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# The School of Education

### About the School

The School of Education is the umbrella for:

- Teacher education and its undergraduate and graduate programs, which lead to B.S. and M.S. degrees and Pennsylvania State Teacher Certification for grades kindergarten through grade 12, and graduate Instructional Technology Specialist and school principal certification programs .
- The Drexel Center for the Prevention of School Violence, which is committed to reducing violence in schools by assisting schools in designing, implementing, and evaluating a creative school violence prevention model of pedagogy based on current research in creativity as opposed to the prevalent punitive focus on discipline.
- Ph.D. degree program in Educational Leadership Development and Learning Technologies, and School Superintendent certification.

### **Title II Reporting**

In compliance with Title II, Section 207, of the Higher Education Act of 1998 and General Standards for the Institutional Preparation of Professional Educators (Chapter 354), pass rates on the Praxis Series Exam for students prepared as teachers by Drexel University are available at the School of Education.



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# The School of Education

#### About the Curriculum

Certification for classroom instruction is available in:

- <u>Elementary education</u> (emphasis on mathematics, science, and technology)
- Secondary education (grades 7-12)
  - о <u>Biology</u>
  - o Chemistry
  - Earth and Space Science
  - o General Science
  - o <u>Mathematics</u>
  - o Physics
  - Library Science
- Secondary education (grades K-12)
  - o Environmental Educaton

Students may acquire certification in more than one subject area.

Teacher education uses University-wide resources to prepare fully qualified mathematics and science teachers at both the elementary and secondary levels. It applies the microcomputer in teaching and learning, and it is the only such program in the country to incorporate a six-month paid internship in industry related to the student's area of certification (for example, a prospective chemistry teacher might co-op at a chemical company).

Because the program requires that students have a B average in content courses needed for certification, the student's content coursework is evaluated at the end of the sophomore year for formal admittance into the Teacher Preparation program. All students are expected to meet the B average requirement in content coursework before beginning pre-student field teaching experience. Students who fail to meet this requirement must take additional content coursework until the B average is met.

Students participate in two periods of direct teaching experience. The first period, in the junior year, consists of a ten-week field experience (EDUC 320 WI) through which students participate in limited teaching; on-campus coursework accompanies the field experience (EDUC 325 and EDUC 326 WI). In the senior year, students complete the 12-week student-teaching experience (EDUC 412 WI) required for certification. Students must receive a grade of at least B in student

teaching and in all pedagogy coursework to be recommended for certification.

Students pursuing the appropriate majors in the College of Arts and Sciences may also complete the requirements for certification within their area of study. For more information, contact the Program Coordinator for the School of Education at 215-895-6770.

#### Writing-Intensive Course Requirements

In order to graduate, all students beginning with the entering class of 2002/01 (fall, 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

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# The School of Education

#### **Co-operative Education**

Drexel University has long been known for its co-operative education program, through which students combine periods of fulltime, career-related employment with their studies. Internship employment is a requirement for all teacher education majors.

The degree is completed in four years, and it includes one six-month or threemonth internship period of full-time employment. The goal of the co-op program in teacher education is to provide real-world experiences for future teachers to use in their classrooms.

Students pursue varied positions geared directly to their area(s) of certification. For example, a student working toward certification in chemistry might seek employment in a corporate laboratory, just as a chemistry major would do. Some students, especially elementary certification majors, intern in liberal arts areas or such educationally oriented museums as Philadelphia's Please Touch Museum and the Franklin Institute Science Museum.



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### **Combination Certifications**

Combination certifications are available. Sample combinations include:

- Biology certification, with courses for additional certification in chemistry.
- Chemistry certification, with courses for additional certification in biology.
- Earth and space science certification, with courses for additional certification in chemistry.
- Earth and space science certification, with courses for additional certification in physics.
- Mathematics certification, with courses for additional certification in physics
- Physics certification, with courses for additional certification in mathematics.



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# **Elementary Education Certification**

Bachelor of Science Degree: 180.0 Credits

#### **Degree Requirements**

General edu	cation requirements	Credits
ARTH 101	History of Art	3.0
COM 111	Techniques of Speaking	3.0
ECON 201	Economics I	4.0
ENGL 101	Expository Writing and Reading	3.0
ENGL 102	Persuasive Writing and Reading	3.0
ENGL 103	Analytical Writing and Reading	3.0
HIST 298	Special Studies in History: Pennsylvania/Philadelphia History	3.0
<u>INFO 101</u>	Introduction to Information Technology	3.0
<u>MATH 181</u>	Mathematical Analysis I	3.0
MATH 182	Mathematical Analysis II	3.0
MATH 183	Mathematical Analysis III	3.0
MUSC 130	Introduction to Music	4.0
SOC 335	Sociology of Education	3.0
PSY 101	General Psychology	3.0
PSY 320	Educational Psychology	3.0
<u>UNIV 101</u>	The Drexel Experience	2.0
	English elective course between 200-329	3.0
	Nutrition elective*	3.0
	Professional or free electives	27.0
*NES 101 is	the recommended Nutrition elective	

\*NFS 101 is the recommended Nutrition elective.

