ASTRONOMY - MASTER OF SCIENCE

The Astronomy Department at NMSU offers programs leading to the Master of Science and the Doctor of Philosophy degrees. Graduate courses (http://astronomy.nmsu.edu/?page_id=2503) cover topics in astrophysics, stellar atmospheres, observational techniques, the interstellar medium, galactic structure, star formation and evolution, extragalactic objects, cosmology, and solar system studies. Students also take courses in other relevant fields to broaden their knowledge and capabilities.

Upon successful completion of the written and oral portions of the PhD comprehensive exam, it is the intention of the department that a student be awarded an Master of Science degree in Astronomy. Other students may elect to pursue a Terminal Master's degree rather than a Doctor of Philosophy upon the advice of their committee.

Terminal Masters: Thesis track

The rules for a Terminal Master of Science: Thesis track are outlined below.

For the Terminal Master of Science degree in Astronomy, the student must satisfy the requirements of the Department as well as those established by the Graduate School. The Department requires a minimum of 33 credits of which six are generally for Master's Thesis research.

The MINIMUM course requirements for a Thesis MS will include

Prefix	Title	Credits
ASTR 500	Seminar (3 credits (1 per semester)) [5]	3
Choose five courses from the following ASTR courses [6]		15
ASTR 503	Fundamentals of Astrophysics	
ASTR 506	Dynamics and Hydrodynamics	
ASTR 530	Gas and Radiative Processes	
ASTR 535	Observational Techniques	
ASTR 545	Stellar Spectroscopy	
ASTR 555	Galaxies I	
ASTR 565	Stellar Interiors	
ASTR 605	Interstellar Medium	
ASTR 616	Galaxies II	
ASTR 620	Planetary Processes	
ASTR 621	Planetary System Formation	
ASTR 630	Statistical and Numerical Methods in Astrophysics	
ASTR 670	Heliophysics, Space Plasmas, and Space Weather	
ASTR 698	Special Topics.	
Select additional two courses from ASTR courses above, OR from the courses below [7]		6
PHYS 462	Intermediate Electricity and Magnetism II	
PHYS 511	Mathematical Methods of Physics I	
PHYS 554	Quantum Mechanics I	
PHYS 562	Electromagnetic Theory II	
PHYS 571	Advanced Experimental Optics	
PHYS 576	Advanced Computational Physics I	
E E 528	Fundamentals of Photonics	
E E 577	Fourier Methods in Electro-Optics	
CSCI 5996	Special Topics	
Special Research Programs [4]		
ASTR 598	Special Research Programs	3
Masters Research		
ASTR 599	Master's Thesis	6
Total Credits		**33**

[4] ASTR 598 Special Research Programs is generally taken in the student's 2nd year (fall or spring) and is intended to provide a semi-formal introduction to doing a research project. It may involve research that subsequently develops into a thesis project.

[5] ASTR 500 Seminar is 1-credit course. It should be taken each semester, for 3 total credits over this track

[6] Any 15 credits (5 courses) selected from these. Each course may only be taken for 3 credits.

[7] In addition to 5 courses from above, students should select another 2 courses (3 credits each, 6 credits total). This can be either another two astronomy graduate classes from above (which will make 7 total different astronomy courses) OR student may opt to take up to 2 out-of-department classes to fulfill the overall credit requirements if these classes are deemed by the student's committee to be appropriate to the student's program-of-study.
A maximum of one 3-credit course numbered between 450 and 499 can be applied to the out-of-department course/credit-hour requirement, and only with the approval of the student's Committee. Otherwise, out of department classes must be at the 500 or greater level.
If more than 6 credits of out-of-department classes are taken, they may potentially count toward the required total courses/credit hours, but only with the approval of the student's Committee. Traditionally, these have been in the area of PHYS, E E and CSCI, as listed. Other Physics courses, or courses offered by other departments such as Engineering, Geology, or Math, are also viable as out-of-department courses. Additionally, for those students intending to specialize in planetary science, courses taught in the Geology department and Geophysics courses taught in the Physics department should be considered.

Terminal Masters: Coursework-only track

The rules for a Terminal Master of Science: Coursework-only track are outlined below.

A thesis is nearly always required for a Terminal Master of Science degree. However, under some exceptional circumstances, the thesis requirement may be waived, in which case the credit requirements must be satisfied in formal course work. Such a waiver requires agreement by both the student's committee and the Department Head. In all cases, the student seeking a Terminal Master of Science degree must pass a final oral examination covering course and any relevant research work. Any regular Terminal Master of Science degree program will require a thesis.

