

# Earth System Sciences, B.S. - Atmospheric Science/Meteorology Concentration

## Earth System Science, Atmospheric Science/Meteorology Concentration, BS Requirements:

- All students are encouraged to see an advisor after completion of 24 credits.
- Earth System Science, concentration in Atmospheric Science/Meteorology, BS degree requires 128 credit hours.
- 39 of 128 credit hours must be taken at 300 level or higher (39 credits includes courses taken at the 300+ level in major, minor (if chosen), Pre professional area and electives).
- 12 credit hours of 300 level and above must be taken in the major or 6 credit hours in the major and 6 credit hours in the minor (if chosen).
- 12 of the last 18 credit hours must be taken at UAH, with an overall 25% of coursework taken at UAH.
- Unless otherwise noted a C- or better is required for all College of Science prerequisite courses.
- No more than 64 credit hours from a two-year college can be applied toward a UAH degree.
- For graduation application instructions, see here (<http://catalog.uah.edu/undergrad/policies-procedures/application-graduation/>).

## Degree Requirements

Charger Foundations Requirements

\*Please see Area V for CoS requirements that can also be used to fulfill Charger Foundations Requirements.

Code	Title	Semester Hours
<b>Area I: Freshman Composition</b>		<b>3-6</b>
EH 101 or EH 101S	COLLEGE WRITING I COLLEGE WRITING I W/STUDIO	
EH 102	COLLEGE WRITING II	
EH 103	ACCELERATED COLLEGE WRITING	
EH 105	HONORS ENGLISH SEMINAR	
<b>Area II: Humanities and Fine Arts*</b>		<b>12</b>
Fine Arts		<b>3</b>
ARH 100	ARH SURV:ANCIENT-MEDIEVAL	
ARH 101	ARH SURV:RENAISSANCE-MODERN	
ARH 103	ARH SUR: WORLD ART	
ARS 160	DRAWING: FOUNDATIONS	
TH 122	THEATRE APPRECIATION	
TH 123	INTRO TO FILM STUDIES	
MU 100	INTRO TO MUSIC LITERATURE	
Literature		<b>3-6</b>
EH 207	READINGS LITERATURE/CULTURE I	
EH 208	READINGS LITERATURE/CULTURE 2	
EH 209	HONORS SEM READINGS LIT/CUL I	
EH 210	HONORS SEM READINGS LIT/CUL 2	
EH 242	MYTHOLOGY	
Humanities and Fine Arts		<b>3-6</b>
CM 113	Intro to Rhetorical Communication	
WLC 101S or WLC 101A or WLC 101F or WLC 101G or WLC 101J	INTRO FOREIGN LANG I: SPANISH INTRO FOREIGN LANG I: ARABIC INTRO FOREIGN LANG I:FRENCH INTRO FOREIGN LANG I:GERMAN INTRO FOREIGN LANG I:JAPANESE	

or WLC 101R	INTRO FOREIGN LANG I:RUSSIAN	
WLC 102S	INTRO FOREIGN LANG II:SPANISH	
or WLC 102A	INTRO FOREIGN LANG II: ARABIC	
or WLC 102F	INTRO FOREIGN LANG II:FRENCH	
or WLC 102G	INTRO FOREIGN LANG II:GERMAN	
or WLC 102J	INTRO FOREIGN LANG II:JAPANESE	
or WLC 102R	INTRO FOREIGN LANG II:RUSSIAN	
WLC 201S	INTERM FOREIGN LANG:SPANISH	
or WLC 201A	INTERM FOREIGN LANG I: ARABIC	
or WLC 201F	INTERM FOREIGN LANG:FRENCH	
or WLC 201G	INTERM FOREIGN LANG:GERMAN	
or WLC 201J	INTERM FOREIGN LANG: JAPANESE	
or WLC 201R	INTERM FOREIGN LANG:RUSSIAN	
WLC 202S	INTERM FOREIGN LANG II:SPANISH	
or WLC 202A	INTERM FOREIGN LANG II: ARABIC	
or WLC 202F	INTERM FOREIGN LANG II:FRENCH	
or WLC 202G	INTERM FOREIGN LANG II:GERMAN	
or WLC 202J	INTERM FORGN LANG II:JAPANESE	
or WLC 202R	INTERM FOREIGN LANG II:RUSSIAN	
WLC 204	INTERNATIONAL CINEMA	
PHL 101	INTRODUCTION TO PHILOSOPHY	
PHL 102	INTRO TO ETHICS	
PHL 103	INTRODUCTION TO LOGIC	
PHL 150	TECH, SCIENCE & HUMAN VALUES	
WGS 200	INTRO WOMEN'S & GENDER STUDIES	
AMS 229	ANCIENT & MEDIEVAL WORLDS	
ARH 100	ARH SURV:ANCIENT-MEDIEVAL	
ARH 101	ARH SURV:RENAISSANCE-MODERN	
ARH 103	ARH SUR: WORLD ART	
ARS 160	DRAWING: FOUNDATIONS	
TH 122	THEATRE APPRECIATION	
TH 123	INTRO TO FILM STUDIES	
MU 100	INTRO TO MUSIC LITERATURE	
<b>Area III: Mathematics and Sciences</b>		<b>11-12</b>
Mathematics		3-4
MA 105	NATURE OF MATHEMATICS	
MA 107	ALGEBRA WITH APPLICATIONS	
MA 110	FINITE MATHEMATICS	
MA 112	PRECALCULUS ALGEBRA	
MA 113	PRECALCULUS TRIGONOMETRY	
MA 115	PRECALCULUS ALGEBRA & TRIG	
MA 120	MATH PROFESSIONAL APPLICATIONS	
MA 171	CALCULUS A	
Natural Sciences (Lab)		8
AST 100	SURVEY OF ASTRONOMY	
AST 106	EXPLORING THE COSMOS I	
AST 107	EXPLORING THE COSMOS II	
BYS 109	FUNDAMENTALS OF BIOLOGY	
BYS 119	PRINCIPLES OF BIOLOGY	
BYS 120	ORGANISMAL BIOLOGY	
BYS 215	HUMAN ANATOMY & PHYSIOLOGY I	

