dynamics in atmospheric physics; equations of motion; symmetric circulation models; gravity waves; Rossby waves, quasi-geostrophy; introduction to instability of atmospheric flows.

**Prerequisites:** jr st; Atm Sci 240(P); Math 233(P).

**Last Taught:** Fall 2018, Fall 2016.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 352 Dynamic Meteorology II**

3 cr. Undergraduate/Graduate.

Circulation, vorticity, potential vorticity; shallow water equations: Poincare, Kelvin, and Rossby waves, energy and enstrophy; quasi-geostrophy for a stratified atmosphere; barotropic and baroclinic instability.

**Prerequisites:** jr st; Atm Sci 351(P); Math 234(P).

**Last Taught:** Spring 2019, Spring 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 352G Dynamic Meteorology II**

3 cr. Undergraduate/Graduate.

Circulation, vorticity, potential vorticity; shallow water equations: Poincare, Kelvin, and Rossby waves, energy and enstrophy; quasi-geostrophy for a stratified atmosphere; barotropic and baroclinic instability.

**Prerequisites:** jr st; Atm Sci 351(P); Math 234(P).

**Last Taught:** Spring 2019, Spring 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 360 Synoptic Meteorology I**

4 cr. Undergraduate/Graduate.

Fundamental principles; synoptic-scale structure and dynamics; equivalent barotropic model; vertical motions; introduction to and application of quasi-geostrophic theory.

**Prerequisites:** jr st; Math 232(P); Physics 210(P); Atm Sci 240(P).

**Last Taught:** Fall 2018, Fall 2016.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 360G Synoptic Meteorology I**

4 cr. Undergraduate/Graduate.

Fundamental principles; synoptic-scale structure and dynamics; equivalent barotropic model; vertical motions; introduction to and application of quasi-geostrophic theory.

**Prerequisites:** jr st; Math 232(P); Physics 210(P); Atm Sci 240(P).

**Last Taught:** Fall 2018, Fall 2016.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 361 Synoptic Meteorology II**

4 cr. Undergraduate/Graduate.

Extension of quasi-geostrophic theory to Q-vectors; isentropic potential vorticity applied to mid-latitude weather systems; fronts and jets.

**Prerequisites:** jr st; Atm Sci 360(P).

**Last Taught:** Spring 2019, Spring 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 361G Synoptic Meteorology II**

4 cr. Undergraduate/Graduate.

Extension of quasi-geostrophic theory to Q-vectors; isentropic potential vorticity applied to mid-latitude weather systems; fronts and jets.

**Prerequisites:** jr st; Atm Sci 360(P).

**Last Taught:** Spring 2019, Spring 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 381 Honors Seminar.**

3 cr. Undergraduate.

Selected topics.

**Prerequisites:** soph st; Honors 200(P); cons Honors College dir.

**Course Rules:** May be retaken w/chg in topic to 9 cr max.

**General Education Requirements:** NS

**Last Taught:** Spring 2020, Fall 2018, Spring 2018, Fall 2007.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 405 Atmospheric Science for in-Service Teachers:**

1-3 cr. Undergraduate/Graduate.

Basic, advanced or new topics in atmospheric sciences for in-service teachers.

**Prerequisites:** in-service teacher; add'l prereqs depending on topic.

**Course Rules:** May be retaken w/chg in topic to 9 cr max.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 405G Atmospheric Science for in-Service Teachers:**

1-3 cr. Undergraduate/Graduate.

Basic, advanced or new topics in atmospheric sciences for in-service teachers.

**Prerequisites:** in-service teacher; add'l prereqs depending on topic.

**Course Rules:** May be retaken w/chg in topic to 9 cr max.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 460 Mesoscale Circulations**

3 cr. Undergraduate/Graduate.

Theory, analysis and forecasting of mesoscale flows, including convective systems, polar lows, terrain and surface-forced flows, jet streams and hurricanes.

**Prerequisites:** jr st; Atm Sci 360(R) or cons instr.

**Last Taught:** Spring 2019, Spring 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 460G Mesoscale Circulations**

3 cr. Undergraduate/Graduate.

Theory, analysis and forecasting of mesoscale flows, including convective systems, polar lows, terrain and surface-forced flows, jet streams and hurricanes.

**Prerequisites:** jr st; Atm Sci 360(R) or cons instr.

**Last Taught:** Spring 2019, Spring 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 464 Physical Meteorology: Cloud Physics**

3 cr. Undergraduate/Graduate.

Formation of cloud droplets, droplet growth by condensation, formation of ice crystals, precipitation processes, weather radars, cloud models.

**Prerequisites:** jr st; Physics 210(P); Math 232(P); Atm Sci 350(P).

**Last Taught:** Spring 2020, Spring 2018.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 464G Physical Meteorology: Cloud Physics**

3 cr. Undergraduate/Graduate.

