

**B.A. IN MUSIC *PLUS* A SECONDARY MAJOR IN
ASTRONOMY AND ASTROPHYSICS (A&A)**

- The B.A. degree in Music requires 120 credits.
--66 hours must be non-music credits.
--40 hours must be 300 or 400-level courses.
--All music majors have Arts Event Attendance Requirements; for details, check <https://www.butler.edu/jca/for-current-students>.
- The double major of Music and A&A will fulfill the following Areas of Inquiry in the University Core Curriculum: Perspectives of the Creative Arts, The Natural World, and Analytic Reasoning. In addition, the B.A. Music curriculum fulfills the Butler Cultural Requirement because of the arts event attendance requirements for all arts majors. The Indianapolis Community Requirement is NOT satisfied.
- The student will be assigned an A&A advisor in addition to their Music advisor.

Semester 1

AM 021*	Keyboard Skills 1	1
<i>*Piano majors substitute AM 031 and AM 032 plus two credits of music electives for AM 021,022,023,024.</i>		
AM ____	Major Instrument or Voice	2
ES ____	Major Ensemble	1
MT 101	Music Theory 1	3
MT 111	Aural Skills 1	1
FYS 101	First Year Seminar	3
MA 106*	Calculus & Anal. Geo. 1	4
PH 201	Intro to Anal. Physics 1	5
PH 490	Colloquium	0

TOTAL Credit Hours: 20

Semester 2

AM 022	Keyboard Skills 2	1
AM ____	Major Instrument or Voice	2
ES ____	Major Ensemble	1
MT 102	Music Theory 2	3
MT 112	Aural Skills 2	1
FYS 102	First Year Seminar	3
MA 107	Calculus & Anal Geo. 2	4
PH 202	Intro to Anal. Physics 2	5
PH 490	Colloquium	0

TOTAL Credit Hours: 20

**Math placement test required; the student may need to take MA 101 (Algebra, 3 cr.) and/or MA 102 (Precalculus, 3 cr.) prior to MA 106. Students get credit for MA 106 if they receive a 4 or 5 on the Calculus AB AP exam; they receive credit for both MA 106 and MA 107 if they receive a 4 or 5 on the Calculus BC AP exam with a 4 or 5 on the AB subscore.*

Summer

GHS ____	Global and Historical Studies	3
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Semester 3

AM 023	Keyboard Skills 3	1
AM ____	Major Instrument or Voice	2
ES ____	Major Ensemble	1

Semester 4

AM 024	Keyboard Skills 4	1
AM ____	Major Instrument or Voice	2
ES ____	Major Ensemble	1

ME 330	Self-Represent for Musicians	1	MT 202	Music Theory 4	3
MT 201	Music Theory 3	3	MT 212	Aural Skills 4	1
MT 211	Aural Skills 3	1			
WB ____	Well-Being	1			
MA 208	Calculus & Anal. Geo. 3	4	AS 301	Modern Astronomical Tech	3
AS 102	Modern Astronomy	3	MA 310	Linear Algebra	3
PH 301	Modern Physics	3	PH 303	Electromag Waves & Optics	4
PH 490	Colloquium	0	PH 490	Colloquium	0
TOTAL Credit Hours:		20			18

Semester 5

AM ____	Major Instrument or Voice	2
ES ____	Major Ensemble	1
MH 305	Music and Devotion	3
GHS ____	Global and Historical Studies	3
AS 311	Astrophysics 1	3
MA 334	Differential Equations	3
PH 331	Electromagnetic Theory	4
PH 490	Colloquium	0

TOTAL Credit Hours: 19

Semester 6

AM ____	Major Instrument or Voice	2
ES ____	Major Ensemble	1
MH 306	Music and Narrative	3
AS 312	Astrophysics 2	3
AS 340	Cosmol & Extragal Astrophy	3
CS 142	Intro to Comp Science & Prog	3
PH 321	Inter Classical Mechanics	4
PH 490	Colloquium	0

TOTAL Credit Hours: 19

****Not required for the A&A major, but recommended for students considering graduate school in A&A.**

Semester 7

AM ____	Major Instrument or Voice	2
ES ____	Major Ensemble	1
MH 307	Music, Globalization & Industry	3
TI ____	Texts and Ideas	3
PH 421**	Quantum Theory	4
PH 461**	Computational Physics	3
PH 495	Senior Seminar	1
Language Elective		3

Explanation: 6 hours of the same language at the 200-level or higher are required.

