### 1.0 Degree Title
Specify the two degrees for concurrent degree programs

**Bachelor of Science**

#### 1.1 Major (Legacy= Subject) (30-char. max.)

<table>
<thead>
<tr>
<th>Honours Atmospheric Science</th>
</tr>
</thead>
</table>

#### 1.2 Concentration (Legacy = Concentration/Option) If applicable (30 char. max.)

#### 1.3 Minor (with Concentration, if applicable) (30 char. max.)

#### 1.4 Category

- Faculty Program (FP)
- Major
- Joint Major
- Major Concentration (CON)
- Minor
- Minor Concentration (CON)

<table>
<thead>
<tr>
<th>Honours (HON) X</th>
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- Internship/Co-op
- Thesis (T)
- Non-Thesis (N)
- Other
- Please specify

### 1.5 Complete Program Title

**B.Sc.; Honours Atmospheric Science**

### 2.0 Administering Faculty/Unit

<table>
<thead>
<tr>
<th>Science</th>
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### 3.0 Effective Term of revision or retirement

- Please give reasons in 5.0 “Rationale” in the case of retirement
- (Ex. Sept. 2004 = 200409) Retirement

<table>
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### 4.0 Existing Credit Weight

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<th>Proposed Credit Weight</th>
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<th>70</th>
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### 5.0 Rationale for revised program

There are several motivations behind these changes:

1. To introduce an atmospheric sciences and oceanography specific laboratory course (ATOC 357) that is required in most other meteorology programs in North America. This was strongly favoured by our current undergraduate students.
2. To provide atmospheric dynamics at the U2 level (ATOC 312). Currently our students do not receive this training until their U3 year, well after they complete their prerequisites. This earlier exposure to dynamics will strengthen their foundation for more advanced 400-500-level courses.
3. To provide more flexibility for students seeking to pursue sub-fields of atmospheric science other than operational meteorology, including atmospheric chemistry and physics.
4. To enrich the educational experience for AOS students by offering more options for complementary courses within AOS and the faculty of science.

### 6.0 Revised Program Description (Maximum 150 words)

There are several motivations behind these changes:
### List of existing program and proposed program

<table>
<thead>
<tr>
<th>Required Courses (52 credits)</th>
</tr>
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<tbody>
<tr>
<td><strong>ATOC 214 Introduction: Physics of the Atmosphere</strong> (3 credits)</td>
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<tr>
<td><strong>ATOC 215 Oceans, Weather and Climate</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>ATOC 309 Weather Radars and Satellites</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>ATOC 315 Thermodynamics and Convection</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>ATOC 480 Honours Research Project</strong> (3 credits)</td>
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<tr>
<td><strong>ATOC 512 Atmospheric and Oceanic Dynamics</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>ATOC 531 Dynamics of Current Climates</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>ATOC 540 Synoptic Meteorology 1</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>ATOC 546 Current Weather Discussion</strong> (1 credit)</td>
</tr>
<tr>
<td><strong>COMP 208 Computers in Engineering</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>MATH 222 Calculus 3</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>MATH 223 Linear Algebra</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>MATH 314 Advanced Calculus</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>MATH 315 Ordinary Differential Equations</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>MATH 319 Introduction to Partial Differential Equations</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>PHYS 230 Dynamics of Simple Systems</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>PHYS 233 Heat and Waves</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>PHYS 257 Experimental Methods 1</strong> (3 credits)</td>
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</tbody>
</table>

### Complementary Courses (18 credits)

3-6 credits to satisfy a statistics requirement.

Students usually take MATH 203 or both MATH 323 and MATH 324.

- MATH 203 Principles of Statistics (1 credit)
- MATH 323 Probability (3 credits)
- MATH 324 Statistics (3 credits)

3 credits selected from:

- PHYS 333 Thermal and Statistical Physics (3 credits)
- PHYS 340 Majors Electricity and Magnetism (3 credits)

3 credits ordinarily selected from the courses below:

* Students may take either ATOC 419 or CHEM 419
** Students may take either PHYS 432 or MATH 555

- ATOC 419 Advances in Chemistry of Atmosphere (3 credits)
- ATOC 515 Turbulence in Atmosphere and Oceans (3 credits)
- CHEM 419 Advances in Chemistry of Atmosphere (3 credits)
- GEOG 320 Environmental Hydrology (3 credits)
- GEOG 372 Running Water Environments (3 credits)
- MATH 317 Numerical Analysis (3 credits)
- MATH 423 Regression and Analysis of Variance (4 credits)
- PHYS 241 Signal Processing (3 credits)
- PHYS 331 Topics in Classical Mechanics (3 credits)
- PHYS 340 Majors Electricity and Magnetism (3 credits)
- PHYS 342 Majors Electromagnetic Waves (3 credits)
- PHYS 432 Physics of Fluids (4 credits)

