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Planning Sheet: BACHELOR OF SCIENCE in PHYSICS

(This major consists of 17 courses)

Physics Major Core Requirements:

Term	Grade	Course #	AugCore	Title
_____	_____	PHY 121	NSM-L	General Physics I (Prereq: MAT 145 or concurrent registration)
_____	_____	PHY 122	NSM-L	General Physics II (Prereq: PHY 121, & MAT 146 or concurrent registration, and ENL 111 or 112 or HON 111)
_____	_____	PHY 245		Modern Physics w/ Lab (Prereq: PHY 122)
_____	_____	PHY 261		Electronics w/ Lab (Prereq: MAT 146 & PHY 116 or 122)
_____	_____	PHY 351		Mechanics 1 (Prereq: Pass CT assessment or GST 100; PHY 122 and MAT/PHY 327)
_____	_____	PHY 352		Mechanics 2 (Prereq: PHY 122, PHY 351 and MAT/PHY 327)
_____	_____	PHY 362		Electromagnetic Fields I (Prereq: PHY 122 and MAT/PHY 327)
_____	_____	PHY 363		Electromagnetic Fields II (Prereq: PHY 362 and MAT/PHY 327)
_____	_____	PHY 395		Comprehensive Laboratory I (.5) (Prereq: ENL 111 or 112 or HON 111 & jr standing or consent of instructor)
_____	_____	PHY 396		Comprehensive Laboratory II (.5) (Prereq: PSY 395, ENL 111 or 112 or HON 111 & jr standing or consent of instructor)
_____	_____	PHY 486		Quantum Physics (Prereq: PHY 245, 351)
_____	_____	PHY _____		Physics Elective (above PHY 122): _____

Non-Departmental Supporting Requirements:

Chemistry: It is recommended that students take the CHM 115 & 116 sequence, although CHM 105 & CHM 106: Principles of Chemistry I & II will also be accepted.

_____	_____	CHM 115	NSM-L	General Chemistry 1 (Prereq: MPG 4 and high school chemistry)
_____	_____	CHM 116	NSM-L	General Chemistry 2 (Prereq: CHM 115)

Mathematics:

_____	_____	MAT 145	NSM	Calculus 1 (Prereq: MPG 4)
_____	_____	MAT 146	NSM	Calculus 2 (Prereq: MAT 145)
_____	_____	MAT 245		Calculus 3 (Prereq: MAT 146)
_____	_____	MAT/PHY 327		Special Functions (Prereq: PHY 122 & MAT 245 or consent of instructor)

Notes:

- Students should take PHY 121 & 122: General Physics I & II *and* MAT 145 & 146: Calculus I & II during their first year.
- Students interested in Physics but not testing at MPG 4 may consider taking PHY 116: Introduction to Physics & MAT 114: Pre-Calculus during their first year. This would prepare such students for PHY 121 & 122 during the second year. Students might also consider CHM 105 & CHM 106: Principles of Chemistry I & II and MAT 114: Pre-Calculus during the first year. The Chemistry sequence is required for the pre-engineering program & the BS degree in Physics.
- **B.S. Waiver:** Student completing the B.S. in Physics may waive two Liberal Arts Foundation courses (in two different areas), or waive the two-course Modern Language requirement.
- **Keystone:** Complete SCI 490 or a keystone through a different department as part of a second major or minor.
- **Space Physics:** Students planning to obtain a B.S. with a Space Physics concentration should **also** take PHY 320: Introduction to Space Science **and** PHY 420: Plasma Physics.
- **Abbreviation Key:** ML = Modern Language; SC = Signature Curriculum; EM = Engaging Minneapolis; AE = Augsburg Experience; KC = Senior Keystone Course; NSM = Natural Science & Mathematics - no lab; NSM-L = Natural Science & Mathematics-with lab; SBS = Social & Behavioral Science; FA = Fine Arts; HUM = Humanities; QA = Quantitative Applications; QF = Quantitative Foundations; QFA = Quantitative Foundations & Applications.

See back for information on graduation skills requirements

Planning Sheet: GRADUATION SKILLS REQUIREMENTS

These requirements were implemented for Fall 2008. Please talk with your faculty advisor for information.

Graduation skills, including the Quantitative Reasoning requirements, are completed as follows. Graduation skills in Critical Thinking, Writing, Speaking, and Quantitative Reasoning are required for graduation. Critical Thinking is embedded in all majors. Plans for completion of other graduation skills are determined by the major department. Consult your department chair or faculty advisor to select appropriate courses to meet the Quantitative Reasoning (QR) graduation skill. QR is satisfied by completing one (1) Quantitative Foundational course (QF) and one (1) Quantitative Application course (QA), or one (1) combined QFA course. The most current information on Graduation Skills can be found online at www.augsburg.edu/catalog/ and clicking on "Graduation Skills Catalog Supplement 2008 – 2010" near the bottom of the page.

Transfer students must consult an advisor about potential adjustments to their course requirements to fulfill each graduation skill.