#### One of the following courses

HIST 201	U.S. History to 1815
HIST 202	U.S. History 1815 -1900
<u>HIST 203</u>	The United States Since 1900

Credits

3.0

<u>BIO 102</u>	Bioscience I	4.0
BIO 104	Bioscience II	4.0
CHEM 111	General Chemistry I	
or		
PHYS 103	General Physics I	4.0
CHEM 112	General Chemistry II	
or		
PHYS 104	General Physics II	4.0
ENVR 260	Environmental Science and Society	3.0
PHYS 131 WI	Survey of the Universe	3.0

Education re	equirements	Credits
EDUC 105	Freshman Seminar	3.0
EDUC 112	Integrative Instruction	3.0
EDUC 114	Science Teaching Methods	3.0
EDUC 205	Sophomore Seminar	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
EDUC 301	Introduction to Personalized System of Instruction	3.0
EDUC 305	Junior Seminar	2.0
EDUC 310	Computer Applications in Teaching	3.0
EDUC 320 WI_	Professional Studies in Instruction	9.0
EDUC 322	Evaluation of Instruction	4.0
EDUC 323 W	<u>/I</u> Diagnostic Teaching	4.0
EDUC 324	Current Research in Curriculum and Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 326 W	<u>/I</u> Language Arts Processes	3.0
EDUC 327	Learning Disabilities	3.0
EDUC 405	Senior Seminar	2.0
EDUC 475	Special Studies in Teacher Education: Conflict Resolution/ Prevention of School Violence	3.0

## Student teaching experience

EDUC 412 WI Student Teaching	
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## **Suggested Professional Electives**

Bioscience		Credits
BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BIO 221	Microbiology	5.0
<u>BIO 244</u>	Genetics I	3.0

12.0

<u>BIO 254</u>	Invertebrate Morphology and Physiology	5.0
BIO 256	Vertebrate Morphology and Physiology	5.0
<u>BIO 260</u>	Plant Biology I: Evolution and Diversity	4.0
BIO 262	Plant Biology II: Morphology and Physiology	4.0
BIO 235	Terrestrial Ecology	5.0

Chemistry		Credits
CHEM 103	General Chemistry III	5.0
CHEM 230	Quantitative Analysis	3.0
<u>CHEM 231</u> <u>WI</u>	Quantitative Analysis Laboratory	2.0
CHEM 241	Organic Chemistry I	4.0
CHEM 242	Organic Chemistry II	4.0

Nutrition and foods	Credits
NFS 200 WI Nutrition I: Principles of Nutrition	4.0

Physics		Credits
PHEV 145	Weather 1: Climate and Global Change	4.0
PHEV 146	Weather 2: Analysis and Forecasting	4.0
PHYS 106 V	VI The Physics of High Fidelity	3.0

#### Writing-Intensive Course Requirements

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#### **Recommended Plan Of Study**

#### **BS Education**

4 YR UG Co-op Concentration /Elementary Education

	•	
Term 1		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 310	Computer Applications in Teaching	3.0
ENGL 101	Expository Writing and Reading	3.0
MATH 181	Mathematical Analysis I	3.0
<u>PSY 101</u> UNIV 101	General Psychology I	3.0
<u>UNIV 101</u>	The Drexel Experience	1.0
	Term Credits	14.0
Term 2		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 301	Introduction to Personalized System of Instruction	3.0
ENGL 102	Persuasive Writing and Reading	3.0
MATH 182	Mathematical Analysis II	3.0
<b>UNIV 101</b>	The Drexel Experience	1.0
HIST 201	US History to 1815	3.0
or		
HIST 202	US History, 1815-1900	3.0
Or HIST 203	US History Since 1000	2.0
1101 200	US History Since 1900 Term Credits	3.0 14.0
	Term Credits	14.0
Term 3		Credits
ARTH 101	History of Art I: Ancient to Medieval	3.0
EDUC 105	Freshman Seminar	1.0
EDUC 112	Integrative Instruction	3.0
EDUC 324	Current Research in Curriculum and Instruction	3.0
EDUC 475	Special Studies in Teacher Education: Analysis	3.0
ENGL 103	Analytical Writing and Reading	3.0
INFO 101	Introduction to Information Technology	3.0
	Term Credits	19.0
		<b>.</b>
Term 4		Credits
BIO 102	Biology I: Cells and Tissues	4.0
EDUC 205 EDUC 326	Sophomore Seminar	1.0
HIST 280	Language Arts Processes	3.0
	History of Science I	3.0
MUSC 130 NFS 101	Introduction to Music Introduction to Nutrition and Foods	3.0
	Term Credits	3.0
	Term Credits	17.0
Term 5		Credits
BIO 104	Biology II: Growth and Heredity	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
	English (ENGL) course between 200-329	3.0
	Term Credits	14.0
T		0
Term 6	Division of Oceanies from	Credits
COM 111	Principles of Communication	3.0