TOTAL Credit Hours: 20

Semester 8

AM ____	Major Instrument or Voice	2
ES ____	Major Ensemble	1
ME 430	E-Portfolio Capstone	0
MH 308-SJD	Music and Movement	3
SW ____	The Social World	3
PH 311**	Experimental Modern Physics	3
PH 325**	Thermodyn & Statistical Phys	4
PH 490	Colloquium	0
Language Elective		3

TOTAL Credit Hours: 19

****Not required for the A&A major, but recommended for students considering graduate school in A&A.**

SUMMARY

REQUIRED MUSIC COURSES:

Note: The 8-semester sequence shown above includes 4 additional semesters of Applied Music (8 credits) and 2 additional semesters of Major Ensemble (2 credits), in addition to the courses listed below. While not required in the B.A. degree, most music majors will take these additional classes for scholarship reasons.

AM 021,022,023,024	Keyboard Skills 1,2,3,4	4
<i>*Piano majors substitute AM 031 and AM 032 plus two credits of music electives.</i>		
AM ____	Major Instrument or Voice	8
ES ____	Major Ensemble	6
ME 330	Self-Representation for Musicians	1
ME 430	E-Portfolio Capstone	0
MH 305	Music and Devotion	3
MH 306	Music and Narrative	3
MH 307	Music, Globalization, and Industry	3
MH 308-SJD	Music and Movement	3
MT 101	Music Theory 1	3
MT 111	Aural Skills 1	1
MT 102	Music Theory 2	3
MT 112	Aural Skills 2	1
MT 201	Music Theory 3	3
MT 211	Aural Skills 3	1
MT 202	Music Theory 4	3
MT 212	Aural Skills 4	1
TOTAL		47 (plan shows 57 music credits per the note above)

UNIVERSITY CORE CURRICULUM:

FYS 101,102	First Year Seminar	3,3
GHS ____	Global and Historical Studies	3,3
SW ____	The Social World	3
TI ____	Texts and Ideas	3
WB ____	Well-Being	1
TOTAL		19

COURSES REQUIRED FOR THE ASRTRONOMY AND ASTROPHYSICS MAJOR:

NOTE: Many upper-level physics courses require one or more of the following math courses as prerequisites (included in the plan above):

MA 106*	Calculus & Anal Geometry 1	4
MA 107	Calculus & Anal Geometry 2	4
MA 208	Calculus & Anal Geometry 3	4
MA 310	Linear Algebra	3
MA 334	Differential Equations	3
AS 102	Modern Astronomy	3
AS 301	Modern Astronomical Techniques	3
AS 311	Astrophysics 1	3
AS 312	Astrophysics 2	3
AS 340	Cosmology & Extragalactic Astrophysics	3
CS 142	Introduction to Comp Science & Program	3
PH 201	Introduction to Analytical Physics 1	5
PH 202	Introduction to Analytical Physics 2	5

PH 301	Modern Physics	3
PH 303	Electromagnetic Waves and Optics	4
PH 321	Intermediate Classical Mechanics	4
PH 331	Electromagnetic Theory	4
PH 490	Colloquium (seven semesters)	0
PH 495	Senior Seminar	1
Language	6 hours of the same language at the 200-level or higher	
TOTAL		50 (plus 18 additional math credits, if necessary)

**Math placement test required; the student may need to take MA 101 (Algebra, 3 cr.) and/or MA 102 (Precalculus, 3 cr.) prior to MA 106. Students get credit for MA 106 if they receive a 4 or 5 on the Calculus AB AP exam; they receive credit for both MA 106 and MA 107 if they receive a 4 or 5 on the Calculus BC AP exam with a 4 or 5 on the AB subscore.*

Additional courses recommended for students (shown above):

PH 311	Experimental Modern Physics	3
PH 325	Thermodynamics and Statistical Physics	4
PH 421	Quantum Theory	4
PH 461	Computational Physics	3