For a student who has decided and been approved to pursue a Course-work only Master of Science Astronomy degree, the MINIMUM course requirements are:

Prefix	Title	Credits
ASTR 500	Seminar (3 credits (1 per semester)) [5]	3
Choose seven courses from the following ASTR courses [8]		21
ASTR 503	Fundamentals of Astrophysics	
ASTR 506	Dynamics and Hydrodynamics	

ASTR 530	Gas and Radiative Processes	
ASTR 535	Observational Techniques	
ASTR 545	Stellar Spectroscopy	
ASTR 555	Galaxies I	
ASTR 565	Stellar Interiors	
ASTR 605	Interstellar Medium	
ASTR 616	Galaxies II	
ASTR 620	Planetary Processes	
ASTR 621	Planetary System Formation	
ASTR 630	Statistical and Numerical Methods in Astrophysics	
ASTR 670	Heliophysics, Space Plasmas, and Space Weather	
ASTR 698	Special Topics.	
Select additional two courses from ASTR courses above, OR from the courses below [9]		6
PHYS 462	Intermediate Electricity and Magnetism II	
PHYS 511	Mathematical Methods of Physics I	
PHYS 554	Quantum Mechanics I	
PHYS 562	Electromagnetic Theory II	
PHYS 571	Advanced Experimental Optics	
PHYS 576	Advanced Computational Physics I	
E E 528	Fundamentals of Photonics	
E E 577	Fourier Methods in Electro-Optics	
CSCI 5996	Special Topics	
Special Research Programs [4]		
ASTR 598	Special Research Programs	3
Total Credits		**33**

[5] ASTR 500 Seminar is 1-credit course. It should be taken each semester, for 3 total credits over this track

[8] Any 21 credits (7 courses) selected from these. Each course may only be taken for 3 credits.

[9] In addition to 7 courses from above, students should select another 2 courses (3 credits each, 6 credits total). This can be either another two astronomy graduate classes from above (which will make 9 total different astronomy courses) OR student may opt to take up to 2 out-of-department classes to fulfill the overall credit requirements if these classes are deemed by the student's committee to be appropriate to the student's program-of-study.
A maximum of one 3-credit course numbered between 450 and 499 can be applied to the out-of-department course/credit-hour requirement, and only with the approval of the student's Committee. Otherwise, out of department classes must be at the 500 or greater level.
If more than 6 credits of out-of-department classes are taken, they may potentially count toward the required total courses/credit hours, but only with the approval of the student's Committee.
Traditionally, these have been in the area of PHYS, E E and CSCI, as listed. Other Physics courses, or courses offered by other departments such as Engineering, Geology, or Math, are also viable as out-of-department courses. Additionally, for those students intending to specialize in planetary science, courses taught in the Geology department and Geophysics courses taught in the Physics department should be considered.

[4] ASTR 598 Special Research Programs is generally taken in the student's 2nd year (fall or spring) and is intended to provide a semi-formal introduction to doing a research project. It may involve research that subsequently develops into a thesis project.

Masters degree: Upon completion of PhD comprehensive exam track

The requirements for the Masters track are for the student to have completed their PhD comprehensive exam, and the following credits:

Prefix	Title	Credits
ASTR 500	Seminar (4 credits (1 per semester)) [1]	4
Choose nine courses from the following ASTR courses [2]		27
ASTR 503	Fundamentals of Astrophysics	
ASTR 506	Dynamics and Hydrodynamics	
ASTR 530	Gas and Radiative Processes	
ASTR 535	Observational Techniques	
ASTR 545	Stellar Spectroscopy	
ASTR 555	Galaxies I	
ASTR 565	Stellar Interiors	
ASTR 605	Interstellar Medium	
ASTR 616	Galaxies II	
ASTR 620	Planetary Processes	
ASTR 621	Planetary System Formation	
ASTR 630	Statistical and Numerical Methods in Astrophysics	
ASTR 670	Heliophysics, Space Plasmas, and Space Weather	
ASTR 698	Special Topics.	
Select additional two courses from ASTR courses above, OR from the courses below [3]		6
PHYS 462	Intermediate Electricity and Magnetism II	
PHYS 511	Mathematical Methods of Physics I	
PHYS 554	Quantum Mechanics I	
PHYS 562	Electromagnetic Theory II	
PHYS 571	Advanced Experimental Optics	
PHYS 576	Advanced Computational Physics I	
E E 528	Fundamentals of Photonics	
E E 577	Fourier Methods in Electro-Optics	
CSCI 5996	Special Topics	
Special Research Programs [4]		
ASTR 598	Special Research Programs	3
Pre-dissertation Research [5]		
ASTR 600	Pre-dissertation Research	6
Total Credits		**46**

[1] ASTR 500 Seminar is 1-credit course. It should be taken each semesters, for 4 total credits over the program

[2] Any 27 credits (9 courses) selected from these. Each course may only be taken for 3 credits.