ECON 201	Economics I	4.0
EDUC 205	Sophomore Seminar	1.0
PSY 320	Educational Psychology	3.0
	Free electives	6.0
	Term Credits	17.0
Ferm 7		Credits
EDUC 305	Junior Seminar	1.0
EDUC 327	Learning Disabilities	3.0
HIST 298	Special Studies in History	3.0
PHYS 131	Survey of the Universe	3.0
CHEM 111	General Chemistry I	4.0
	O second Directory I	
PHYS 103	General Physics I	4.0
	Term Credits	14.0
Term 8		Credits
EDUC 305	Junior Seminar	1.0
DUC 322	Evaluation of Instruction	4.0
ENVR 260	Environmental Science and Society I	3.0
SOC 335	Sociology of Education I	3.0
CHEM 112	General Chemistry II	4.0
Or PHYS 104	General Physics II	4.0
1110 104	Term Credits	4.0
	Term Credits	10.0
Term 9		Credits
EDUC 114	Science Teaching Methods	3.0
EDUC 320	Professional Studies in Instruction	9.0
EDUC 325	Multimedia in Instructional Design	3.0
	Term Credits	15.0
Term 10		Credits
EDUC 323	Diagnostic Teaching	4.0
EDUC 405	Senior Seminar	1.0
	Free electives	9.0
	Term Credits	14.0
Ferm 11		Credits
EDUC 412	Student Teaching	12.0
2000 412	Term Credits	12.0
	Term Credits	12.0
Term 12		Credits
EDUC 324	Current Research in Curriculum & Instruction	3.0
EDUC 405	Senior Seminar	1.0
EDUC 475	Special Studies: Conflict Resolution	3.0
	Free electives	9.0
	Term Credits	16.0
	Total Credits (minimum)	181.0

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# **Biology Certification**

Bachelor of Science: 186.5 credits Certification is for grades 7 - 12

#### **Degree Requirements**

General education requirements		Credits
<u>HIST 280</u>	History of Science I	3.0
ENGL 101	Expository Writing and Reading	3.0
ENGL 102	Persuasive Writing and Reading	3.0
ENGL 103	Analytical Writing and Reading	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
PHIL 251	Ethics	3.0
PSY 101	General Psychology	3.0
PSY 320	Educational Psychology	3.0
<u>UNIV 101</u>	The Drexel Experience	2.0
	English elective course between 200-329	3.0

Science requirements		Credits
BIO 121	Physiology and Nutrition	4.5
BIO 122	Cells and Genetics	4.5
BIO 123	Organismal Diversity and Ecology	4.5
BIO 201	Human Psychology I	4.0
BIO 214	Principles of Cell Biology	3.0
<u>BIO 215</u>	Techniques of Cell Biology	2.5
<u>BIO 218</u>	Principles of Molecular Biology	3.0
BIO 219	Techniques of Molecular Biology	2.5
<u>BIO 270</u>	Developmental Biology	3.0
<u>BIO 271</u>	Developmental Biology Laboratory	2.0
BIO 404	Structure and Function of Biomolecules	4.0
BIO 306	Biochemistry Laboratory	2.0
CHEM 101	General Chemistry I	3.5

<u>CHEM 102</u>	General Chemistry II	4.5
CHEM 241	Organic Chemistry I	4.0
CHEM 242	Organic Chemistry II	4.0
CHEM 244	Organic Chemistry I Laboratory	3.0
CHEM 245	Organic Chemistry Laboratory II	3.0
ENVR 169	Environmental Science	3.0
ENVR 284 WI	Ecology I: Physiological and Population Ecology	5.0
ENVR 460	Evolution	3.0
PHYS 152	Physics for Life Sciences I	4.5
PHYS 153	Physics for Life Sciences II	4.5

# **Education requirements**

#### Credits

EDUC 105	Freshman Seminar	3.0
EDUC 112	Integrative Instruction	3.0
EDUC 114	Science Teaching Methods	3.0
EDUC 205	Sophomore Seminar	2.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
EDUC 301	Introduction to Personalized System of Instruction	3.0
EDUC 305	Junior Seminar	2.0
EDUC 310	Computer Applications in Teaching	3.0
EDUC 320 WI	Professional Studies in Instruction	9.0
EDUC 322	Evaluation of Instruction	4.0
EDUC 323 WI	Diagnostic Teaching	4.0
EDUC 324	Current Research in Curriculum and Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 326 WI	Language Arts Processes	3.0
EDUC 327	Learning Disabilities	3.0
EDUC 405	Senior Seminar	2.0

#### Student teaching experience

EDUC 412 WI	Student Teaching	12.0

#### Writing-Intensive Course Requirements

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#### **Recommended Plan Of Study**

