

## COLLEGE OF SCIENCE

# Atmospheric & Earth Science, BS Earth System Science Concentration

2022-2023 Catalog | catalog.uah.edu

Completed	Course Number	Credits	Course Name	Prerequisites, Corequisites and/or Prerequisites with Concurrency	Semester Usually Offered
				Foundations	
			<u> </u>	credits - see attached for more options	
	EH 101	3	College Writing I	<u>Placement</u>	FA/SP/SU
	EH 102	3	College Writing II	EH 101 or EH 101S	FA/SP/SU
	EH 103	3	Accelerated College Writing	<u>Placement</u>	SP
	EH 105	3	Honors English Seminar	Honors	FA
			Area II: Humanities	and Fine Arts 12 credits	
		3	Fine Art	See attached for choices	
		3	Literature	Completion of Area I	
		3	Non-Literature Humanity	See attached for choices	
	*	3	Humanities/Fine Arts/Literature	See attached for choices	
		J		and Sciences 11-12 credits	
				ics 3-4 credits	
	MA 120 (or MA 171/171S)	3-4	Math Professional Applications (or Calculus A)	<u>Placement</u> or MA 107, 112 (or MA 113 or 115)	FA/SP/SU
				ces (Lab) 8 credits	
_	PH 101/101L		General Physics I + Lab		
	(or PH 111/115)	4	(or General Physics w/ Calculus I +	(or MA 171)	FA/SP/SU
	PH 102/102L		General Physics II + Lab	PH 101	
	(or PH 112/116)	4	(or General Physics w/ Calculus II +	(or MA 172, PH 111/114)	FA/SP/SU
	(01111112/110)		•	k Behavioral Sciences 12 credits	
		3	History	See attached for choices	
	AES 105	3	World Geography	Strongly Recommended, see attached for all choices	FA/SP
	AES 110	3	Human Geography	Strongly Recommended, see attached for all choices	FA/SP
		3	History/Social & Behavioral Science	See attached for choices	
	EVE 1010	1		ience Majors (ESS) 14-15 credits	ΕΛ
	FYE 101S	1	Charger Success - Science	REQUIRED	FA
		3	Intro to Computer Programming	See attached for choices	
		4	Biology or Chemistry	See attached for choices	
	MA 281	3	Math Professional Applications	MA 113, 115, or <u>Placement</u>	FA/SP
ш	(or MA 172)	(4)	(or Calculus B)	(or MA 171)	(FA/SP/SU)
		3	Applied Statistics course	See attached for choices	
			Atmospheric & Earth	Science Core 17 credits	
	AES 103/103L	4	Environmental Earth Science + Lab		FA/SP
	AES 104/ 104L	4	Weather & Climate Change + Lab		FA/SP
	AES 209	2	Data Analysis Tools	AES 103, 104, and CS 102+ w/conc	FA/SP
	AES 301	3	Intro to Earth & Atmos Physics	AES 103, 104, PH 101 or 111, MA 120 or 171	FA/SP
	AES 303	3	Class/Physical Causes Climate	AES 103, 104, PH 101 or 111, MA 120 or 171	SP
	AES 498	1	Research & Prof Dev Capstone	Junior or Senior Standing (61+ credit hours)	FA/SP
	AES 490	1	·	Concentration 15 credits	FA/SF
	AES 305	4	-	AES 103, 104, MA 120 oR 171, and PH 101 or 111	SP
Ш		4	Hydrology		ЭГ
	AES 312	3	Principles of Ecology (or Pollution Problems)	BYS 120  (AES 103 104 CH 101 or 121 MA 120+ PH 101 or 111)	FA/SP
	(or AES 321)	1	(	(AES 103, 104, CH 101 or 121, MA 120+, PH 101 or 111)	
	AES 313	3	Geographic Information Systems	AES 103 and CS 102/103/104	FA/SP
	AES 370	3	Introduction to Remote Sensing	AES 103, 104, CS 102/103/104, MA 120+, PH 101 or 111	FA/SP
	AES 408	3	Python for GIS	AES 313	SP
	(or AES 409)		(or Sci Programming for Earth/Atmos)		(FA)
				Choose 17-18 credits: 6 credits must be 400+ level	
4500				nly one of these courses to count as a concentration elective.	. 1
	12, AES 321, AES 40	ö, AES 409	y - Each of these courses can be used t	o satisfy a concentration requirement or an elective requirem	ent, but not both.
			Genera	al Electives	
	Е	lective cou		nt and do not have to be taken in your major or minor.	
			Total = 1 <u>20+ c</u>	redits to graduate	