Formation of cloud droplets, droplet growth by condensation, formation of ice crystals, precipitation processes, weather radars, cloud models.

**Prerequisites:** jr st; Physics 210(P); Math 232(P); Atm Sci 350(P).

**Last Taught:** Spring 2020, Spring 2018.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 470 Tropical Meteorology**

3 cr. Undergraduate/Graduate.

Dynamics and energetics of tropical circulations. Origins and evolution of equatorial disturbances and easterly waves. Structure and dynamics of tropical cyclones. Hurricane modeling and prediction.

**Prerequisites:** Atm Sci 351(P) or 360(P).

**Last Taught:** Spring 2020.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 470G Tropical Meteorology**

3 cr. Undergraduate/Graduate.

Dynamics and energetics of tropical circulations. Origins and evolution of equatorial disturbances and easterly waves. Structure and dynamics of tropical cyclones. Hurricane modeling and prediction.

**Prerequisites:** Atm Sci 351(P) or 360(P).

**Last Taught:** Spring 2020.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 480 The General Circulation and Climate Dynamics**

3 cr. Undergraduate/Graduate.

Historical overview, the zonally symmetric circulation, momentum, heat and water budgets, stationary waves, the El Nino Southern oscillation, global warming, interpentadal variability in the North Atlantic.

**Prerequisites:** jr st; Atm Sci 351(P).

**Last Taught:** Spring 2020.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 480G The General Circulation and Climate Dynamics**

3 cr. Undergraduate/Graduate.

Historical overview, the zonally symmetric circulation, momentum, heat and water budgets, stationary waves, the El Nino Southern oscillation, global warming, interpentadal variability in the North Atlantic.

**Prerequisites:** jr st; Atm Sci 351(P).

**Last Taught:** Spring 2020.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 497 Study Abroad:**

1-12 cr. Undergraduate/Graduate.

Designed to enroll students in UWM sponsored program before course work level, content, and credits are determined and/or in specially prepared course work.

**Prerequisites:** jr st; acceptance for Study Abroad Prog.

**Course Rules:** May be retaken w/chg in topic.

**General Education Requirements:** NS

**Last Taught:** UWinteriM 2020, UWinteriM 2019.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 497G Study Abroad:**

1-12 cr. Undergraduate/Graduate.

Designed to enroll students in UWM sponsored program before course work level, content, and credits are determined and/or in specially prepared course work.

**Prerequisites:** jr st; acceptance for Study Abroad Prog.

**Course Rules:** May be retaken w/chg in topic.

**General Education Requirements:** NS

**Last Taught:** UWinteriM 2020, UWinteriM 2019.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 499 Ad Hoc:**

1-6 cr. Undergraduate.

Course created expressly for offering in a specified enrollment period. Requires only dept & assoc dean approval. In exceptional circumstances, can be offered in one add'l sem.

**Prerequisites:** jr st; add'l prereqs may be assigned to specific topic.

**Course Rules:** May be retaken w/chg in topic.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 500 Statistical Methods in Atmospheric Sciences**

3 cr. Undergraduate/Graduate.

Mathematical and statistical tools applicable to the investigation of atmospheric problems; the nature and treatment of atmospheric data.

**Prerequisites:** jr st; Atm Sci 240(P) or 350(P), & Math 232(P) or cons instr.**Last Taught:** Fall 2019.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 500G Statistical Methods in Atmospheric Sciences**

3 cr. Undergraduate/Graduate.

Mathematical and statistical tools applicable to the investigation of atmospheric problems; the nature and treatment of atmospheric data.

**Prerequisites:** jr st; Atm Sci 240(P) or 350(P), & Math 232(P) or cons instr.**Last Taught:** Fall 2019.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 505 Micrometeorology**

3 cr. Undergraduate/Graduate.

Surface energy budget; radiation balance and heat transfer; boundary-layer profiles of wind, temperature and moisture; turbulence and boundary-layer fluxes; evapotranspiration; special topics.

**Prerequisites:** jr st; Atm Sci 351(P) & 330(P).**Last Taught:** Fall 2018, Fall 2016.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 505G Micrometeorology**

3 cr. Undergraduate/Graduate.

Surface energy budget; radiation balance and heat transfer; boundary-layer profiles of wind, temperature and moisture; turbulence and boundary-layer fluxes; evapotranspiration; special topics.

**Prerequisites:** jr st; Atm Sci 351(P) & 330(P).**Last Taught:** Fall 2018, Fall 2016.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 511 Seminar in Atmospheric Radiation and Remote Sensing**

3 cr. Undergraduate/Graduate.