6 credits selected from:

- ATOC 513 Waves and Stability (3 credits)
- ATOC 521 Cloud Physics (3 credits)
- ATOC 525 Atmospheric Radiation (3 credits)
- ATOC 530 Paleoclimate Dynamics (3 credits)
- ATOC 541 Synoptic Meteorology 2 (3 credits)

### Required Courses (27 credits)

- ATOC 214 Introduction: Physics of the Atmosphere (3 credits)
- ATOC 312 Dynamics of Rotating Fluids (3 credits)
- ATOC 315 Thermodynamics and Convection (3 credits)
- ATOC 480 Honours Research Project
- COMP 208 Computers in Engineering (3 credits)
- MATH 222 Calculus 3 (3 credits)
- MATH 223 Linear Algebra (3 credits)
- MATH 314 Advanced Calculus (3 credits)
- MATH 315 Ordinary Differential Equations (3 credits)

### Complementary Courses (45-46 credits)

Note: All students are encouraged to consult with the undergraduate adviser for help selecting from among the complementary courses. As general recommendations (but not programmatic requirements), students wishing to comply with Environment Canada recommendations for careers in operational meteorology are advised to take ATOC 215, 309, 512, 513, 540, 541, and 546. Students interested in atmospheric chemistry, aerosols, and cloud physics are advised to take ATOC 219, 309, 419, 521, 525, 540, and CHEM 223, 253. Suggested minors include math, physics, chemistry, computer science, earth and planetary science, and geography.

27 credits at the 200-to-300 level

3-6 credits selected from:

- ATOC 215 Oceans, Weather and Climate (3 credits)
- ATOC 219 Introduction to Atmospheric Chemistry (3 credits)

3 credits selected from:

- PHYS 257 Experimental Methods 1 (3 credits)
- ATOC 357 (Atmospheric and Oceanic Lab)

3 credits selected from:

- PHYS 230 (Dynamics of Simple Systems) (3 credits)
- PHYS 251 (Classical Mechanics) (3 credits)

3 credits selected from:

- CHEM 223 Introductory Physical Chemistry 1 (2 credits)
- CHEM 253 Introductory Physical Chemistry 1 Laboratory (1 credit)
- MATH 319 Partial Differential Equations (3 credits)

9-12 credits selected from:

- ATOC 309 Weather Radars and Satellites (3 credits)
- CHEM 243 Introductory Physical Chemistry (2 credits)
- CHEM 362 Advanced Organic Chemistry Laboratory (2 credits)
- CHEM 367 Instrumental Analysis (3 credits)
- PHYS 241 Signal Processing (3 credits)
- PHYS 331 Topics in Classical Mechanics (3 credits)
- PHYS 340 Majors Electricity and Magnetism (3 credits)
- PHYS 342 Majors Electromagnetic Waves (3 credits)
- MATH 203 Principles of Statistics (3 credits)
- MATH 317 Numerical Analysis (3 credits)
- MATH 323 Probability (3 credits)
- MATH 324 Statistics (3 credits)

18-19 credits at 400-to-500 level, selected from:

* Students may take either ATOC 419 or CHEM 419
** Students may take either PHYS 432 or MATH 555

- ATOC 419 Advances in Chemistry of Atmosphere (3 credits)
- ATOC 512 Atmospheric and Oceanic Dynamics (3 credits)
- ATOC 513 Waves and Stability (3 credits)
- ATOC 515 Turbulence in Atmosphere and Oceans (3 credits)
- ATOC 521 Cloud Physics (3 credits)
- ATOC 525 Atmospheric Radiation (3 credits)
- ATOC 531 Dynamics of Current Climates (3 credits)
- ATOC 540 Synoptic Meteorology (3 credits)
- ATOC 541 Synoptic Meteorology 2 (3 credits)
- ATOC 546 Current Weather Discussion (1 credit)
- ATOC 558 Numerical Methods (3 credits)
- ATOC 568 Ocean Physics (3 credits)
- CHEM 367 Instrumental Analysis (3 credits)
- CHEM 575 Chemical Kinetics (3 credits)
- EPSC 542 Chemical Oceanography (3 credits)
- MATH 423 Regression and Analysis of Variance (3 credits)
- PHYS 432 Physics of Fluids (3 credits)
- PHYS 551 Quantum Theory (3 credits)
- PHYS 559 Statistical Mechanics (3 credits)
### 8.0 Consultation with Related Units

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### 9. Approvals

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To be completed by ARR:

- **CIP Code**