Academic Planning Worksheet for B.S. in Atmospheric and Climate Science: Data Science Option

Prerequisites: Math & Physics (30 credits total)
Besides **English composition**, these courses (or their equivalent) must be completed prior to registering for the first course in the Core ATMOS sequence. Students interested in majoring in Atmospheric and Climate Science should start taking these courses as soon as possible.
MATH 124 Calculus with Analytic Geometry I (5cr, AWSpS)
MATH 125 Calculus with Analytic Geometry II (5cr, AWSpS)
MATH 126 Calculus with Analytic Geometry III (5cr, AWSpS)
PHYS 121 Mechanics (5cr, AWSpS)
PHYS 122 Electromagnetism (5cr, AWSpS)
PHYS 123 Waves, Light, and Heat (5cr, AWSpS)

Statistics Requirement (4-5 credits total)
One of these courses should be completed as soon as possible, as it is a prerequisite for upper-division ATMOS coursework. Both courses have prerequisites. **STAT 390 is recommended for the Data Science Option.**

Q SCI 381 Introduction to Probability and Statistics (5cr; AWSpS) **or**
STAT 390 Statistical Methods in Engineering and Science (4cr, AWSpS)

Core – Atmospheric and Climate Science (ATMOS) (23 credits total)
These courses must be completed **in the order** listed below, beginning with ATMOS 301 in Autumn Quarter.
ATMOS 220 Exploring the Atmospheric and Climate Science (1cr)
ATMOS 301 Introduction to Atmospheric Sciences (5cr, Aut)
ATMOS 340 Introduction to Thermodynamics and Cloud Processes (3cr, Win)
ATMOS 370 Atmospheric Structure and Analysis (5cr, Win)
ATMOS 321 The Science of Climate (3cr, Spr)
ATMOS 341 Atmospheric Radiative Transfer (3cr, Spr)
ATMOS 431 Boundary-Layer Meteorology (3cr, Aut)

DATA SCIENCE OPTION COURSEWORK (28-39 CREDITS TOTAL)

Courses listed below are required to complete a BS in Atmospheric and Climate Science in the Data Science Option and are in addition to the Atmospheric and Climate Science core coursework and UW College of Environment general education requirements.

Advanced Math (Required; 6-12 credits total)
These courses (or their equivalent*) should be completed as soon as possible, as they are prerequisites for upper-division ATMOS coursework. All of these courses have their own prerequisites. **NOTE:** Students only need to complete **one** of the sequences listed below.

MATH 207 Introduction to Differential Equations (4cr, AWSpS)
MATH 208 Matrix Algebra with Applications (4cr, AWSpS)
MATH 209 Linear Analysis (4cr, AWSpS)
or
AMATH 351 Introduction to Differential Equations and Applications (3cr, AWSpS)
AMATH 353 Partial Differential Equations and Waves (3cr, SpS)
For transfer students – some WA-state community colleges offer equivalents to the courses listed above. Consult your institutional adviser or the **UW Equivalency Guide for more information.*

Atmospheric and Climate Science Elective (choose 1):
ATMOS 350 Ecological Climatology (3 cr, Aut) **or**
ATMOS 358 Fundamentals of Atmospheric Chemistry (3cr, Sp) **or**
ATMOS 380 Weather and Climate Prediction (3cr, Win) **or**
ATMOS 458 Air Pollution Chemistry (4cr, Aut) **or**
ATMOS 310 Programming for Atmospheric Data Analysis (3cr, Aut) (Overlapping with CSE 163 – if you took CSE 163, please choose one of the other ATMOS elective courses)

Data Science and Society (Required; 3 credits total): SOC 225 Data and Society (3cr)

Data Science Courses (Required; 16-20 credits total)
Students must complete **one course from each of the four following categories**. Most courses have **prerequisites**. Please make sure you satisfy the prerequisites for the ones you choose to take.