Designated Major Course	GRADUATION SKILLS – Physics		Completed
Embedded in major	Writing Requirements TWO (2) Writing courses		
Embedded in major			
COM 115	Speaking One (1) Speaking course		
Designated Major Course	QUANTITATIVE REASONING		Completed
Embedded in major	Quantitative Foundations & Applications One (1) QFA course (Prereq: MPG3)	QFA course	
– OR –			
Embedded in major	Quantitative Foundations and Quantitative Applications One (1) QF course (Prereq: MPG 3) and one (1) QA course		QF course
Embedded in major			QA course

Graduation Tally Checklist

These requirements were implemented in April 2003 and remain in effect until further notice.

Requirement	Progress Towards Completion	
Cumulative Course Credits <ul style="list-style-type: none"> ▪ Minimum number of course credits needed for graduation = 32 ▪ At least 8 credits completed at Augsburg. ▪ 6 of last 8 credits completed in residence. ▪ Second degree – minimum of 8 credits completed in residence. 	Transfer Credits Earned	
	+ Aug. Credits Earned	
	= Total Credits Earned	
	# Credits Needed	

Grade Point Average (GPA) <ul style="list-style-type: none"> ▪ Minimum 2.0 GPA required in major, minor, & overall. ▪ Some majors require higher GPA. ▪ Latin Honors GPA requirements: <ul style="list-style-type: none"> ○ Summa cum laude: 3.9-4.0 ○ Magna cum laude: 3.80-3.89 ○ Cum laude: 3.60-3.79 	Cumulative GPA	
	Major 1 GPA	
	Major 2 GPA	
	Minor GPA	

Other Limits	Minimum/Maximum	Your Total
Overall maximum courses graded Pass/No Pass (P/N) <ul style="list-style-type: none"> ▪ Grade of 2.0 or above required to Pass and earn credit for course. ▪ Maximum of 2 of 6 credits P/N may be in major. 	Maximum of 6	
Major Courses graded Pass/No Pass (P/N)	Maximum of 2	
Latin Honors courses graded Pass/No Pass (P/N)	Maximum of 2	
Latin Honors traditionally graded courses	Minimum of 14	
Internships	Maximum of 4	
Independent/Directed Studies	Maximum of 2	

Sample Four-Year Plan (B.S.)

This is a possible plan for the Bachelor of Science in Physics, though there are many configurations of courses. Students should complete PHY 121 – 122 and MAT 145 – 146 during the first year. Liberal Arts Foundation (LAF), Modern Language and other Core courses are more flexible. **NOTE: Students completing the B.S. curriculum may waive two Liberal Arts Foundation courses (in two different areas), or waive the two-course Modern Language requirement.**

Freshman Year

<u>Fall Term</u> (4)	<u>Spring</u> (4)
PHY 121	PHY 122
MAT 145	MAT 146
LAF Course	LAF Course
ENL 111	REL 100
AugSem	HPE 001

Sophomore Year

<u>Fall Term</u> (4)	<u>Spring</u> (4)
PHY 245	MAT/PHY 327
MAT 245	PHY 261
CHM 115	CHM 116
LAF Course	REL 200

Junior Year

<u>Fall Term</u> (4)	<u>Spring</u> (4)
PHY 351	PHY 486
PHY 362	PHY 363
COM 115 (Humanities LAF)	Minor or Elective
Minor or Elective	Minor or Elective
HPE Skill	

Senior Year

<u>Fall Term</u> (4.5)	<u>Spring</u> (4)
PHY 395 (.5 credit)	PHY 396 (.5 credit)
PHY Elective	PHY 352
LAF Course	Keystone: SCI 490 (.5 credit)
Minor or Elective	LAF Course
Minor or Elective	Minor or Elective

NOTE:

- COM 115 is recommended to meet a Speaking skill for Physics majors, and also a Liberal Art Foundation requirement in Humanities in the Core Curriculum.

What can I do with a Physics major?

The following jobs are some of the positions that physics majors could pursue. Many require professional or graduate school.

Astronomer	Aerospace Engineer
Astrophysicist	Lawyer
Professor	Physician
Consultant	Veterinarian
Geophysicist	Space Scientist
Meteorologist	Patent Attorney
Physicist	Medical Researcher
Quality Control Specialist	Technical Writer
Research Scientist	Teacher
Software Engineer	Systems Analyst
Solid State Physicist	

For more information on possible careers in Physics, please talk with your faculty advisor, and also the Center for Service, Work and Learning

Physics Department

The Physics Department is located on the lower level of Science Hall. You may contact the following faculty for more information on the major, and also check out the website at www.augsburg.edu/physics.

Jeffrey Johnson, Associate Professor
Department Chair
Science Hall 17A
Phone: 612-330-1070
E-mail: johnson9@augsborg.edu

Stuart Anderson, Associate Professor
Science Hall 8A
Phone: 612-330-1012
E-mail: anderstu@augsborg.edu

Gary Egbert, Assistant Professor
Science Hall 17D
Phone: 612-330-1484
E-mail: egbert@augsborg.edu

Mark Engebretson, Professor
Science Hall 17C
Phone: 612-330-1067
E-mail: engebret@augsborg.edu

David Murr, Associate Professor
Science Hall 17B
Phone: 612-330-1068
E-mail: murrdl@augsborg.edu

Benjamin Stottrup, Assistant Professor
Science Hall 18
Phone: 612-330-1035
E-mail: stottrup@augsborg.edu

David Venne, Assistant Professor
Science Hall 24C
Phone: 612-330-1673
E-mail: venne@augsborg.edu

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