

ATSC Undergrad Advising - Degree Requirements

<https://vancouver.calendar.ubc.ca/faculties-colleges-and-schools/faculty-science/bachelor-science/atmospheric-science>

Major in ATSC (0167)

valid summer 2023

| First Year Courses | Credits | Prerequisites & Footnotes |
|--|---------|--|
| Communication Requirement ¹ | 3 | Footnote 1. For a full list of acceptable courses see Communication Requirement. https://vancouver.calendar.ubc.ca/node/15384 |
| DSCI 100 -Intro to Data Sci.(R or python) | 3 | |
| CHEM 121-Structure & bonding (or CHEM 111 - Struct, bonds, equilib. or CHEM 141 - Bonds, struct. for labs) & take the associated lab. | 4 | Footnote: 2. Students who do not have B.C. High School Chemistry 12 (or its equivalent) must write the UBC Chemistry Basic Skills Test and may be required to take CHEM 100 (Foundations of chem). CHEM 110 lecture + CHEM 115 lab may substitute for CHEM 111, CHEM 120 lecture + CHEM 115 lab may substitute for CHEM 121, |
| CHEM 123-Thermo, kinetics, organic. & take associated lab. | 4 | 1 Prereq: Chem 121, 111, or 141. Footnote 2. CHEM 130 lecture a+nd CHEM 135 lab may substitute for CHEM 123. |
| MATH 100 -Differential Calc. w Applic. (or MATH 102 - Diff.Calc. for Life Sci., or MATH 104 - Diff.Calc. for SocialSci.) | 3 | Footnote 3. MATH 180 or MATH 184 or MATH 120 Honours Diff. Calc. may substitute for any of the specified differential calculus courses listed by decreasing the electives by 1 credit. MATH 110 Diff.Calc (& algebra, geom, trig., logs., exponentials, 6 cr) may substitute for any of the specified differential calculus courses listed by decreasing the electives by 3 credits. |
| MATH 101 -Integral Calculus (or MATH 103 - Integral .calc. for LifeSci, or MATH 105 - Integral calc. for Social.) | 3 | 1 Prereq: Differential Calc. Footnote 4. MATH 121 Honours Integral Calc. may substitute for any of the specified integral calculus courses listed by decreasing the electives by 1 credit. |
| PHYS 117 -Dynamics & waves (or 101 or 106 or 107 or 131) | 3 | Footnote 5: Students without Physics 12 must take PHYS 100 prior to other physics courses. PHYS 100 will be counted as an elective. Qualified students are encouraged to take PHYS 106 (Enriched Phys1) and PHYS 108 (Enriched Phys2). |
| PHYS 118 (or 108) -Elect., Light, Radiation | 3 | 1 Prereq: PHYS Dynamics & waves, or equiv. Footnote 5: Qualified students are encouraged to take PHYS 108 (Enriched Phys2). |
| PHYS 119 (or 109) - Lab | 1 | |
| Elective | 3 | Footnote 6: Students are permitted to move elective credits between years. Footnote 7: Elective credits together with required courses must fulfill the Faculty of Science's: a) Foundational Requirement; (1 course each in biol, phys, chem, UNLESS already had in high school) b) Laboratory Science Requirement; (take 1 lab course - see specified list) c) Science Breadth Requirement; (take 3 cr from any 6 topics: math, chem, phys, life sci, stat, cpsc, earth) d) Science and Arts Requirements; (72 cr in Sci, & 12 cr in Arts). Note: GEOS/GEOB is sci. e) Upper-level Requirement; (48 cr of courses ≥300, of which 30 cr must be science) f) General Degree Requirements (120 cr total, etc.). Footnote 8: Students wishing to pursue a career in weather forecasting or meteorology to prepare for graduate study in Atmospheric Science should consult with an ATSC advisor regarding choices of electives, including additional courses in Physics, Chemistry, Mathematics, Statistics or Computer Science. (See Prof. Stull's notes on ECCC Meteorologist qualifications at the end of Year 4.) |