CH 101 & CH 105	INTRO TO CHEMISTRY and INTRO CHEMISTRY LAB	
CH 121 & CH 125	GENERAL CHEMISTRY I and GENERAL CHEMISTRY LAB I	
CH 123 & CH 126	GENERAL CHEMISTRY II and GENERAL CHEMISTRY LAB II	
CH 151 & CH 105	GENERAL, ORGANIC, BIOCHEMISTRY and INTRO CHEMISTRY LAB	
ESS 103	ENVIRONMENTAL EARTH SCIENCE	
ESS 111	WEATHER, CLIMATE & GLOBAL CHNG	
PH 100	CONCEPTUAL PHYSICS	
PH 101	GENERAL PHYSICS I	
PH 102	GENERAL PHYSICS II	
PH 111 & PH 114	GEN PHYSICS W/CALCULUS I and GENERAL PHYSICS LAB I	
PH 112 & PH 115	GEN PHYSICS W/CALC II and GENERAL PHYSICS LAB II	
PH 113 & PH 116	GEN PHYSICS W/CALC III and GENERAL PHYSICS LAB III	
<b>Area IV: History and Social and Behavioral Sciences*</b>		<b>12</b>
History		3-6
HY 103	WORLD HISTORY TO 1500	
HY 104	WORLD HISTORY SINCE 1500	
HY 221	UNITED STATES TO 1877	
HY 222	UNITED STATES SINCE 1877	
Social and Behavioral Sciences		6-9
ECN 142	PRINC OF MACROECONOMICS	
ECN 143	PRINC OF MICROECONOMICS	
GS 200	GLOBAL SYSTEMS AND CULTURES	
ESS 105	WORLD REGIONAL GEOGRAPHY	
ESS 110	PRINCIPLES OF HUMAN GEOGRAPHY	
PSC 101	INTRO TO AMERICAN GOVERNMENT	
PSC 102	INTRO TO COMPARATIVE POLITICS	
PSC 260	INTRODUCTION TO INTERNATIONAL RELATIONS	
PY 101	GENERAL PSYCHOLOGY I	
PY 201	LIFE-SPAN DEVELOPMENT	
SOC 100	INTRO TO SOCIOLOGY	
SOC 102	ANALYSIS OF SOCIAL PROBLEMS	
SOC 103	INTRO TO CRIMINOLOGY	
SOC 105		

\* Take either 1 EH (Area II) + 2 HY (Area IV) <OR> 2 EH (Area II) + 1 HY (Area IV). Take no more than six hours in a single discipline in Area II or Area IV.

#### Area V: Pre Professional Requirements

Code	Title	Semester Hours
Courses in this area may also be used to fulfill Charger Foundations requirements		
<b>Communications</b>		<b>3</b>
CM 113	Intro to Rhetorical Communication	
<b>Mathematics<sup>2</sup></b>		<b>18</b>
MA 171	CALCULUS A	
MA 172	CALCULUS B	
MA 201	CALCULUS C	

