Mathematical Sciences, Double Major in Science or Dual Degree in Engineering, BS - Concentration III

Mathematical Sciences, Double Major or Dual Degree, **(**p. 1**) Concentration III, BS Requirements:**

- All students are encouraged to see an advisor after completion of 24 credits.
- Mathematical Sciences, Double Major or Dual Degree, Concentration III, BS degree requires a minimum of 128 credit hours depending upon the second major or dual degree chosen.
- 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 Foundation Requirements
*Please see Area V for CoS requirements that can also be used to fulfill Charger Foundations Requirements.

Code	Title	Semester Hours
Area I: Freshman Composition		**3-6**
EH 101	COLLEGE WRITING I	
or EH 101S	COLLEGE WRITING I W/STUDIO	
EH 102	COLLEGE WRITING II	
EH 103	ACCELERATED COLLEGE WRITING	
EH 105	HONORS ENGLISH SEMINAR	
Area II: Humanities and Fine Arts*		**12**
Fine Arts		3
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		3-6
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		3-6
CM 113	Intro to Rhetorical Communication	
WLC 101S	INTRO FOREIGN LANG I: SPANISH	
or WLC 101A	INTRO FOREIGN LANG I: ARABIC	
or WLC 101F	INTRO FOREIGN LANG I:FRENCH	
or WLC 101G	INTRO FOREIGN LANG I:GERMAN	
or WLC 101J	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	
Area III: Mathematics and Sciences		**11-12**
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	
Area IV: History and Social and Behavioral Sciences*		**12**
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 fulfill Charger Foundations requirements		
Communications		**3**
CM 113	Intro to Rhetorical Communication	
Physics sequence		**8**
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	
Additional Lab Science (may be fulfilled by second science major): choose one		**4**

AST 106 & 106L	EXPLORING THE COSMOS I and ASTRONOMY LABORATORY
CH 101 & CH 105	INTRO TO CHEMISTRY and INTRO CHEMISTRY LAB
CH 121 & CH 125	GENERAL CHEMISTRY I and GENERAL CHEMISTRY LAB I
ESS 103 & 103L	ENVIRONMENTAL EARTH SCIENCE and LABORATORY
ESS 111 & 111L	WEATHER, CLIMATE & GLOBAL CHNG and LABORATORY
BYS 119 & 119L	PRINCIPLES OF BIOLOGY and LABORATORY
PH 113 & PH 116	GEN PHYSICS W/CALC III and GENERAL PHYSICS LAB III
Computer Science	**6**
CS 102	INTRO TO C PROGRAMMING
or CS 104	INTRO TO CS USING PYTHON
CS 121	COMPUTER SCIENCE I
Technical Writing	**3**
EH 301	TECHNICAL WRITING

Major Requirements

Code	Title	Semester Hours
Mathematics Core		**21**
MA 171	CALCULUS A	
MA 172	CALCULUS B	
MA 201	CALCULUS C	
MA 244	INTRO TO LINEAR ALGEBRA	
MA 330	FOUNDATIONS OF MATH	
MA 385	INTRO TO PROBABILITY & STATIST	
Mathematics Double Major in Science or Dual Degree in Engineering Concentration III Requirements		**18**
MA 238	APPL DIFFERENTIAL EQUATIONS	
Choose one analysis course:		
MA 415	INTRO NUMERICAL METHODS	
MA 452	INTRO TO REAL ANALYSIS [5]	
MA 453	INTRO TO COMPLEX ANALYSIS	
MA 460	INTRO FOURIER ANALYSIS	
Choose one algebra course:		
MA 442	ALGEBRAIC STRUCTURES W/APPLIC [5]	
MA 450	COMBINATORIAL ENUMERATION	
MA 458	APPLIED LINEAR ALGEBRA	
MA 300+ level or higher course		
MA 300+ level or higher course		
MA 300+ level or higher course		

Second Major or Degree Requirements

Code	Title	Semester Hours
May be used to fulfill Charger Foundations or Pre Professional requirements - minimum of 36 credits		**36+**

Elective Requirements

Code	Title	Semester Hours
Elective Courses		**0-2**
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.		