Basic laws of radiation, absorption and scattering, weather radar, retrieval of soundings, remote sensing and climate, weather satellites.

**Prerequisites:** jr st; Math 232(P); Atm Sci 350(P) & Physics 210(P).**Last Taught:** Spring 2020.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 511G Seminar in Atmospheric Radiation and Remote Sensing**

3 cr. Undergraduate/Graduate.

Basic laws of radiation, absorption and scattering, weather radar, retrieval of soundings, remote sensing and climate, weather satellites.

**Prerequisites:** jr st; Math 232(P); Atm Sci 350(P) & Physics 210(P).**Last Taught:** Spring 2020.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 520 Advanced Dynamic Meteorology**

3 cr. Undergraduate/Graduate.

Properties of atmospheric sound, gravity, Rossby waves. Baroclinic instability, cyclogenesis, frontogenesis, and the general circulation. Introduction to numerical prediction.

**Prerequisites:** jr st; Math 234(P), Atm Sci 350(P) & 351(P) or equiv.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 520G Advanced Dynamic Meteorology**

3 cr. Undergraduate/Graduate.

Properties of atmospheric sound, gravity, Rossby waves. Baroclinic instability, cyclogenesis, frontogenesis, and the general circulation. Introduction to numerical prediction.

**Prerequisites:** jr st; Math 234(P), Atm Sci 350(P) & 351(P) or equiv.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 599 Capstone Experience**

1 cr. Undergraduate.

Student writes a paper under supervision of an advisor on an approved topic not covered in the student's regular course work.

**Prerequisites:** sr st; cons instr.**Course Rules:** May be retaken w/chg in topic to 2 cr max.**Last Taught:** Spring 2020, Fall 2019, Spring 2018, Fall 2017.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 600 Data Analytics**

3 cr. Undergraduate/Graduate.

overs techniques used to analyze data and test scientific hypotheses for both diagnostic/understanding and prognostic/prediction applications, particularly in the atmospheric and related sciences.

**Prerequisites:** junior standing, or graduate standing, or consent of instructor.**Course Rules:** Counts as repeat of ATM SCI 690 with same topic.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 600G Data Analytics**

3 cr. Undergraduate/Graduate.

overs techniques used to analyze data and test scientific hypotheses for both diagnostic/understanding and prognostic/prediction applications, particularly in the atmospheric and related sciences.

**Prerequisites:** junior standing, or graduate standing, or consent of instructor.**Course Rules:** Counts as repeat of ATM SCI 690 with same topic.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 690 Seminar in Atmospheric Sciences:**

1-3 cr. Undergraduate/Graduate.

Intensive topical studies of currently active problem areas.

**Prerequisites:** jr st; cons instr.**Course Rules:** May be retaken w/chg in topic to 9 cr max. Satisfies L&S Seminar req.**Last Taught:** Fall 2018, Fall 2016.**Current Offerings:** <https://catalog.uwm.edu/course-search/>**ATM SCI 690G Seminar in Atmospheric Sciences:**

1-3 cr. Undergraduate/Graduate.

Intensive topical studies of currently active problem areas.

**Prerequisites:** jr st; cons instr.**Course Rules:** May be retaken w/chg in topic to 9 cr max. Satisfies L&S Seminar req.**Last Taught:** Fall 2018, Fall 2016.**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 695 Internship in Atmospheric Sciences, Upper Division**

1-6 cr. Undergraduate.

Application of advanced principles of atmospheric sciences in a business, organizational, educational, political or other appropriate setting.

**Prerequisites:** jr st; 300-level or above course in atm sci; 3.0 gpa in the major; cons supervising faculty.

**Course Rules:** One cr earned for 40 hrs work. May be retaken to 6 cr max.

**Last Taught:** Fall 2019, Summer 2019, Fall 2017, Spring 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 699 Advanced Independent Reading**

1-3 cr. Undergraduate.

Independent meteorological study.

**Prerequisites:** jr st, 2.0 GPA, consent of instructor, Department Chair, and Assistant Dean for Student Academic Services.

**Course Rules:** May be retaken with change in topic to 3 cr max.

**Last Taught:** Fall 2008, Spring 2007, Spring 2005, Spring 2004.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 700 Statistical Methods in Atmospheric Sciences II: Signal Detection**

3 cr. Graduate.

Fundamentals of signal detection in noisy multivariate space-time data sets; empirical orthogonal functions, singular value decomposition, maximum covariance analysis and canonical correlation analysis; Fourier analysis; singular and multivariate spectrum analysis.

**Prerequisites:** graduate standing in physical sciences or engineering.

**Course Rules:** Counts as a repeat of ATM SCI 950 with the same topic.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 705 Air Pollution Modeling**

3 cr. Graduate.