Programming (Required; 4-5 credits)
CSE 123 Introduction to Computer Programming III (4cr, AWSpS) **or** CSE 143 Computer Programming II (5cr, AWSpS) **or** CSE 163 Intermediate Data Programming (4cr) (CSE 163 overlaps with ATMOS 310 – if you took ATMOS 310, please take CSE 123 or CSE 143 instead of CSE 163)

Machine Learning (Required; 4-5 credits)**:
CSE/STAT 416 Introduction to Machine Learning (4cr) **or** STAT 435 Statistical Machine Learning (4cr, Spr) **or** INFO 371 Advanced Methods in Data Science (5cr)

Data Management (Required; 4-5 credits)**:** CSE 414 Introduction to Database Systems (4cr) **or** INFO 430 Advanced Database Design (5cr)

Data Visualization (Required; 4-5 credits)**:
CSE 412 Introduction to Data Visualizations (4cr) **or** HCDE 411 Information Visualization (5cr) **or** INFO 474 Interactive Data Visualization (5cr)

**A new course that also fulfills the data visualization requirement: STAT 451 Visualizing Data (4cr, Aut). Another new course that fulfills the machine learning requirement: ESS 469 Machine Learning in Geosciences (4 cr, Aut)

Four-Year Plan for Students Starting as First-Year Students (Data Science Option)

Year 1 (First Year)

Autumn Quarter	Winter Quarter	Spring Quarter
☐ MATH 124 (5) Calculus with Analytic Geometry I	☐ MATH 125 (5) Calculus with Analytic Geometry II	☐ MATH 126 (5) Calculus with Analytic Geometry III
☐ ATMOS 220 (1) Exploring the Atmospheric and Climate Science	☐ PHYS 121 (5) Mechanics	☐ PHYS 122 (5) Electromagnetism

Year 2 (Sophomore Year)

Autumn Quarter	Winter Quarter	Spring Quarter
☐ MATH 207 (4) Introduction to Differential Equations *(only if you choose to take the MATH 2XX sequence)*	☐ *MATH 208 (4) Matrix Algebra with Applications* **or** ☐ *AMATH 351 (3) Introduction to Differential Equations and Applications*	☐ *MATH 209 (4) Linear Analysis,* **or** ☐ *AMATH 353 (3) Fourier Analysis and Partial Differential Equations*
☐ PHYS 123 (5) Waves, Light, and Heat	☐ STAT 390 (4) Statistical Methods in Engineering and Science	☐ *CSE 123 (4) Introduction to Computer Programming III* **or** ☐ *CSE 143 (5) Computer Programming II,* **or** ☐ *CSE 163 (4) Intermediate Data Programming*
☐ SOC 225 (3) Data and Society		

Year 3 (Junior Year)

Autumn Quarter	Winter Quarter	Spring Quarter
☐ ATMOS 301 (5) Introduction to Atmospheric Sciences	☐ ATMOS 340 (3) Introduction to Thermodynamics and Cloud Processes	☐ ATMOS 321 (3) The Science of Climate
ATMOS Elective: ☐ *ATMOS 310 (3) Programming for Atmospheric Data Analysis* **or** ☐ *ATMOS 350 (3) Ecological Climatology* **or** ☐ *ATMOS 458 (4) Air Pollution Chemistry*	☐ ATMOS 370 (5) Atmospheric Structure and Analysis	☐ ATMOS 341 (3) Atmospheric Radiative Transfer
		ATMOS Elective: (*If not already taken in Aut or Win)* ☐ *ATMOS 358 (3) Fundamentals of Atmospheric Chemistry*

Year 4 (Senior Year)

Autumn Quarter	Winter Quarter	Spring Quarter
☐ ATMOS 431 (3) Boundary-Layer Meteorology	☐ *CSE 412 (4) Introduction to Data Visualization* **or** ☐ *STAT 451 (4) Visualizing Data* **or** ☐ *HCDE 411 (5) Information Visualization* **or** ☐ *INFO 474 (5) Interactive Information Visualization*	☐ *CSE/STAT 416 (4) Introduction to Machine Learning* **or** ☐ *STAT 435 (4) Introduction to Statistical Machine Learning* **or** ☐ *INFO 371 (5) Advanced Methods in Data Science*
☐ *CSE 414 (4) Introduction to Database Systems* **or** ☐ *INFO 430 (5) Database Design and Management*	ATMOS Elective: (*If not already taken in Autumn)* ☐ *ATMOS 380 (3) Weather and Climate Prediction*	