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/) department.

5 If neither MA 442 or 452 is taken, choose an additional MA 300+ level or higher course.

Sample four year plan for Mathematical Sciences, Double major with Computer Science, Curriculum III, BS degree:

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

Year 1		
Fall		**Semester Hours**
FYE 101S	CHARGER SUCCESS - SCIENCE	1
MA 171	CALCULUS A	4
CS 102	INTRO TO C PROGRAMMING	3
or CS 104	or INTRO TO CS USING PYTHON	
EH 101	COLLEGE WRITING I	3
Social and Behavioral science		3
See Requirements tab for approved list.		
Fine art		3
See Requirements tab for approved list.		
	Term Semester Hours:	17
Spring		
MA 172	CALCULUS B	4
CS 121	COMPUTER SCIENCE I	3
PH 111 & PH 114	GEN PHYSICS W/CALCULUS I and GENERAL PHYSICS LAB I	4
EH 102	COLLEGE WRITING II	3
Social and Behavioral science		3
See Requirements tab for approved list.		
	Term Semester Hours:	17
Year 2		
Fall		
MA 201	CALCULUS C	4
CS 221	COMP SCI II: DATA STRUCTURES	3
CS 214	INTRO DISCRETE STRUCTURE	3
PH 112 & PH 115	GEN PHYSICS W/CALC II and GENERAL PHYSICS LAB II	4
Literature		3

See Requirements tab for approved list.		
	Term Semester Hours:	17
Spring		
MA 238	APPL DIFFERENTIAL EQUATIONS	3
MA 244	INTRO TO LINEAR ALGEBRA	3
CS 105	COMP SCI SEM:ETH/PROFESS	1
CS 309 & 309L	COMPUTER ORG & SWTCHNG THRY and LABORATORY	3
CS 321	INTRO OBJECT-ORIENTED PROG JAV	3
Lab Science		4
See Requirements tab for approved list.		
	Term Semester Hours:	17
Year 3		
Fall		
MA 330	FOUNDATIONS OF MATH	3
MA 385	INTRO TO PROBABILITY STATIST	3
CS 317	INTRO DESIGN/ANALYSIS OF ALG	3
CS 300+ level or higher course		3
CM 113	Intro to Rhetorical Communication	3
Humanities, 2nd Fine Art or 2nd Literature		3
See Requirements tab for approved list.		
	Term Semester Hours:	18
Spring		
MA 442	ALGEBRAIC STRUCTURES W/ APPLIC	3
or MA 450	or COMBINATORIAL ENUMERATION	
or MA 458	or APPLIED LINEAR ALGEBRA	
MA 300+ level or higher course		3
CS 413 & 413L	INTRO DIGITAL COMP ARCHITECTUR and LABORATORY	3
CS 300+ level or higher course		3
History		3
See Requirements tab for approved list.		
	Term Semester Hours:	15
Year 4		
Fall		
MA 415	INTRO NUMERICAL METHODS	3
or MA 452	or INTRO TO REAL ANALYSIS	
or MA 453	or INTRO TO COMPLEX ANALYSIS	
or MA 460	or INTRO FOURIER ANALYSIS	
MA 300+ level or higher course		3
CS 300+ level or higher course		3
CS 424	PRINCIPLES PROGRAMMING LANG	3
EH 301	TECHNICAL WRITING	3
2nd History or 3rd Social and Behavioral science		3

See Requirements tab for approved list.		
	Term Semester Hours:	18
Spring		
CS 490	INTRO TO OPERATING SYSTEMS	3
CS 499	SR PROJ:TEAM SOFTWARE DESIGN	3
MA 300+ level or higher course		3
CS 400+ level or higher course		3
CS 400+ level or higher course		3
	Term Semester Hours:	15
	Total Semester Hours:	134