

Bachelor of Science in Astronomy

The Bachelor of Science in astronomy requires 122 credit hours, including 23 hours in astronomy, 40 hours in physics, 14 hours in math, 3 hours in computer programming and 12 hours in technical electives.

Major courses

ASTR 221	Stars and Planets	3
ASTR 222	Galaxies and Cosmology	3
ASTR 306	Astronomical Techniques	3
ASTR 309	Astrophysics Seminar I	1
ASTR 310	Astrophysics Seminar II	1
ASTR 311	Stellar Physics	3
ASTR 323	The Local Universe	3
ASTR 328	Cosmology and the Structure of the Universe	3
ASTR 333	Dark Matter	3

Additional required courses

MATH 121	Calculus for Science and Engineering I	4
MATH 122	Calculus for Science and Engineering II	4
or MATH 124	Calculus II	
MATH 223	Calculus for Science and Engineering III	3
or MATH 227	Calculus III	
MATH 224	Elementary Differential Equations	3
or MATH 228	Differential Equations	
PHYS 121	General Physics I - Mechanics	4
or PHYS 123	Physics and Frontiers I - Mechanics	
PHYS 122	General Physics II - Electricity and Magnetism	4
or PHYS 124	Physics and Frontiers II - Electricity and Magnetism	
PHYS 203	Analog and Digital Electronics	4
PHYS 204	Advanced Instrumentation Laboratory	4
PHYS 221	Introduction to Modern Physics	3
PHYS 250	Computational Methods in Physics	3
PHYS 310	Classical Mechanics	3
PHYS 313	Thermodynamics and Statistical Mechanics	3
PHYS 324	Electricity and Magnetism I	3
PHYS 325	Electricity and Magnetism II	3
PHYS 331	Introduction to Quantum Mechanics I	3
PHYS 332	Introduction to Quantum Mechanics II	3
ENGR 131	Elementary Computer Programming	3

Approved technical electives (these can be from the Departments of Astronomy; Chemistry; Mathematics, Applied Mathematics, and Statistics; Physics; or Earth, Environmental, and Planetary Sciences. Check with advisor for complete list.) 12

MATH 201	Introduction to Linear Algebra for Applications
EEPS 345	Planetary Materials
PHYS 316	Introduction to Nuclear and Particle Physics
PHYS 349	Methods of Mathematical Physics I
PHYS 326	Physical Optics
PHYS 350	Methods of Mathematical Physics II

Total Units 92

Six hours of mathematics and natural science (physics) are double counted towards the SAGES breadth requirements, and one required math course is double counted towards the SAGES Quantitative Reasoning requirement.

Sample Plan of Study: Bachelor of Science in Astronomy

	Units	
	Fall	Spring
First Year		
Calculus for Science and Engineering I (MATH 121)	4	
General Physics I - Mechanics (PHYS 121) ^a	4	
PHED (2 half semester courses)	0	
SAGES First Seminar	4	
Social Science I	3	
Calculus for Science and Engineering II (MATH 122) or Calculus II (MATH 124)		4
General Physics II - Electricity and Magnetism (PHYS 122)		4
PHED (2 half semester courses)		0
Elementary Computer Programming (ENGR 131)		3
Doing Astronomy (ASTR 151) [*]		1
Arts & Humanities I		3
Year Total:	15	15

	Units	
	Fall	Spring
Second Year		
Stars and Planets (ASTR 221)	3	
Calculus for Science and Engineering III (MATH 223) or Calculus III (MATH 227)	3	
Introduction to Modern Physics (PHYS 221) ^a	3	
Analog and Digital Electronics (PHYS 203)	4	

SAGES University Seminar	3	
Galaxies and Cosmology (ASTR 222)		3
Elementary Differential Equations (MATH 224) or Differential Equations (MATH 228)		3
Advanced Instrumentation Laboratory (PHYS 204)		4
Computational Methods in Physics (PHYS 250)		3
SAGES University Seminar		3
Year Total:	16	16

Third Year

Units

Fall Spring

Cosmology and the Structure of the Universe (ASTR 328) ^b	3	
Thermodynamics and Statistical Mechanics (PHYS 313)	3	
Technical Elective	3	
Arts & Humanities II	3	
Social Science II	3	
Stellar Physics (ASTR 311) ^b		3
Electricity and Magnetism I (PHYS 324)		3
Classical Mechanics (PHYS 310)		3
Quantitative Reasoning		3
Technical Elective		3
Year Total:	15	15

Fourth Year

Units

Fall Spring

Astronomical Techniques (ASTR 306) ^b	3	
Astrophysics Seminar I (ASTR 309)	1	
The Local Universe (ASTR 323) ^b	3	
Electricity and Magnetism II (PHYS 325)	3	
Introduction to Quantum Mechanics I (PHYS 331)	3	
Astronomy Capstone Project (ASTR 351) ^c	1 - 3	
Technical Elective	3	
Astrophysics Seminar II (ASTR 310)		1
Dark Matter (ASTR 333) ^b		3
Introduction to Quantum Mechanics II (PHYS 332)		3
Astronomy Capstone Project (ASTR 351) ^c		1 - 3
Technical Elective		3
Global and Cultural Diversity		3

Year Total:

17-19 14-16

Total Units in Sequence:

123-127

a Selected students may be invited to take [PHYS 123](#) Physics and Frontiers I - Mechanics, [PHYS 124](#) Physics and Frontiers II - Electricity and Magnetism, in place of [PHYS 121](#) General Physics I - Mechanics, [PHYS 122](#) General Physics II - Electricity and Magnetism.

b [ASTR 306](#) Astronomical Techniques, [ASTR 311](#) Stellar Physics, [ASTR 323](#) The Local Universe, [ASTR 328](#) Cosmology and the Structure of the Universe , and [ASTR 333](#) Dark Matter are taught every other year only.

c A SAGES Capstone Experience is required of all students. The BS does not require the astronomy capstone but only that a capstone be taken. The number of hours shown assumes the astronomy capstone with 1 hour in the senior fall semester and 3 hours in the senior spring semester. If another capstone is taken, the number of hours may be different.