MA 238	APPL DIFFERENTIAL EQUATIONS <sup>5</sup>	
MA 385	INTRO TO PROBABILITY & STATIST <sup>5</sup>	
<b>Chemistry</b>		<b>4</b>
CH 121 & CH 125	GENERAL CHEMISTRY I and GENERAL CHEMISTRY LAB I <sup>5</sup>	
<b>Physics</b>		<b>8</b>
PH 111 & PH 114	GEN PHYSICS W/CALCULUS I and GENERAL PHYSICS LAB I <sup>5</sup>	
and		
PH 112 & PH 115	GEN PHYSICS W/CALC II and GENERAL PHYSICS LAB II <sup>5</sup>	
<b>Computer Science choose one:</b>		<b>3</b>
CS 102	INTRO TO C PROGRAMMING	
or CS 103	INTRO PROGRAMMING USING JAVA	
or CS 104	INTRO TO CS USING PYTHON	
*CS 104 strongly recommended		
<b>Technical Writing</b>		<b>3</b>
EH 301	TECHNICAL WRITING	

## Major Requirements

Code	Title	Semester Hours
<b>Earth System Science Core</b>		<b>20</b>
ESS 103 & 103L	ENVIRONMENTAL EARTH SCIENCE and LABORATORY	
ESS 111 & 111L	WEATHER, CLIMATE & GLOBAL CHNG and LABORATORY	
ESS 209	DATA ANALYSIS TOOLS	
ESS 301	INTRO TO EARTH & ATMOSPHERIC PHYS <sup>5</sup>	
ESS 303	CLASSICAL & PHYSICAL CAUSES CLIM <sup>5</sup>	
ESS 370	INTRODUCTION TO REMOTE SENSING <sup>5</sup>	
ESS 498	RESEARCH & PROF DEV CAPSTONE	
<b>Atmospheric Science Concentration Requirements</b>		<b>19</b>
ESS 212 & 212L	SEVERE WEATHER ANALYSIS and LABORATORY	
ESS 305	HYDROLOGY <sup>5</sup>	
ESS 321	POLLUTION PROBLEMS	
ESS 341	THERMODYNAMIC METEOROLOGY	
ESS 351	DYNAMIC METEOROLOGY	
ESS 409 or ESS 408	SCI PROGRAMMING FOR EARTH & ATMOS <sup>5</sup> PYTHON FOR GIS	
Atmospheric Science Concentration elective courses: Choose at least 11 credit hours		14-16
ESS 313	GEOGRAPHIC INFORMATION SYSTEMS (GEOGRAPHIC INFORMATION SYSTEMS) <sup>7</sup>	
ESS 352	SYNOPTIC METEOROLOGY <sup>6</sup>	
ESS 408 or ESS 409	PYTHON FOR GIS <sup>7</sup> SCI PROGRAMMING FOR EARTH & ATMOS	
ESS 410	OPERATIONAL WEATHER FORECASTING <sup>6</sup>	
ESS 414	GEOSPATIAL APPLICATIONS <sup>7</sup>	
ESS 420	INTRO ATMOSPHERIC CHEM & AIR POLLU	
ESS 441	ATMOSPHERIC THERMODYNAMICS & CLOUD PHYSICS <sup>5</sup>	
ESS 451	ATMOSPHERIC FLUID DYNAMICS I	
ESS 454	FORECASTING MESOSCALE PROC <sup>6</sup>	
ESS 461	ATMOSPHERIC RADIATION I	

ESS 471	RADAR METEOROLOGY
ESS 472	SATELLITE METEOROLOGY
ESS 495	DIRECTED STUDY <sup>8</sup>
ESS 497	UNDERGRADUATE INTERNSHIP
ESS 499	UNDERGRADUATE RESEARCH <sup>8</sup>

Elective Requirements

Code	Title	Semester Hours
<b>Elective Courses</b>		<b>9-11</b>
Additional Elective courses 100+ level to reach 128 credit hours. Electives can be taken from any department and do not have to be taken in your major or minor. No more than 4 credits of 100 level HPE courses can count toward degree requirements.		

Overall Requirements

Code	Title	Semester Hours
All College of Science degrees must have at least 128 credits.		
At least 39 of the 128 credits must be at the 300+ level. These may be taken in any area including electives.		

**Total Semester Hours** **128**

- 1 Students must take one literature and one history course. Students must also take either a second literature or history course to complete a sequence. Acceptable Literature sequences must include one early literature (EH 207 or EH 242 or EH 209) and one later literature (EH 208 or EH 210). Acceptable history sequences are (HY 103 + HY 104), or (HY 221 + HY 222)
- 2 Based on Math placement, (<http://www.uah.edu/science/departments/math/undergraduate-students/placement/>) prerequisite MA 112 and/ or MA 113 Mathematics courses may be required.
- 3 No more than 6 credit hours can be taken in a single discipline.
- 4 For choices see the World Languages and Cultures (<http://catalog.uah.edu/undergrad/colleges-departments/arts-humanities-social-sciences/foreign-languages-literatures/#coursestext>) department.
- 5 PH 111 + PH 114, PH 112 + PH 115, MA 238, MA 385, CH 121+ CH 125, ESS 301, ESS 303, ESS 305, ESS 351, ESS 370, ESS 409, ESS 441, ESS 471. These courses partially satisfy the National Weather Service GS-1340 Federal Civil Service Requirements.
- 6 ESS 410, ESS 352, ESS 454. Choose at least two of these elective courses to complete the National Weather Service GS-1340 Federal Civil Service Requirements.
- 7 ESS 313, ESS 408 and ESS 414. Student may choose 2 of these 3 GIS tools courses to count in the 'choose 5 electives' section.
- 8 ESS 495 or ESS 497 or ESS 499. Students may choose one of these courses to count as an Atmospheric Science/Meteorology concentration elective.