#### **BS Education**

4 YR UG Co-op Concentration /Biological Sciences

Term 1		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 310	Computer Applications in Teaching	3.0
ENGL 101	Expository Writing and Reading	3.0
MATH 121	Calculus I	4.0
PSY 101	General Psychology I	3.0
<u>UNIV 101</u>	The Drexel Experience	1.0
	Term Credits	15.0
Term 2		Credits
<u>CHEM 101</u>	General Chemistry I	3.5
EDUC 105	Freshman Seminar	1.0
EDUC 301	Introduction to Personalized Systems of Instruction	3.0
ENGL 102	Persuasive Writing and Reading	3.0
MATH 122	Calculus II	4.0
<u>UNIV 101</u>	The Drexel Experience	1.0
	Term Credits	15.5
		•
Term 3 CHEM 102		Credits
	General Chemistry II	4.5
EDUC 105	Freshman Seminar	1.0
EDUC 112 ENGL 103	Integrative Instruction	3.0
	Analytical Writing and Reading	3.0
MATH 123	Calculus III	4.0
	Term Credits	15.5
Term 4		Credits
CHEM 241	Organic Chemistry I	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 326	Language Arts Processes	3.0
HIST 280	History of Science I	3.0
BIO 121	Physiology of Nutrition	4.5
	Term Credits	15.5
Term 5		Credits
BIO 122	Cells and Genetics	4.5
CHEM 242	Organic Chemistry II	4.0
CHEM 244	Organic Chemistry Lab I	3.0
EDUC 205	Sophomore Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
	Term Credits	18.5
Term 6		Credits
BIO 123	Organismal Diversity & Ecology	4.5
CHEM 245	Organic Chemistry Lab II	3.0
EDUC 205	Sophomore Seminar	1.0
PHIL 251	Ethics	3.0
PSY 320	Educational Psychology	3.0
	Term Credits	14.5

Term 7		Credits
<u>3IO 218</u>	Principles of Molecular Biology	3.0
BIO 219	Techniques in Molecular Biology	2.5
DUC 305	Junior Seminar	1.0
EDUC 327	Learning Disabilities	3.0
PHYS 152	Physics for Life Science I	4.5
	Term Credits	14.0
Ferm 8		Credits
<u>3IO 214</u>	Principles of Cell Biology	3.0
<u>BIO 215</u>	Techniques in Cell Biology	2.5
DUC 305	Junior Seminar	1.0
DUC 322	Evaluation of Instruction	4.0
PHYS 153	Physics for Life Sciences II	4.5
	English (ENGL) course between 200-329	3.0
	Term Credits	18.0
Ferm 9		Credits
BIO 201	Human Physiology I	4.0
BIO 270	Development Biology	3.0
BIO 271	Developmental Biology Laboratoy	2.0
DUC 320	Professional Studies in Instruction	9.0
	Term Credits	18.0
Ferm 10		Credits
BIO 306	Biochemistry Laboratory	2.0
BIO 404	Structure and Function of Biomolecules	4.0
DUC 323	Diagnostic Teaching	4.0
DUC 324	Current Research in Curriculum & Instruction	3.0
DUC 405	Senior Seminar	1.0
	Term Credits	14.0
		One dite
erm 11	Chudent Teaching	Credits
DUC 412	Student Teaching Term Credits	12.0 12.0
	Term Creatts	12.0
erm 12		Credits
<u>IO 460</u>	Evolution	3.0
DUC 114	Science Teaching Methods	3.0
DUC 325	Multimedia in Instructional Design	3.0
DUC 405	Senior Seminar	1.0
NVR 284	Ecology I: Physiological and Population Ecology	5.0
	Term Credits	15.0
	Total Credits (minimum)	185.5
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# **Chemistry Certification**

Bachelor of Science: 186.5 credits (Certification is for grades 7 - 12)

#### **Degree Requirements**

General educ	ation requirements	Credits
HIST 280	History of Science I	3.0
ENGL 101	Expository Writing and Reading	3.0
ENGL 102	Persuasive Writing and Reading	3.0
ENGL 103	Analytical Writing and Reading	3.0
<u>MATH 121</u>	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
PHIL 251	Ethics	3.0
PSY 101	General Psychology	3.0
PSY 320	Educational Psychology	3.0
UNIV 101	The Drexel Experience	2.0
	English elective course between 200-329	3.0

#### Science requirements

•		
BIO 102	Bioscience I	4.0
<u>BIO 104</u>	Bioscience II	4.0
BIO 404	Structure and Function of Biomolecules	4.0
BIO 306	Biochemistry Laboratory	2.0
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0
CHEM 230	Quantitative Analysis	3.0
<u>CHEM 231 WI</u>	Quantitative Analysis Laboratory	2.0
CHEM 241	Organic Chemistry	4.0
CHEM 242	Organic Chemistry II	4.0
CHEM 243	Organic Chemistry III	3.0
<u>CHEM 244</u>	Organic Chemistry Laboratory I	3.0