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		Charger Foundations Choices	
I. Freshman Composition	College Writing I & II (EH 101 + 102) Intensive Writing & Studio & Freshman Comp II (EH 101S + 101L & EH 102) Honors English Seminar (EH 105; equivalent to EH 101 & EH 102) Accelerated College Writing (EH 103: equivalent to EH 101 & EH 102)		
II. Fine Arts	Choose 1	Ancient to Medieval Art (ARH 100) Renaissance to Modern Art (ARH 101) World Art (ARH 103) Introduction to Drawing (ARS 160) Intro to Film Studies (FMA 123) Intro to Music Literature (MU 100) Theatre Appreciation (TH 122)	
II. Humanities (Literature)	Choose 1	Readings Literature/Culture I (EH 207) Readings Literature/Culture II (EH 208) Honors Literature/Culture I (EH 209) Honors Literature/Culture II (EH 210) Literature Without Borders (EH 241)	Mythology (EH 242) Protest Literature (EH 243) Heroes &/or Monsters (EH 244) Love &/or Romance (EH 245) Speculative Realities (EH 246)
II. Humanities (Non-Literature)	Choose 1	Ancient to Medieval Art (ARH 100) Renaissance to Modern Art (ARH 101) World Art (ARH 103) Introduction to Drawing (ARS 160) Ancient & Medieval Worlds (AMS 229) Public Speaking (CM 113) Intro to Film Studies (FMA 123) Intro to Music Literature (MU 100) Intro to Philosophy (PHL 101)	Intro to Philosophy (PHL 101) Intro to Ethics (PHL 102) Intro to Logic (PHL 103) Science, Tech & Human Values (PHL 150) Theatre Appreciation (TH 122) Intro to Women's Studies (WGS 200) Foreign Language (WLC 101) International Cinema (WLC 204)
III. Mathematics	Choose 1	Math Professional Applications (MA 120) Calculus A (MA 171 or MA 171S)	
III. Natural Sciences (Lab) Sequence	Choose 1 sequence	Physics w/ Calculus I (PH 111/114) and Physics w/ Calculus II (PH 112/115) General Physics I (PH 101/101L) and General Physics II (PH 102/102L)	
IV. History	Choose 1	World History I (HY 103) World History II (HY 104)	United States to 1877 (HY 221) United States Since 1877 (HY 222)
IV. Social & Behavioral Sciences	Choose 2	World Geography (AES 105) Human Geography (AES 110) Global systems & Cultures (GS 200) Macroeconomics (ECN 142) Microeconomics (ECN 143) American Gov't (PSC 101) Politics & Foreign Govt (PSC 102)	International Relations (PSC 260) General Psychology (PY 101) Life Span Development (PY 201) Intro to Sociology (SOC 100) Analysis of Social Problems (SOC 102) Intro to Criminology (SOC 103)
Stude	nts must also ta	Students must take one literature and one h	
Area II Sequence		rature <b>AND</b> History or Social & Behavioral Science	
<u>OR</u>			
Area IV Sequence	Take either 2 <sup>n</sup>	<sup>d</sup> History <b>OR</b> 3 <sup>rd</sup> Social & Behavioral Science <b>AND</b> Fine Art	s or Non-Literature Humanities or Literature Humanities
		Area V. Choices	
Biology or Chemistry	Choose 1	Organismal Biology + Lab (BYS 120/121) Intro to Chemistry + Lab (CH 101/105) General Chemistry I + Lab (CH 121/125)	
Computer Programming	Choose 1	Intro to Computers & Programming (CS 100) Intro to C Programming (CS 102) Intro to Programming Using JAVA (CS 103) Intro to CS Using Python (CS 104)	
Applied Statistics	Choose 1	Elements of Statistics Analysis (MA 281) Probability & Statistics (MA 385) Intro to Social Science Statistics (PSC 300) Psychological Statistics (PY 300) Statistics for Social Sciences (SOC 303)	
		Major Choices  AES 305 Hydrology*	
Concentration Electives	Choose 17 Credits (9 @ 400+)	AES 305 Hydrology* AES 313 Geographic Information Systems AES 313 Geographic Information Systems AES 321 Pollution Problems AES 352 Synoptic Meteorology* AES 370 Intro to Remote Sensing AES 402 Natural Disasters AES 408 Python for GIS AES 409 Scientific Programming for Earth & Atmos AES 410 Operational Weather Forecasting* AES 414 Geospatial Applications AES 420 Intro Atmospheric Chemistry & Air Pollution	AES 441 Atmospheric Thermodynamics & Cloud Physics AES 451 Atmospheric Fluid Dynamics I AES 454 Forecasting Mesoscale Proc* AES 461 Atmospheric Radiation I AES 471 Radar Meteorology AES 472 Satellite Meteorology* AES 490 Special Topics in Earth & Atmos AES 495 Directed Study AES 497 Undergrad Internship AES 499 Undergrad Research