Computational techniques for determining surface fluxes of heat and momentum. Numerical methods for solving advection and diffusion problems; statistical diffusion modeling.

**Prerequisites:** grad st; cons instr.

**Last Taught:** Fall 2018, Fall 2016, Fall 2014, Fall 2012.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 711 Cloud Dynamics**

3 cr. Graduate.

Atmospheric applications of turbulent flow theory. Nonprecipitating clouds: structure of individual cumulus clouds, stratocumulus and cumulus boundary layers. Precipitating clouds: thunderstorms, squall lines, hurricanes.

**Prerequisites:** grad st; cons instr.

**Last Taught:** Spring 2019, Spring 2017, Spring 2015, Spring 2013.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 725 Remote Sensing of the Environment**

3 cr. Graduate.

Remote sensing technology, data processing, and analysis in meteorology, with application to oceanography and geology. Radar and acoustic sounding. Ert, sms/goes, thermal scanner, conventional weather satellites.

**Prerequisites:** grad st in Physics, Math, Geog, Geo Sci, Engr, or Atm Sci.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 730 Numerical Weather Prediction**

3 cr. Graduate.

Numerical methods for predicting atmospheric phenomena; numerical stability and dispersion; implicit and explicit damping methods; physical process parameterization; ensemble data assimilation techniques.

**Prerequisites:** graduate standing in physical sciences or engineering.

**Course Rules:** Counts as a repeat of ATM SCI 950 with the same topic.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 750 Nonlinear Time Series Analysis**

3 cr. Graduate.

Phase space reconstruction; singular spectrum analysis; prediction; dimension estimation; application of nonlinear time series analysis techniques to selected data sets.

**Prerequisites:** grad st; cons instr.

**Last Taught:** Fall 2013, Spring 2012, Spring 2010, Spring 2008.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 760 Advanced Cloud, Aerosol & Precipitation Principles, Processes & Interactions**

4 cr. Graduate.

(3 hr lc, 2 hr la). Theoretical & experimental look at cloud & precipitation formation, interaction & dissipation microphysics & chemistry aerosol physics & chemistry, & their application.

**Prerequisites:** grad st; Atm Sci 464(C) or cons instr.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 761 Advanced Synoptic/Mesoscale Meteorology**

3 cr. Graduate.

Advanced analysis techniques for synoptic/mesoscale diagnoses, case studies of relevant circulation systems; role of planetary, synoptic, and mesoscale flows in system development.

**Prerequisites:** grad st; cons instr.

**Last Taught:** Fall 2019, Fall 2017, Fall 2015, Fall 2013.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 888 Candidate for Degree**

0 cr. Graduate.

Available for graduate students who must meet minimum credit load requirement.

**Prerequisites:** graduate standing.

**Course Rules:** Fee for 1 cr assessed; unit does not count towards credit load for Fin Aid. Repeatable. Satisfactory/Unsatisfactory only.

**Last Taught:** Summer 2018, Summer 2017, Summer 2016, Spring 2016.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 943 Seminar: Hydrology:**

3 cr. Graduate.

**Prerequisites:** grad st.

**Course Rules:** Retakable w/chg in topic to 9 cr max.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 950 Seminar on Topics in Atmospheric Sciences:**

3 cr. Graduate.

Selected topics in atmospheric dynamics, satellite meteorology, atmospheric & oceanic convection, air & water pollution, numerical prediction remote sensing, & others.

**Prerequisites:** grad st in physical sciences or engineering. Retakable w/chg in topic to 9 cr max.

**Last Taught:** Spring 2020, Fall 2019, Spring 2018, Fall 2017.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 990 Master's Thesis**

1-8 cr. Graduate.

**Prerequisites:** grad st; cons instr & completed thesis proposal.

**Last Taught:** Spring 2020, Spring 2019, Fall 2018, Spring 2018.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 997 Doctoral Externship**

1-12 cr. Graduate.

Externship for students enrolled in the Atmospheric Science PhD program.

**Prerequisites:** grad st; admis to candidacy for the PhD.

**Course Rules:** Retakeable to 12 cr max.

**Last Taught:** Fall 2019, Spring 2019, Fall 2018, Fall 2010.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 998 Doctoral Dissertation**

1-12 cr. Graduate.

**Prerequisites:** grad st; admis to candidacy for PhD.

**Last Taught:** Spring 2020, Spring 2016, Fall 2015, Summer 2015.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>

**ATM SCI 999 Advanced Independent Reading**

1-12 cr. Graduate.

Independent meteorological study.

**Prerequisites:** grad st & cons instr.

**Course Rules:** Retakable to 12 cr max.

**Last Taught:** Spring 2020, Fall 2019, Spring 2019, Fall 2018.

**Current Offerings:** <https://catalog.uwm.edu/course-search/>