<u>CHEM 245</u>	Organic Chemistry Laboratory	3.0
CHEM 251	Physical Chemistry I	3.0
CHEC 352	Physical Chemistry and Applications II	4.0
CHEM 357	Physical Chemistry II Laboratory	2.5
CHEM 421	Inorganic Chemistry I	3.0
CHEM 430	Analytical Chemistry I	4.0
ENVR 401	Chemistry of the Environmental	3.0
PHYS 111	Physics I	4.5
PHYS 112	Physics II	4.5
<u>PHYS 131 WI</u>	Survey of the Universe	3.0
or		
PHEV 145	Weather 1: Climate and Global Change	4.0

Education requirements		Credits
EDUC 105	Freshman Seminar	3.0
EDUC 112	Integrative Instruction	3.0
EDUC 114	Science Teaching Methods	3.0
EDUC 205	Sophomore Seminar	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
EDUC 301	Introduction to Personalized System of Instruction	3.0
EDUC 305	Junior Seminar	2.0
EDUC 310	Computer Applications in Teaching	3.0
EDUC 320 WI	Professional Studies in Instruction	9.0
EDUC 322	Evaluation of Instruction	4.0
EDUC 323 WI	Diagnostic Teaching	4.0
EDUC 324	Current Research in Curriculum and Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 326 WI	Language Arts Processes	3.0
EDUC 327	Learning Disabilities	3.0
EDUC 405	Senior Seminar	2.0

#### Student teaching experience

	<b>J</b> ·   · · · ·	
EDUC 412 WI	Student Teaching	12.0

#### **Recommended Plan Of Study**

#### BS Education

4 YR UG Co-op Concentration /Chemistry

Term 1		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 310	Computer Applications in Teaching	3.0
ENGL 101	Expository Writing and Reading	3.0
MATH 121	Calculus I	4.0
PSY 101	General Psychology I	3.0
UNIV 101	The Drexel Experience	1.0
	Term Credits	15.0
Term 2		Credits
<u>CHEM 101</u>	General Chemistry I	3.5
EDUC 105	Freshman Seminar	1.0
ENGL 102	Persuasive Writing and Reading	3.0
MATH 122	Calculus II	4.0
<u>PHYS 111</u>	Physics I	4.5
UNIV 101	The Drexel Experience	1.0
	Term Credits	17.0
Term 3		Credits
CHEM 102	General Chemistry II	4.5
EDUC 105	Freshman Seminar	1.0
EDUC 112	Integrative Instruction	3.0
ENGL 103	Analytical Writing and Reading	3.0
MATH 123	Calculus III	4.0
<u>PHYS 112</u>	Physics II	4.5
	Term Credits	20.0
		•
Term 4		Credits
BIO 102	Biology I: Cells and Tissues	4.0
<u>CHEM 103</u>	General Chemistry III	5.0
EDUC 205	Sophomore Seminar	1.0
EDUC 326	Language Arts Processes	3.0
<u>HIST 280</u>	History of Science I	3.0
	Term Credits	16.0
Term 5		One dite
BIO 104	Dialogy II. Onewith and Hangdity	Credits
EDUC 205	Biology II: Growth and HereditY	4.0
_	Sophomore Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
EDUC 301	Introduction to Personalized Systems of Instruction	3.0
	Term Credits	14.0
Term 6		Credits
BIO 306	Biochemistry Laboratory	2.0
BIO 404	Structure and Function of Biomolecules	4.0
EDUC 114	Science Teaching Methods	3.0
EDUC 205	Sophomore Seminar	1.0
MATH 200	Multivariate Calculus	4.0
PHIL 251	Ethics	3.0
-		

PSY 320 Educational Psychology

3.0

erm 7		Credi
HEM 230	Quantitative Analysis	3
HEM 231	Quantitative Analysis Lab	2
HEM 241	Organic Chemistry I	4
DUC 305	Junior Seminar	1
DUC 327	Learning Disabilities	3
PHEV 145	Weather I: Climate and Global Change	4
r	-	
HYS 131	Survey of the Universe	3
	Term Credits	17
erm 8		Cred
HEM 242	Organic Chemistry II	4
HEM 244	Organic Chemistry Laboratory I	3
HEM 356	Physical Chemistry Lab	2
DUC 305	Junior Seminar	1
DUC 322	Evaluation of Instruction	4
	Term Credits	14
erm 9		Cred
HEC 352	Physical Chemistry II	4
HEM 245	Organic Chemistry Lab II	3
DUC 320	Professional Studies in Instruction	ç
	Term Credits	16
erm 10		Cred
HEM 421	Inorganic Chemistry I	
HEM 430	Analytical Chemistry I	
DUC 323	Diagnostic Teaching	
DUC 405	Senior Seminar	1
	English (ENGL) course between 200-329	3
	Term Credits	14
erm 11		Cred
DUC 412	Student Teaching	12
	Term Credits	1:
erm 12		Cred
HEM 243	Organic Chemistry III	Cred
HEM 357	Physical Chemistry Lab I	2
DUC 324	Current Research in Curriculum & Instruction	3
DUC 405	Senior Seminar	1
DUC 325	Multimedia in Instructional Design	3
	Term Credits	12
	Total Credits (minimum)	187