<sup>\*</sup>MA 281can be used to satisfy the Area V Mathematics requirement  $\underline{or}$  the Applied Statistics requirement, but not both. **Strongly recommended.** 



#### **COLLEGE OF SCIENCE**

## **Atmospheric & Earth Science, BS** Atmospheric Science & Meteorology Concentration 2022-2023 Catalog | catalog.uah.edu

Completed	Course Number	Credits	Course Name	Prerequisites, Corequisites, and/or Prerequisites with Concurrency	Semester Usually Offered	
			Charger Foun			
			Area I: Freshman Composition 6 credit			
	EH 101	3	College Writing I	<u>Placement</u>	FA/SP/SU	
	EH 102	3	College Writing II	EH 101 or EH 101S	FA/SP/SU	
	EH 103	3	Accelerated College Writing	<u>Placement</u>	SP	
	EH 105	3	Honors English Seminar	Honors	FA	
Area II: Humanities and Fine Arts 12 credits						
		3	Fine Art	See attached for choices		
		3	Literature	Completion of Area I		
		3	Non-Literature Humanity	See attached for choices		
	*	3	Humanities/Fine Arts/Literature	See attached for choices		
			Area III: Mathematics and			
			Mathematics 4			
	MA 171 or MA 171S	4	Calculus A	MA 113, 115, or <u>Placement</u>	FA/SP/SU	
	DI 111/114	2 /1	Natural Sciences (L	MA 171	FA/SP/SU	
	PH 111/114	3/1	Physics w/ Calculus I + Lab			
	PH 112/115	3/1	Physics w/ Calculus II + Lab	PH 111/114, MA 172	FA/SP/SU	
			Area IV: History and Social & Beh			
		3	History	See attached for choices		
	AES 105	3	World Geography	Strongly Recommended, see attached for all choices	SP	
	AES 110	3	Human Geography	Strongly Recommended, see attached for all choices	FA	
		3	History/Social & Behavioral Science	See attached for choices		
			Area V: Pre-Pro	fessional		
			For Atmospheric & Earth Science	ce Majors (ATS) 22 credits		
	FYE 101S	1	Charger Success - Science	REQUIRED	FA	
		3	Intro to Computer Programming	See attached for choices		
	CH 121/125	3/1	General Chemistry I + Lab	Placement or MA 113 w/ conc	FA/SP/SU	
	MA 172	4	Calculus B	MA 171	FA/SP/SU	
	MA 201	4	Calculus C	MA 171	FA/SP/SU	
	MA 238	3	Applied Differential Equations	MA 172, 201 w/ conc	FA/SP/SU	
		3	Applied Statistics Course	See attached for choices		
			Major Requir			
_	. ==		Atmospheric & Earth Scie	nce Core 1 / credits		
	AES 103/103L	4	Environmental Earth Science + Lab		FA/SP	
	AES 104/ 104L	4	Weather & Climate Change + Lab		FA/SP	
	AES 209	2	Data Analysis Tools	AES 103, 104 and CS 102+ w/ conc	FA/SP	
	*AES 301	3	Intro to Earth & Atmos Physics	AES 103, 104, PH 101 or 111, MA 120 or 171	FA/SP	
	*AES 303	3	Class/Physical Causes Climate	AES 103, 104, PH 101 or 111, MA 120 or 171	SP	
	AES 498	1	Research & Prof Dev Capstone	Junior or Senior Standing (61+ credits)	FA/SP	
			Atmospheric Science/Meteorolog	gy Concentration 16 credits		
	AES 212/212L	4	Severe Weather Analysis	AES 104	SP	
	AES 321		Pollution Problems	AES 103, 104, CH 101 or 121, MA 120+, PH 101 or 111	FA	
	(or AES 370)	3	(or Intro to Remote Sensing)	(AES 370: and CS 102, 103, or 104)	(SP)	
	*AES 341	3	Thermodynamic Meteorology	AES 209, 212, 301, and CS 102/103/104 preregs w/ conc: MA 201, PH 112	FA	
	*AES 351	3	Dynamic Meteorology	AES 301, PH 111, CS 102/103/104 prereq w/ conc: MA 201	FA	
	AES 408 (or AES 409)	3	Python for GIS (or Sci Programming for Earth/Atmos)	AES 313 (AES 409: AES 301, CS 102/103/104,	SP (EA)	
	(OI AES 409)		:	MA 172, PH 112/115)	(FA)	
				ives Choose 17 credits: 9 credits must be 400+ level		
*^ = 20 =	Atmo					
*AES 305, /	<b>Atmo</b> AES 352, AES 410, AI AES 313, A	ES 454, AE: AES 408, ar	S 471, AES 472. These courses count toward AES 414 - Student may choose 2 of these	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives.	rvice Requirements	
	Atmo AES 352, AES 410, AI AES 313, A AES 495	ES 454, AE AES 408, ar or AES 497	S 471, AES 472. These courses count towar nd AES 414 - Student may choose 2 of thes 7 or AES 499 - Student may choose only on	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives. le of these courses to count as a concentration elective.		