Bachelor of Arts in Astronomy

The Bachelor of Arts in astronomy requires 120 credit hours, including 20 hours in astronomy, 26 hours in physics, 14 hours in math, 3 hours in computer programming, and 6 hours in technical electives.

Required 200 Level Courses	6
ASTR 221 Stars and Planets	
ASTR 222 Galaxies and Cosmology	
Required 300 Level Courses	5
ASTR 306 Astronomical Techniques	
ASTR 309 Astrophysics Seminar I	
ASTR 310 Astrophysics Seminar II	
Additional 300 Level Courses—3 of 4 Required	9
ASTR 311 Stellar Physics	
ASTR 323 The Local Universe	
ASTR 328 Cosmology and the Structure of the Universe (Additional required courses)	
ASTR 333 Dark Matter	
Additional required courses	
MATH 121 Calculus for Science and Engineering I	4
MATH 122 Calculus for Science and Engineering II	4
or MATH 124 Calculus II	
MATH 223 Calculus for Science and Engineering III	3
or MATH 227 Calculus III	
MATH 224 Elementary Differential Equations	3
or MATH 228 Differential Equations	
PHYS 121 General Physics I - Mechanics	4
or PHYS 123 Physics and Frontiers I - Mechanics	
PHYS 122 General Physics II - Electricity and Magnetism	4
or PHYS 124 Physics and Frontiers II - Electricity and Magnetism	
PHYS 221 Introduction to Modern Physics	3
PHYS 250 Computational Methods in Physics	3
PHYS 310 Classical Mechanics	3
PHYS 313 Thermodynamics and Statistical Mechanics	3
PHYS 324 Electricity and Magnetism I	3
PHYS 331 Introduction to Quantum Mechanics I	3
ENGR 131 Elementary Computer Programming	3
Approved technical electives (consult advisor for other acceptable classes)	6
PHYS 204 Advanced Instrumentation Laboratory	

PHYS 316	Introduction to Nuclear and Particle Physics
PHYS 325	Electricity and Magnetism II
PHYS 326	Physical Optics
PHYS 332	Introduction to Quantum Mechanics II
Total Units	

69

Six hours of mathematics and natural science (physics) are double counted towards the SAGES breadth requirements, and one required math course is double counted towards the SAGES Quantitative Reasoning requirement.

Sample Plan of Study: Bachelor of Arts in Astronomy

	Units	
	Fall	Spring
Calculus for Science and Engineering I (MATH 121)	4	
General Physics I - Mechanics (PHYS 121)	4	
SAGES First Seminar	4	
PHED (2 half semester courses)	0	
Social Science I	3	
Calculus for Science and Engineering II (MATH 122) or Calculus II (MATH 124)		4
General Physics II - Electricity and Magnetism (PHYS 122)		4
Elementary Computer Programming (ENGR 131)		3
PHED (2 half semester courses)		0
Doing Astronomy (ASTR 151)*		1
Social Science II		3
Year Total:	15	15

	Units	
	Fall	Spring
Stars and Planets (ASTR 221)	3	
Calculus for Science and Engineering III (MATH 223) or Calculus III (MATH 227)	3	
Introduction to Modern Physics (PHYS 221)	3	
SAGES University Seminar	3	
Galaxies and Cosmology (ASTR 222)		3
Elementary Differential Equations (MATH 224) or Differential Equations (MATH 228)		3
Computational Methods in Physics (PHYS 250)		3
Classical Mechanics (PHYS 310)		3

SAGES University Seminar	3
Year Total:	12 15

Third Year	Units	
	Fall	Spring
Cosmology and the Structure of the Universe (ASTR 328)	3	
Thermodynamics and Statistical Mechanics (PHYS 313)	3	
Arts & Humanities I	3	
Arts & Humanities II	3	
Technical Elective	3	
Stellar Physics (ASTR 311)		3
Electricity and Magnetism I (PHYS 324)		3
Quantitative Reasoning		3
Technical Elective		3
Year Total:	15	12

Fourth Year	Units	
	Fall	Spring
Astronomical Techniques (ASTR 306) ^a	3	
Astrophysics Seminar I (ASTR 309)	1	
Introduction to Quantum Mechanics I (PHYS 331)	3	
Astronomy Capstone Project (ASTR 351) ^b	1 - 3	
Global and Cultural Diversity	3	
Astrophysics Seminar II (ASTR 310)		1
Dark Matter (ASTR 333)		3
Astronomy Capstone Project (ASTR 351) ^b		1 - 3
Year Total:	11-13	5-7

Total Units in Sequence: 100-104

a 300-level astronomy courses: three of the following five are required: [ASTR 306](#), [ASTR 311](#), [ASTR 323](#), [ASTR 328](#), [ASTR 333](#).

b A SAGES Capstone Experience is required of all students. The BA in astronomy does not require the astronomy capstone but only that a capstone be taken. The number of hours shown assumes the astronomy capstone with 1 hour in the senior fall semester and 3 hours in the senior spring semester. If another capstone is taken, the number of hours may be different.

* Suggested, but not required for the major.