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# Earth and Space Science Certification

Bachelor of Science: 188.5 credits (Certification is for grades 7 - 12)

#### **Degree Requirements**

General ed	ucation requirements	Credits
ENGL 101	Expository Writing and Reading	3.0
ENGL 102	Persuasive Writing and Reading	3.0
ENGL 103	Analytical Writing and Reading	3.0
ECON 201	Economics I	4.0
ECON 351	Environmental and Resource Economics	4.0
HIST 280	History of Science I	3.0
HIST 285	Technology in Historical Perspective	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	
<u>PHIL 251</u>	Ethics	3.0
PSY 101	General Psychology	3.0
PSY 320	Educational Psychology	3.0
UNIV 101	The Drexel Experience	2.0
	English elective course between 200-329	3.0
	Elective	3.0

Science requirements		Credits	
<u>BIO 121</u>	Physiology and Nutrition	4.5	
BIO 122	Cells and Genetics	4.5	
BIO 123	Organismal Diversity and Ecology	4.5	
<u>CHEM 101</u>	General Chemistry I	3.5	
CHEM 102	General Chemisty II	4.5	
ENVR 260	Environmental Science and Society	3.0	
ENVR 270	History of Life on Earth	4.0	
ENVR 272	Physical Geology	4.0	

ENVR 284 W	<u>I</u> Ecology I: Physiological and Population Ecology	5.0
<u>ENVR 286</u> <u>WI</u>	Ecology II: Communities and Ecosystems	5.0
ENVR 310	Environmental Data Analysis	3.0
ENVR 330	Aquatic Ecology	3.0
ENVR 390	Marine Ecology	3.0
PHEV 145	Weather 1: Climate and Global Change	4.0
PHEV 146	Weather 2: Analysis and Forecasting	4.0
PHEV 141	Issues in Global Change I: Seminar	2.0
PHYS 111	Physics I	4.5
PHYS 112	Physics II	4.5
PHYS 131 W	I Survey of the Universe	3.0

Education requirements		Credits
EDUC 105	Freshman Seminar	3.0
EDUC 112	Integrative Instruction	3.0
EDUC 114	Science Teaching Methods	3.0
EDUC 205	Sophomore Seminar	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
EDUC 301	Introduction to Personalized System of Instruction	3.0
EDUC 305	Junior Seminar	2.0
EDUC 310	Computer Applications in Teaching	3.0
EDUC 320 WI	Professional Studies in Instruction	9.0
EDUC 322	Evaluation of Instruction	4.0
EDUC 323 V	VI Diagnostic Teaching	4.0
EDUC 324	Current Research in Curriculum and Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 326 V	VI Language Arts Processes	3.0
EDUC 327	Learning Disabilities	3.0
EDUC 405	Senior Seminar	2.0

## Student teaching experience

12.0

#### **Recommended Plan Of Study**

#### **BS Education**

4 YR UG Co-op Concentration /Earth & Space Science

Concentration	Trainin & Opace Ocience	
Term 1		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 310	Computer Applications in Teaching	3.0
ENGL 101	Expository Writing and Reading	3.0
MATH 121	Calculus I	4.0
PSY 101	General Psychology I	3.0
UNIV 101	The Drexel Experience	1.0
	Term Credits	15.0
Term 2		Credits
CHEM 101	General Chemistry I	3.5
EDUC 105	Freshman Seminar	1.0
EDUC 301	Introduction to Personalized Systems of Instruction	3.0
ENGL 102	Persuasive Writing and Reading	3.0
MATH 122	Calculus II	4.0
<u>UNIV 101</u>	The Drexel Experience	1.0
	Term Credits	15.5
Term 3		Credits
CHEM 102	General Chemistry II	4.5
EDUC 105	Freshman Seminar	1.0
EDUC 112	Integrative Instruction	3.0
ENGL 103	Analytical Writing and Reading	3.0
<b>MATH 123</b>		4.0
,	Free elective	3.0
	Term Credits	18.5
Term 4		Credits
BIO 102	Biology I: Cells and Tissues	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 326	Language Arts Processes	3.0
<u>HIST 280</u>	History of Science I	3.0
<u>PHYS 111</u>	Physics I	4.5
	Term Credits	15.5
Town F		Credite
Term 5 BIO 104	Biology II: Growth and Heredit	Credits 4.0
EDUC 205		4.0
EDUC 218	Sophomore Seminar Math: Methods and Content	3.0
ENVR 260	Environmental Science & Society I	3.0
ENVR 261	Environmental Science & Society I Lab	<u> </u>
PHYS 112	Physics II	4.5
	Term Credits	16.5
		10.5
Term 6		Credits
ECON 201	Economics I	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
PSY 320	Educational Psychology	3.0
	English (ENGL) course between 200-329	3.0
-		

