### Academic Planning Worksheet for B.S. in Atmospheric Sciences:
#### 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 ATM S sequence. Students interested in majoring in Atmospheric Sciences 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 pre-requisite for upper-division ATM S coursework. Both courses have prerequisites. STAT 390 is recommended for the Data Science Option.

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

**Core – Atmospheric Sciences (ATM S)** (23 credits total)

These courses must be completed in the order listed below, beginning with ATM S 301 in Autumn Quarter.

- ATM S 220 Exploring the Atmospheric Sciences (1cr)
- ATM S 301 Introduction to Atmospheric Sciences (5cr, Aut)
- ATM S 340 Introduction to Thermodynamics and Cloud Processes (3cr, Win)
- ATM S 370 Atmospheric Structure and Analysis (5cr, Win)
- ATM S 321 The Science of Climate (3cr, Spr)
- ATM S 341 Atmospheric Radiative Transfer (3cr, Spr)
- ATM S 431 Boundary-Layer Meteorology (3cr, Aut)

#### DATA SCIENCE OPTION COURSEWORK (28-35 CREDITS TOTAL)

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

**Advanced Math** (Required; 9-12 credits total)

These courses (or their equivalent*) should be completed as soon as possible as they are prerequisites for upper-division ATM S 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 (3cr, AWSpS)
- MATH 208 Matrix Algebra with Applications (3cr, AWSpS)
- MATH 209 Linear Analysis (3cr, 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 Sciences Elective** (choose 1):

- ATM S 350 Ecological Climatology (3cr, Aut)
- ATM S 358 Fundamentals of Atmospheric Chemistry (3cr, Sp)
- ATM S 380 Weather and Climate Prediction (3cr, Win)
- ATM S 458 Air Pollution Chemistry (4cr, Aut)
- ATM S 310 Programming for Atmospheric Data Analysis (3cr, Aut) (Overlapping with CSE 163 – if you took CSE 163 please choose one of the other ATM S 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)
- CSE 143 Computer Programming II (4cr, AWSpS)
- CSE 163 Intermediate Data Programming (4cr) (CSE 163 overlaps with ATM S 310 – if you took ATM S 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)
- STAT 435 Statistical Machine Learning (4cr)
- INFO 371 Advanced Methods in Data Science (5cr)

**Data Management** (Required; 4-5 credits):

- CSE 414 Introduction to Database Systems (4cr)
- INFO 430 Advanced Database Design (5cr)

**Data Visualization** (Required; 4-5 credits)**:

- CSE 412 Introduction to Data Visualizations (4cr)
- HCDE 411 Information Visualization (5cr)
- 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 (4cr, Aut)
## Four-Year Plan for Students Starting as Freshmen (Data Science Option)

### Year 1 (Freshman Year)

<table>
<thead>
<tr>
<th>Autumn Quarter</th>
<th>Winter Quarter</th>
<th>Spring Quarter</th>
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</thead>
<tbody>
<tr>
<td>☐ MATH 124 (5) Calculus with Analytic Geometry I</td>
<td>☐ MATH 125 (5) Calculus with Analytic Geometry II</td>
<td>☐ MATH 126 (5) Calculus with Analytic Geometry III</td>
</tr>
<tr>
<td>☐ ATM S 220 (1) Exploring the Atmospheric Sciences</td>
<td>☐ PHYS 121 (5) Mechanics</td>
<td>☐ PHYS 122 (5) Electromagnetism</td>
</tr>
<tr>
<td>☐ MATH 124 (5) Calculus with Analytic Geometry I</td>
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<tr>
<td>☐ ATM S 220 (1) Exploring the Atmospheric Sciences</td>
<td>☐ PHYS 121 (5) Mechanics</td>
<td>☐ PHYS 122 (5) Electromagnetism</td>
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</table>

### Year 2 (Sophomore Year)

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<th>Winter Quarter</th>
<th>Spring Quarter</th>
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</thead>
<tbody>
<tr>
<td>☐ MATH 207 (3) Introduction to Differential Equations (only if you choose to take the MATH 2XX sequence)</td>
<td>☐ MATH 208 (3) Matrix Algebra with Applications, or ☐ AMATH 351 (3) Introduction to Differential Equations and Applications</td>
<td>☐ MATH 209 (3) Linear Analysis, or ☐ AMATH 353 (3) Fourier Analysis and Partial Differential Equations</td>
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<td>☐ SOC 225 (3) Data and Society</td>
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### Year 3 (Junior Year)

<table>
<thead>
<tr>
<th>Autumn Quarter</th>
<th>Winter Quarter</th>
<th>Spring Quarter</th>
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<tbody>
<tr>
<td>☐ ATM S 301 (5) Introduction to Atmospheric Sciences</td>
<td>☐ ATM S 340 (3) Introduction to Thermodynamics and Cloud Processes</td>
<td>☐ ATM S 321 (3) The Science of Climate</td>
</tr>
<tr>
<td>ATM S Elective: ☐ ATM S 310 (3) Programming for Atmospheric Data Analysis, or ☐ ATM S 350 (3) Ecological Climatology or ☐ ATM S 458 (4) Air Pollution Chemistry</td>
<td>ATM S Elective: (if not already taken in Autumn) ☐ ATM S 380 (3) Weather and Climate Prediction</td>
<td>ATM S Elective: (if not already taken in Aut or Win) ☐ ATM S 358 (3) Fundamentals of Atmospheric Chemistry</td>
</tr>
<tr>
<td>☐ 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</td>
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### Year 4 (Senior Year)

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<tr>
<th>Autumn Quarter</th>
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<th>Spring Quarter</th>
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<tbody>
<tr>
<td>☐ ATM S 431 (3) Boundary-Layer Meteorology</td>
<td>☐ ATM S 370 (5) Atmospheric Structure and Analysis</td>
<td>☐ ATM S 341 (3) Atmospheric Radiative Transfer</td>
</tr>
<tr>
<td>☐ 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</td>
<td></td>
<td>☐ CSE 414 (4) Introduction to Database Systems, or ☐ INFO 430 (5) Database Design and Management</td>
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