[3] In addition to 9 courses from above, students should select another 2 courses (3 credits each, 6 credits total). This can be either another two astronomy graduate classes from above (which will make 7 total different astronomy courses) OR student may opt to take up to 2 out-of-department classes to fulfill the overall credit requirements if these classes are deemed by the student's committee to be appropriate to the student's program-of-study.
A maximum of one 3-credit course numbered between 450 and 499 can be applied to the out-of-department course/credit-hour requirement, and only with the approval of the student's Committee. Otherwise, out of department classes must be at the 500 or greater level.

If more than 6 credits of out-of-department classes are taken, they may potentially count toward the required total courses/credit hours, but only with the approval of the student's Committee. Traditionally, these have been in the area of PHYS, E E and CSCI, as listed. Other Physics courses, or courses offered by other departments such as Engineering, Geology, or Math, are also viable as out-of-department courses. Additionally, for those students intending to specialize in planetary science, courses taught in the Geology department and Geophysics courses taught in the Physics department should be considered.

[4] ASTR 598 Special Research Programs is generally taken in the student's 2nd year (fall or spring) and is intended to provide a semi-formal introduction to doing a research project. It may involve research that subsequently develops into a thesis project.

Year A

A Suggested Plan of Study For Students

A typical roadmap for the Masters Thesis track program, including course and credit-hour minimum requirements, is summarized in the following table. Note there is some flexibility for each of these components, so students should confirm all their selections directly with their advisor. Most regular graduate courses (501-597, 601-699) are offered on a 2 year rotation. So specific courses will depend on whether a student is on a year A or Year B cycle. ASTR 503 Fundamentals of Astrophysics is offered each fall and should be taken by all students in their first year only. Students may opt for up to 2 courses (6 credits) from outside the department (See Course Requirements). ASTR 598 Special Research Programs and ASTR 599 Master's Thesis are offered every semester, as one-on-one research credits with an advisor.

For a student on wishing to pursue a Master Coursework-only track, they may substitute the 6 credits of 599 credits for any of the regular Yr A or Yr B courses

First Year		
Fall		**Credits**
ASTR 500	Seminar [1]	1
ASTR 503	Fundamentals of Astrophysics	3
Choose two courses from the following:		6
ASTR 535	Observational Techniques	
ASTR 565	Stellar Interiors	
ASTR 605	Interstellar Medium	
	Credits	**10**
Spring		
ASTR 500	Seminar [1]	1
Choose three courses from the following		9
ASTR 621	Planetary System Formation	
ASTR 630	Statistical and Numerical Methods in Astrophysics	
ASTR 670	Heliophysics, Space Plasmas, and Space Weather	
	Credits	**10**
Second Year		
Fall		
ASTR 500	Seminar [1]	1
Choose one from the following: [2]		3
ASTR 555	Galaxies I	
ASTR 620	Planetary Processes	
ASTR 698	Special Topics.	
Research Programs Course [2]		0-3
ASTR 598	Special Research Programs [2]	
ASTR 599	Master's Thesis [3,4]	3
	Credits	**7-10**
Spring		
ASTR 599	Master's Thesis [3, 4]	3-9
Choose one from the following:		3
ASTR 506	Dynamics and Hydrodynamics	
ASTR 545	Stellar Spectroscopy	
ASTR 616	Galaxies II	
Research Programs Course [2]		0-3
ASTR 598	Special Research Programs [2]	
	Credits	**6-15**
	Total Credits	**33-45**

[1] Students must take ASTR 500 Seminar as 1-credit in each of their first 3 semesters, for a total of 3 credits over 2 years

[2] Students must take ASTR 598 Special Research Programs for 3 credits during fall of Yr2 or spring of Yr2.

[3] Students on a Thesis track must take 6 total credits of ASTR 599 Master's Thesis in Yr 2. Students on a coursework-only track may substitute any 6 credits of regular Yr2 course in place of 599 credits

[4] Students on a Thesis track who have completed 10 credits in each of their first 3 semesters, including 3 ASTR 598 Special Research Programs and 3 ASTR 599 Master's Thesis in fall of Yr2 only require 3 credits of ASTR 599 in spring of Yr2 in order to meet minimum requirements as detailed in Course Requirements above. Students on a Coursework-only track who have completed 10 credits in each of their first 3 semester, including 3 ASTR 598, only require 3 more regular course credits in spring of Yr2. However graduate students must enroll in 9 credits each semester in order to remain full time and retain eligibility for an GA. For students in their final semester of dissertation writing, it is possible to petition the Graduate School for permission to enroll in fewer credits, for that one semester only, to reduce tuition expenses. For students who do not complete their Masters in 2 years, they should continue to enroll in ASTR 599 in future semesters.