	Term Credits	14.
Ferm 7		Credit
DUC 305	Junior Seminar	1.
DUC 327	Learning Disabilities	3.
NVR 284	Ecology I: Physiological and Population Ecology	5.
<u>HEV 145</u>	Weather I: Climate and Global Change	4.
HIL 251	Ethics	3.
HYS 131	Survey of the Universe	3.
	Term Credits	19.
erm 8		Credit
DUC 305	Junior Seminar	1.
DUC 322	Evaluation of Instruction	4.
NVR 272	Physical Geology	4.
NVR 286	Ecology II: Communities and Ecosystems	5.
HEV 146	Weather II: Analysis and Forecasting	4.
	Term Credits	18.
erm 9		Credit
DUC 114	Science Teaching Methods	3
DUC 320	Professional Studies in Instruction	9
DUC 325	Multimedia in Instructional Design	3
	Term Credits	15
erm 10		Credit
DUC 323	Diagnostic Teaching	4
DUC 405	Senior Seminar	1.
NVR 310	Environmental Data Analysis	3
NVR 330	Aquatic Ecology	3
HEV 141	Atmospheric Science I: Climate and Global Change	3.
	Term Credits	14
erm 11		Credit
DUC 412	Student Teaching	12
	Term Credits	12.
orm 12		Cradit
erm 12	Current Research in Curriculum and Instruction	Credit 3
DUC 405	Senior Seminar	3. 1.
NVR 270	History of Life on Earth	4.
NVR 390	Marine Ecology	3.
	Technology in Historical Perspective	3
IST 285		
IST 285	Term Credits	14

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# **General Science Certification**

Bachelor of Science: 188.0 credits (Certification is for grades 7 - 12)

#### **Degree Requirements**

General edu	ication requirements	Credits
ENGL 101	Expository Writing and Reading	3.0
ENGL 102	Persuasive Writing and Reading	3.0
ENGL 103	Analytical Writing and Reading	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
PHIL 251	Ethics	3.0
PSY 101	General Psychology	3.0
PSY 320	Educational Psychology	3.0
UNIV 101	The Drexel Experience	2.0
HIST 280	History of Science I	3.0
	English elective course between 200-329	3.0
	Science, Technology, Human Affairs electives *	6.0
	Electives	18.0

#### Science requirements

BIO 102	Bioscience I	4.0
BIO 104	Bioscience II	4.0
<u>CHEM 101</u>	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
CHEM 103	General Chemistry III	5.0
ENVR 272	Physical Geology	4.0
ENVR 270	History of Life on Earth	4.0
ENVR 284 W	Ecology I: Physiological and Population Ecology	5.0
<u>ENVR 286</u> <u>WI</u>	Ecology II: Communities and Ecosystems	5.0

ENVR 390	Marine Ecology	3.0
PHEV 145	Weather 1: Climate and Global Change	4.0
PHYS 111	Physics I	4.5
PHYS 112	Physics II	4.5
<u>PHYS 131 W</u>	Survey of the Universe	3.0

#### **Education requirements**

- 4	
Freshman Seminar	3.0
Integrative Instruction	3.0
Science Teaching Methods	3.0
Sophomore Seminar	3.0
Diversity and Today's Teacher	3.0
Math: Methods and Content	3.0
Introduction to Personalized System of Instruction	3.0
Junior Seminar	2.0
Computer Applications in Teaching	3.0
Professional Studies in Instruction	9.0
Evaluation of Instruction	4.0
VI Diagnostic Teaching	4.0
Current Research in Curriculum and Instruction	3.0
Multimedia in Instructional Design	3.0
VI Language Arts Processes	3.0
Learning Disabilities	3.0
Senior Seminar	2.0
	Integrative InstructionScience Teaching MethodsSophomore SeminarDiversity and Today's TeacherMath: Methods and ContentIntroduction to Personalized System of InstructionJunior SeminarComputer Applications in TeachingProfessional Studies in InstructionEvaluation of InstructionVI Diagnostic TeachingCurrent Research in Curriculum and InstructionMultimedia in Instructional DesignVI Language Arts Processes

#### Student teaching experience

EDUC 412 WI Student Teaching	12.0
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#### Writing-Intensive Course Requirements

In order to graduate, all students beginning with the entering class of 2002/01 (fall, 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writingintensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term. For more information on writing-intensive courses, see the Drexel University Writing Program's <u>Writing-Intensive Course</u> page.

