

**Recommended Academic Plan for Astronomy & Astrophysics - Computer Science Option (ASTRO - CMPS C at UP)**  
Effective Summer 2008

Semester 1	Credits	Semester 2	Credits
<b>MATH 140</b> (GQ) Calculus with Analytic Geometry I	4	<b>MATH 141</b> (GQ) Calculus with Analytic Geometry II	4
<b>PHYS 211</b> (GN) General Physics: Mechanics	4	<b>PHYS 212</b> (GN) General Physics: Electricity & Magnetism	4
<b>CHEM 110</b> (GN) Chemical Principles I	3	CHEM 111 (GN) Experimental Chemistry I	1
General Education course (GA/GH/GS)	3	CHEM 112 (GN) Chemical Principles II	3
<i>First-Year Seminar</i> (ASTRO 020S)	2	<i>ENGL 015 or 030</i> (GWS) Composition/Honors Composition	3
		Health/Kinesiology course (GHA)	1.5
Total Credits:	16	Total Credits:	16.5
Semester 3	Credits	Semester 4	Credits
<b>ASTRO 291</b> (GN) Astronomical Methods & the Solar System	3	<b>ASTRO 292</b> (GN) Astronomy of the Distant Universe	3
MATH 230 Calculus and Vector Analysis	4	MATH 251 Ordinary and Partial Differential Equations	4
PHYS 213 (GN) General Physics: Fluids & Thermal Physics	2	PHYS 237 Introduction to Modern Physics	3
PHYS 214 (GN) Gen. Physics: Wave Motion & Quantum Phys.	2	CMPS C 121 (GQ) Introduction to Programming Techniques	3
CAS 100 (GWS) Effective Speech	3	General Education course (IL/US: GA/GH/GS)	3
Total Credits:	14	Total Credits:	16
Semester 5	Credits	Semester 6	Credits
ASTRO 320 (GN) Observational Astronomy Laboratory	2	<b>ASTRO 4xx</b> (Select a 3-credit 400-level ASTRO course)	3
<b>ASTRO 4xx</b> (Select a 3-credit 400-level ASTRO course)	3	<i>ENGL 202C</i> (GWS) Effective Writing: Technical	3
CMPS C 122 Intermediate Programming ( <i>prereq.</i> CMPS C 121)	3	CMPS C 221 Object-Oriented Programming w/ Applications	3
Select 3 credits from STAT 318, 319, 401, 414 or 418	3	<i>Hardware:</i> CMPEN 271 Introduction to Digital Systems or <i>Software:</i> CMPS C 360 Discrete Math for Computer Science	3
General Education course (IL/US: GA/GH/GS)	3	General Education course (GA/GH/GS)	3
Health/Kinesiology course (GHA)	1.5		
Total Credits:	15.5	Total Credits:	15
Semester 7	Credits	Semester 8	Credits
<b>ASTRO 4xxW</b> (Select a 3-credit 400-level ASTRO W course)	3	<b>ASTRO 4xx</b> (Select a 3-credit 400-level ASTRO course)	3
CMPS C 451 Numerical Computations	3	CMPS C 4xx (Select a 400-level CSE course - <i>see Notes 4</i> )	3
<i>Hardware:</i> CMPEN 331 Computer Organization & Design or <i>Software:</i> CMPS C 465 Data Structures and Algorithms	3	Supporting Course (Select 3 credits)	3
General Education course (GA/GH/GS)	3	Supporting Course (Select 3 credits)	3
General Education course (GA/GH/GS)	3	Supporting Course (Select 3 credits)	3
Supporting Course (Select 2 credits)	2		
Total Credits:	17	Total Credits:	15

- **Bold** type indicates courses requiring a quality grade of C or better.
- *Italics* indicate courses that satisfy both major and General Education requirements.
- **Bold Italics** indicate courses requiring a quality grade of C or better and that satisfy both major and General Education requirements.
- GWS, GHA, GQ, GN, GA, GH, and GS are codes used to identify General Education requirements.
- US, IL are codes used to designate courses that satisfy University United States (US) and International (IL) Cultures requirements.  
These credits can be acquired concurrently with GA, GH, and/or GS courses.
- W is the code used to designate courses that satisfy University Writing Across the Curriculum requirement.

**Program Notes:**

1. ASTRO 4xx: Choose from ASTRO 400H, 410, 420W, 440, 451, 475W, 480, 485 and 497 courses (except ASTRO 496).
2. For the required writing-intensive coursework we recommend taking ASTRO xxxW courses (e.g., ASTRO 420W, ASTRO 475W).
3. Students taking the Computer Science option should follow one of the following sequences in their junior year:
  - (1) Software Emphasis: CMPS C 360 and 465 or (2) Hardware Emphasis: CMPEN 271 and 331.
4. CMPS C 4xx courses: For Software Emphasis, choose from CMPS C 431W, 442, 450, 458, 467, 468, 483W, CMPEN 454 or  
For Hardware Emphasis, choose from CMPEN 417, 431, 454, 471, 472.
5. See the Undergraduate Handbook and your advisor for recommended supporting courses.