Total Credits 30

Second Year Courses

| Second Year Courses | Credits | Prerequisites & Footnotes |
|--|---------|--|
| Communication Requirement | 3 | Footnote 1. For a full list of acceptable courses see Communication Requirement. https://vancouver.calendar.ubc.ca/node/15384 |
| ATSC 201-Meteorology of Storms, or GEOS (or GEOB) 200 -Atmos. Environs. | 3 | Prereq for ATSC 201- completion of 1st year science (recommended, but not required), or Prereq for GEOS 200- 2nd year standing in science (required) |
| EOSC 211-Computer Methods (or CPSC 103 -Program Design Intro, or CPSC 110 -Programming (4 cr)) | 3 | 1 Prereq for EOSC 211 - integral calculus Footnote 9: If choosing CPSC 110, reduce electives by 1 credit. |
| MATH 200 -Calc.3- ∂ , chain rule, max/min | 3 | 1 Prereq: Integral calc. |
| STAT 201 - Stat.Inference for Data Sci. (or STAT 200 -Mean, var, anova, or STAT 251 -Prob., regression, hypo.test) | 3 | 1 Prereq for STAT 201: DSCI 100 1 Prereq for STAT 200 & 251: Integral calc. Footnote 10: STAT 201 is recommended for students who wish to pursue a minor in data science. STAT 200 or 251 (plus STAT 302-Probability) are recommended for students interested in taking further courses in statistics. |
| Electives | 15 | Footnotes: Same as year-1 Elective footnotes. Recommendation: Some 3rd & 4th Year courses listed below show a "CAUTION" prerequisite. Namely, a course that is NOT already listed above. So you could plan your electives here in Year 2 to satisfy the prereqs of courses that you want to take in the next couple years. |

Total Credits 30

| Third & Fourth Year Courses | Credits | Prerequisites & Footnotes |
|---|---------|---|
| ATSC 301-Atm.Radiation & Remote Sens. | 3 | 2 Prereqs: (PHYS 108 or 118) + (familiarity with a programming language) Footnote 11: Usually only offered every other year. Check timing with the advisor and plan accordingly. |
| GEOS (or GEOB) 300 - Microscale, turb. | 3 | Prereq: (one of ATSC 201, GEOS/GEOB 200, ...) |
| ENVR 300 -Research in Environ.Sci. | 3 | Prereq: 3rd year science standing or higher |
| Three of : | 9 | |
| ATSC 303 - Weather Instruments | | 2 Prereqs: a computer programming course, and either ATSC 201 or GEOS 200. Footnote 11: Usually only offered every other year. Check timing with the advisor and plan accordingly. |
| ATSC 413 -Forest-fire weather & clim. | | 1 Prereq: ATSC 201 or GEOS 200 |
| ATSC 409 -Numerical solution of differential eqs. | | 1 or more Prereqs: CAUTION need to take additional course on Differential Equations (MATH 215, 255, or 256), but MATH 215 requires also MATH 152, 221 or 223 as prereq. Footnote 11: Usually only offered every other year. Check timing with the advisor and plan accordingly. |
| GEOS (or GEOB) 309 -Field Course | | 3 Prereqs: CAUTION need 3 additional GEOS/GEOB courses. |
| GEOS (or GEOB) 370 -Advanced GIS | | 1 Prereq: CAUTION need additional course GEOS 270 -GIS Intro. |
| GEOS (or GEOB) 373 -Remote Sensing | | 1 Prereq: CAUTION need additional course GEOS 270 -GIS Intro. |
| EOSC 352 -Geophys Continuum Dynam. | | 1 Prereq: CAUTION need additional course EOSC 250-Fields & Fluxes or MATH 317-Calc.4 div, grad, curl |
| EOSC 354 -Time Series & Inverse Theory | | 2 Prereqs: first-year integral calculus, and first-year physics (dynamics) |
| EOSC 410 -Geosci Data Anal & model. | | 3 Prereqs: STAT 200 & MATH 200 & computer programming (or equiv.) |
| One of: | 3 | |
| EOSC 340 -Global Climate Change | | 3 Prereqs: first year CHEM & integral calculus & first-year PHYS (dynamics) |
| ENVR 410 -Energy, Environ. & Society | | Prereq: 4th year standing in Sci or Engr. |
| GEOG 312 -Clim.Change: Sci.& Society | | Prereqs: 1 of ATSC 201 or GEOS 200, and 3rd year standing. |
| Four of: | 12 | |
| ATSC 313 -Renewable Energy Meteor. | | 3 Prereqs: first-yr integral MATH, first year dynamics PHYS, & first-year computer programming |
| CHEM 302 -Amos. Chem. | | Prereqs: CHEM 123 and 3rd year standing |
| GEOS (or GEOB) 400 -Global Change Sci | | Prereqs: first year CHEM & CAUTION: BIOL 121-genetics & evolution |
| GEOS (or GEOB) 401 -Urban Meteor. | | 1 Prereq: GEOS 300 |
| GEOS (or GEOB) 402 -Air Pollution Met. | | 1 Prereq: GEOS 200 or GEOS 300 |
| EOSC 471 -Waves, Currents & Mixing | | 3 Prereqs: (ATSC 201 or GEOS200), EOSC 211 (programming), & 1st yr PHYS (dynamics) |
| One of | 3 | |
| ATSC 448 -Directed Studies | | Capstone project. Notify the ATSC 448 leader: Prof. Phil Austin. He can "force-register" you into it. |
| GEOS (or GEOB) 448 -Directed Studies | | Capstone project. Notify the ATSC 448 leader: Prof. Phil Austin. He can "force-register" you into it. |
| Electives | 24 | Footnotes: Same as year-1 Elective footnotes. Recommendation: Some 3rd & 4th Year courses listed above show a "CAUTION" prerequisite. Namely, a course that is NOT already listed above. So you could plan your electives here to satisfy the prereqs of the other 3rd and 4th year courses that you want to take. |
| Total Credits in 3rd + 4th Years | 60 | |