	Atmo AES 352, AES 410, AI AES 313, A AES 495	ES 454, AE AES 408, ar or AES 497	S 471, AES 472. These courses count towar nd AES 414 - Student may choose 2 of thes 7 or AES 499 - Student may choose only on	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives.		
	Atmo AES 352, AES 410, AI AES 313, A AES 495	ES 454, AE AES 408, ar or AES 497	S 471, AES 472. These courses count towar nd AES 414 - Student may choose 2 of thes 7 or AES 499 - Student may choose only on	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives. le of these courses to count as a concentration elective.		
AES 32	Atmo AES 352, AES 410, AI AES 313, A AES 495	ES 454, AE AES 408, ar or AES 497	S 471, AES 472. These courses count towar nd AES 414 - Student may choose 2 of thes 7 or AES 499 - Student may choose only on	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives. le of these courses to count as a concentration elective.		
AES 32	Atmo AES 352, AES 410, AI AES 313, A AES 495	ES 454, AE AES 408, ar or AES 497	S 471, AES 472. These courses count towar nd AES 414 - Student may choose 2 of thes 7 or AES 499 - Student may choose only on	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives. le of these courses to count as a concentration elective.		
AES 32	Atmo AES 352, AES 410, AI AES 313, A AES 495	ES 454, AE AES 408, ar or AES 497	S 471, AES 472. These courses count towar nd AES 414 - Student may choose 2 of thes 7 or AES 499 - Student may choose only on	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives. le of these courses to count as a concentration elective.		
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AES 32	Atmo AES 352, AES 410, AI AES 313, A AES 495	ES 454, AE AES 408, ar or AES 497	S 471, AES 472. These courses count towar nd AES 414 - Student may choose 2 of thes 7 or AES 499 - Student may choose only on	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives. le of these courses to count as a concentration elective.		
AES 3:	Atmo AES 352, AES 410, AI AES 313, A AES 495	ES 454, AE AES 408, ar or AES 497	S 471, AES 472. These courses count towar nd AES 414 - Student may choose 2 of thes 7 or AES 499 - Student may choose only on	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives. le of these courses to count as a concentration elective.		
AES 32	Atmo AES 352, AES 410, AI AES 313, A AES 495	ES 454, AE AES 408, ar or AES 497	S 471, AES 472. These courses count toward AES 414 - Student may choose 2 of thes 7 or AES 499 - Student may choose only on - Each of these courses can be used to sati	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives. It is of these courses to count as a concentration elective. Sfy a concentration requirement or an elective requirement		
AES 3:	Atmo AES 352, AES 410, AI AES 313, A AES 495 21, AES 370, AES 408	ES 454, AE: AES 408, ar or AES 49: 3, AES 409	S 471, AES 472. These courses count toward AES 414 - Student may choose 2 of these or AES 499 - Student may choose only on - Each of these courses can be used to sati	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives. e of these courses to count as a concentration elective. sfy a concentration requirement or an elective requiremen		
AES 32	Atmo AES 352, AES 410, AI AES 313, A AES 495 21, AES 370, AES 408	ES 454, AE: AES 408, ar or AES 49: 3, AES 409	S 471, AES 472. These courses count toward AES 414 - Student may choose 2 of these or AES 499 - Student may choose only on - Each of these courses can be used to sati	rds the National Weather Service GS-1340 Federal Civil Se e 3 GIS tools courses to count as concentration electives. the of these courses to count as a concentration elective. Sfy a concentration requirement or an elective requirement or		