**Sample four year plan for Earth System Science, Atmospheric Science/Meteorology Concentration, BS degree:**

Note: This is only an example and variations are possible.

**Year 1**

Fall		Semester Hours
FYE 101S	CHARGER SUCCESS - SCIENCE	1
ESS 103 & 103L	ENVIRONMENTAL EARTH SCIENCE and LABORATORY	4
ESS 111 & 111L	WEATHER, CLIMATE & GLOBAL CHNG and LABORATORY	4
MA 171	CALCULUS A	4
EH 101	COLLEGE WRITING I	3
Term Semester Hours:		16
<b>Spring</b>		
ESS 212 & 212L	SEVERE WEATHER ANALYSIS and LABORATORY	4
MA 172	CALCULUS B	4

PH 111 & PH 114	GEN PHYSICS W/CALCULUS I and GENERAL PHYSICS LAB I	4
EH 102	COLLEGE WRITING II	3
Elective		1

Electives can be taken from any department and do not have to be taken in your major or minor. No more than 4 credit hours of 100 level HPE courses can count toward degree requirements.

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	Term Semester Hours:	16
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**Year 2****Fall**

ESS 209	DATA ANALYSIS TOOLS	2
ESS 301	INTRO TO EARTH ATMOSPHERIC PHYS	3
CS 102 or CS 103	INTRO TO C PROGRAMMING or INTRO PROGRAMMING USING JAVA	3
or CS 104	or INTRO TO CS USING PYTHON	

\*CS 104 strongly recommended

MA 201	CALCULUS C	4
PH 112 & PH 115	GEN PHYSICS W/CALC II and GENERAL PHYSICS LAB II	4

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	Term Semester Hours:	16
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**Spring**

ESS 105	WORLD REGIONAL GEOGRAPHY	3
ESS 303	CLASSICAL PHYSICAL CAUSES CLIMATE	3
MA 238	APPLIED DIFFERENTIAL EQUATIONS	3
CH 121 & CH 125	GENERAL CHEMISTRY I and GENERAL CHEMISTRY LAB I	4
Fine Art		3

See Requirements tab for approved list.

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	Term Semester Hours:	16
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**Year 3****Fall**

ESS 110	PRINCIPLES OF HUMAN GEOGRAPHY	3
ESS 321	POLLUTION PROBLEMS	3
ESS 341	THERMODYNAMIC METEOROLOGY	3
ESS 351	DYNAMIC METEOROLOGY	3
MA 385	INTRO TO PROBABILITY STATISTICS	3
Elective		1

Electives can be taken from any department and do not have to be taken in your major or minor. No more than 4 credit hours of 100 level HPE courses can count toward degree requirements.

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	Term Semester Hours:	16
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**Spring**

ESS 305	HYDROLOGY	3
ESS 352	SYNOPTIC METEOROLOGY	3
ESS 370	INTRODUCTION TO REMOTE SENSING	3
ESS 498	RESEARCH PROF DEV CAPSTONE	1

History		3
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See Requirements tab for approved list.

Literature		3
See Requirements tab for approved list.		
Term Semester Hours:		16
<b>Year 4</b>		
<b>Fall</b>		
ESS 409	SCI PROGRMNG FOR EARTH ATMOS	3
or ESS 408	or PYTHON FOR GIS	
ESS 410	OPERATIONAL WEATHER FORECAST'G	3
EH 301	TECHNICAL WRITING	3
CM 113	Intro to Rhetorical Communication	3
2nd History or 3rd Social and Behavioral Science		3
See Requirements tab for approved list.		
Elective		1
Electives can be taken from any department and do not have to be taken in your major or minor. No more than 4 credit hours of 100 level HPE courses can count toward degree requirements.		
Term Semester Hours:		16
<b>Spring</b>		
ESS 454	FORECASTING MESOSCALE PROC	3
ESS 471	RADAR METEOROLOGY	3
Humanities, 2nd Fine Art or 2nd Literature		3
See Requirements tab for approved list.		
Elective		3
Elective		3
Elective		1
Electives can be taken from any department and do not have to be taken in your major or minor. No more than 4 credit hours of 100 level HPE courses can count toward degree requirements.		
Term Semester Hours:		16
Total Semester Hours:		128