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| TOTAL CREDITS TO GRADUATE | 120 | with a major in Atmospheric Science. |
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Note: The ATSC majors program above was designed to serve industry, not **Environment & Climate Change Canada (ECCC)**. The reason is that ECCC has hired very few meteorologists during the past 10 years, so we tailored our program for industry. However, if you want to work for ECCC as a meteorologist, then you should plan ahead to take the following courses as electives.

ECCC has stated that the UBC courses shown in **BLUE** will satisfy ECCC's education requirements to be hired as a meteorologist.

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| This is a prereq for an EC required course | * | MATH 221 or 223 - Matrix or Linear Algebra |
| This is a prereq for an EC required course | * | MATH 215 - Diff. Eqs. I (CAUTION: Needs MATH 152, 221, or 223 as prereq.) |
| This is a prereq for an EC required course | * | MATH 217 - Multivariate & vector calculus |
| This is a prereq for an EC required course | * | MATH 316 - Diff. Eqs. II |
| This is a prereq for an EC required course | * | PHYS 203 Thermal Physics or CHEM 304 Thermo & Statistical Mechanics |
| Dynamic Meteorology course | ** | ATSC 404 - Dynamic Meteorology (Prerequisite: One of EOSC 352, MATH 316, PHYS 312 and one of EOSC 250, MATH 217, MATH 317.) |
| Thermodynamic Meteorology course | ** | ATSC 405 - Cloud Physics & Chem. (Prerequisite: MATH 215. Familiarity with a programming language is required. Corequisite: One of PHYS 203, CHEM 304.) |
| Synoptic Meteorology course | | ATSC 413 - Forest-fire Weather & Climate |
| Three other Meteorology courses | | Satisfied by the existing ATSC major. |
| 30 credits or more in Physics & Math | | This would be satisfied with the courses required for the ATSC major PLUS the prerequisite courses listed in BROWN above. |
| | ** | You would need to take these courses as an elective, because they are not explicitly listed in the ATSC major listed above. |
| | * | You would also need to take these courses as electives, to get into the ** courses. |