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# Atmospheric & Earth Science, BS Atmospheric Science & Meteorology Concentration

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		Charger Foundations Choices	
I. Freshman Composition	( h000 1 )		
II. Fine Arts	Choose 1	Ancient to Medieval Art (ARH 100) Renaissance to Modern Art (ARH 101) World Art (ARH 103) Introduction to Drawing (ARS 160) Intro to Film Studies (FMA 123) Intro to Music Literature (MU 100) Theatre Appreciation (TH 122)	
II. Humanities (Literature)	Choose 1	Readings Literature/Culture I (EH 207) Readings Literature/Culture II (EH 208) Honors Literature/Culture I (EH 209) Honors Literature/Culture II (EH 210) Literature Without Borders (EH 241)	Mythology (EH 242) Protest Literature (EH 243) Heroes &/or Monsters (EH 244) Love &/or Romance (EH 245) Speculative Realities (EH 246)
II. Humanities (Non-Literature)	Choose 1	Ancient to Medieval Art (ARH 100) Renaissance to Modern Art (ARH 101) World Art (ARH 103) Introduction to Drawing (ARS 160) Ancient & Medieval Worlds (AMS 229) Public Speaking (CM 113) Intro to Film Studies (FMA 123) Intro to Music Literature (MU 100) Intro to Philosophy (PHL 101)	Intro to Philosophy (PHL 101) Intro to Ethics (PHL 102) Intro to Logic (PHL 103) Science, Tech & Human Values (PHL 150) Theatre Appreciation (TH 122) Intro to Women's Studies (WGS 200) Foreign Language (WLC 101) International Cinema (WLC 204)
III. Mathematics	$\rightarrow$	Calculus A (MA 171 or MA 171S)	
III. Natural Sciences (Lab) Sequence	$\rightarrow$	Physics w/ Calculus I (PH 111/114) Physics w/ Calculus II (PH 112/115)	
IV. History	Choose 1	World History I (HY 103) World History II (HY 104)	United States to 1877 (HY 221) United States Since 1877 (HY 222)
IV. Social & Behavioral Sciences	Choose 2	World Geography (AES 105) Human Geography (AES 110) Global systems & Cultures (GS 200) Macroeconomics (ECN 142) Microeconomics (ECN 143) American Gov't (PSC 101) Politics & Foreign Govt (PSC 102)	International Relations (PSC 260) General Psychology (PY 101) Life Span Development (PY 201) Intro to Sociology (SOC 100) Analysis of Social Problems (SOC 102) Intro to Criminology (SOC 103)
Caudoute	must also taken	Students must take one literature and one histo	
		<ul> <li>either a second literature or history/social &amp; behaviora</li> <li>erature AND History or Social &amp; Behavioral Science</li> </ul>	i science course to complete a sequence.
Area II Sequence OR	Take a Z Lite	erature AND history or social & behavioral science	
Area IV Sequence	Take either 2 <sup>n</sup>	<sup>d</sup> History <b>OR</b> 3 <sup>rd</sup> Social & Behavioral Science <b>AND</b> Fine Arts	or Non-Literature Humanities or Literature Humanities
		Area V. Choices	
Computer Programming	Choose 1	Intro to Computers & Programming (CS 100) Intro to C Programming (CS 102) Intro to Programming Using JAVA (CS 103) Intro to CS Using Python (CS 104)	
Applied Statistics	Choose 1	Elements of Statistics Analysis (MA 281) Probability & Statistics (MA 385) Intro to Social Science Statistics (PSC 300) Psychological Statistics (PY 300) Statistics for Social Sciences (SOC 303)	
		Major Choices	
Concentration Electives	Choose 17 Credits (9 @ 400+)	AES 305 Hydrology* AES 313 Geographic Information Systems AES 321 Pollution Problems AES 352 Synoptic Meteorology* AES 370 Intro to Remote Sensing AES 402 Natural Disasters AES 408 Python for GIS AES 409 Scientific Programming for Earth & Atmos AES 410 Operational Weather Forecasting* AES 414 Geospatial Applications AES 420 Intro Atmospheric Chemistry & Air Pollution	AES 441 Atmospheric Thermodynamics & Cloud Physics AES 451 Atmospheric Fluid Dynamics I AES 454 Forecasting Mesoscale Proc* AES 461 Atmospheric Radiation I AES 471 Radar Meteorology AES 472 Satellite Meteorology* AES 490 Special Topics in Earth & Atmos AES 495 Directed Study AES 497 Undergrad Internship AES 499 Undergrad Research

Strongly recommended.