Year B

A Suggested Plan of Study For Students

A typical roadmap for the Masters Thesis track program, including course and credit-hour minimum requirements, is summarized in the following table. Note there is some flexibility for each of these components, so students should confirm all their selections directly with their advisor. Most regular graduate courses (501-597, 601-699) are offered on a 2 year rotation. So specific courses will depend on whether a student is on a year A or Year B cycle. ASTR 503 Fundamentals of Astrophysics is offered each fall and should be taken by all students in their first year only. Students may opt for up to 2 courses (6 credits) from outside the department (See Course Requirements). ASTR 598 Special Research Programs and ASTR 599 Master's Thesis are offered every semester, as one-on-one research credits with an advisor.

For a student on wishing to pursue a Master Coursework-only track, they may substitute the 6 credits of 599 credits for any of the regular Yr A or Yr B courses

First Year		
Fall		**Credits**
ASTR 500	Seminar [1]	1
ASTR 503	Fundamentals of Astrophysics	3
Choose two courses from the following:		6
ASTR 555	Galaxies I	
ASTR 620	Planetary Processes	
ASTR 698	Special Topics.	
	Credits	**10**
Spring		
ASTR 500	Seminar [1]	1
Choose three from the following:		9
ASTR 506	Dynamics and Hydrodynamics	
ASTR 545	Stellar Spectroscopy	
ASTR 616	Galaxies II	
	Credits	**10**
Second Year		
Fall		
ASTR 500	Seminar [1]	1
Choose one from the following: [2]		3
ASTR 535	Observational Techniques	
ASTR 565	Stellar Interiors	
ASTR 605	Interstellar Medium	
Research Programs Course [2]		0-3
ASTR 598	Special Research Programs	
ASTR 599	Master's Thesis [3,4]	3
	Credits	**7-10**
Spring		
ASTR 599	Master's Thesis [3, 4]	3
Choose one from the following:		3
ASTR 621	Planetary System Formation	
ASTR 630	Statistical and Numerical Methods in Astrophysics	
Research Programs Course [2]		0-3
ASTR 598	Special Research Programs	
	Credits	**6-9**
	Total Credits	**33-39**

1. Students must take ASTR 500 Seminar as 1-credit in each of their first 3 semesters, for a total of 3 credits over 2 years
2. Students must take ASTR 598 Special Research Programs for 3 credits during fall of Yr2 or spring of Yr2.
3. Students on a Thesis track must take 6 total credits of ASTR 599 Master's Thesis in Yr 2. Students on a coursework-only track may substitute any 6 credits of regular Yr2 course in place of 599 credits
4. Students on a Thesis track who have completed 10 credits in each of their first 3 semesters, including 3 ASTR 598 Special Research Programs and 3 ASTR 599 Master's Thesis in fall of Yr2 only require 3 credits of ASTR 599 in spring of Yr2 in order to meet minimum requirements as detailed in Course Requirements above. Students on a Coursework-only track who have completed 10 credits in each of their first 3 semester, including 3 ASTR 598, only require 3 more regular course credits in spring of Yr2. However graduate students must enroll in 9 credits each semester in order to remain full time and retain eligibility for an GA. For students in their final semester of dissertation writing, it is possible to petition the Graduate School for permission to enroll in fewer credits, for that one semester only, to reduce tuition expenses. For students who do not complete their Masters in 2 years, they should continue to enroll in ASTR 599 in future semesters.

Master's Accelerate Program (MAP)

MAP Requirements

In addition to the requirements of the NMSU Graduate School, admission into the Astronomy MAP program requires:

A minimum GPA of 3.5
Student be classified as a rising junior
Completion of the MAP Referral Form and submission with all necessary signatures and anticipated course registrations prior to the first Friday of classes in the junior year.
Students may enroll in up to 12 credits of coursework at the 450+ level and count these credits toward their MS. At least 6 of these credits must come from graduate-level (500+) Astronomy courses, while the other 6 credits may be from outside the Astronomy Department (see below). A final grade of B or higher is required for a course to count toward the Astronomy MS. Students who complete all 12 credits with a final grade of B or higher may apply to the Astronomy MS program, but are not guaranteed admission. MAP-MS students must pass a final oral comprehensive exam toward the end of their MS year.

Students admitted to the Astronomy MAP-MS program will be considered for funding at 20 hours/week through Teaching Assistantships.

Prefix	Title	Credits
PHYS 471	Modern Experimental Optics	3
PHYS 476	Computational Physics	3
PHYS 480	Thermodynamics	3
PHYS 495	Mathematical Methods of Physics I	3