#### **Recommended Plan Of Study**

#### **BS Education**

4 YR UG Co-op Concentration /General Science

**Term Credits** 

Tarra		One dite
Term 1 EDUC 105	Freehman Cominar	Credits
EDUC 105 EDUC 310	Freshman Seminar	1.0
EDGC 310 ENGL 101	Computer Applications in Teaching	3.0
MATH 121	Expository Writing and Reading	3.0
PSY 101	Calculus I	4.0
	General Psychology I	3.0
<u>UNIV 101</u>	The Drexel Experience	1.0
	Term Credits	15.0
Term 2		Credits
CHEM 101	General Chemistry I	3.5
EDUC 105	Freshman Seminar	1.0
EDUC 301	Introduction to Personalized Systems of Instruction	3.0
ENGL 102	Persuasive Writing and Reading	3.0
<b>MATH 122</b>		4.0
UNIV 101	The Drexel Experience	1.0
-	Term Credits	15.5
	Term Credits	10.0
Term 3		Credits
CHEM 102	General Chemistry II	4.5
EDUC 105	Freshman Seminar	1.0
EDUC 112	Integrative Instruction	3.0
ENGL 103	Analytical Writing and Reading	3.0
MATH 123	Calculus III	4.0
•	Free elective	3.0
-	Term Credits	18.5
Term 4		Credits
BIO 102	Biology I: Cells and Tissues	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 326	Language Arts Processes	3.0
HIST 280	History of Science I	3.0
PHYS 111	Physics I	4.5
	Term Credits	15.5
Term 5		Credits
BIO 104	Biology II: Growth and Heredity	4.0
EDUC 205	Sophomore Seminar	4.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
PHYS 112	Physics II	4.5
	Term Credits	15.5
		10.0
Term 6		Credits
CHEM 103	General Chemistry III	5.0
EDUC 205	Sophomore Seminar	1.0
B	English (ENGL) course between 200-329	3.0
B	Free elective	3.0
•	Science, Technology and Human Affairs elective	3.0
-	Town Oreadián	45.0

15.0

erm 7		Credits
DUC 305	Junior Seminar	1.0
DUC 327 NVR 284	Learning Disabilities	3.0
HIL 251	Ecology I: Physiological and Population Ecology	5.0
HIL 251 HYS 131	Ethics	3.0
<b>HTS 131</b>	Survey of the Universe	3.0
	Science, Technology and Human Affairs elective Term Credits	3.(
	Term Creaits	18.0
erm 8		Credits
DUC 305	Junior Seminar	1.0
DUC 322	Evaluation of Instruction	4.0
NVR 272	Physical Geology	4.0
NVR 286	Ecology II: Communities and Ecosystems	5.0
	Free elective	3.0
	Term Credits	17.0
erm 9		Credits
DUC 114	Science Teaching Methods	3.0
DUC 320	Professional Studies in Instruction	9.0
DUC 325	Multimedia in Instructional Design	3.0
	Term Credits	15.0
erm 10		Credits
DUC 323	Diagnostic Teaching	4.0
DUC 405	Senior Seminar	1.0
HEV 145	Weather I: Climate and Global Change	4.0
<u>SY 320</u>	Educational Psychology	3.0
	Free electives	6.0
	Term Credits	18.0
erm 11		Credits
DUC 412	Student Teaching	12.0
	Term Credits	12.0
	Term Greaks	12.0
erm 12		Credits
DUC 324	Current Research in Curriculum & Instruction	3.0
DUC 405	Senior Seminar	1.0
NVR 270	History of Life on Earth	4.(
NVR 390	Marine Ecology	3.0
	Free electives	3.0
	Term Credits	14.0
	Total Credits (minimum)	189.0

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# **Mathematics Certification**

Bachelor of Science: 183.0 credits (Certification is for grades 7 - 12)

#### **Degree Requirements**

General edu	ication requirements	38.0 Credits
ECON 201	Principles of Economics I	4.0
HIST 280	History of Science I	3.0
INFO 108	Foundations of Software	4.0
ENGL 101	Expository Writing and Reading	3.0
ENGL 102	Persuasive Writing and Reading	3.0
ENGL 103	Analytical Writing and Reading	3.0
PHIL 251	Ethics	3.0
PSY 101	General Psychology I	3.0
PSY 320	Educational Psychology	3.0
UNIV 101	The Drexel Experience	2.0
	English elective course between 200-329	3.0
	Elective	4.0

Mathematics	s requirements	48.0 Credits
EDUC 428	Cultural and Historical Significance of Math	3.0
EDUC 475	Special Topics in Education: Non-Euclidean Geometry	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
<u>MATH 200</u>	Multivariate Calculus	4.0
<u>MATH 201</u>	Linear Algebra	4.0
<u>MATH 210</u>	Differential Equations	4.0
MATH 220	Introduction to Mathematical Reasoning	3.0
MATH 221	Discrete Mathematics	3.0
MATH 311	Probability and Statistics I	4.0
<u>MATH 312</u>	Probability and Statistics II	4.0

Science req	uirements	28.0 Credits
BIO 102	Bioscience I	4.0
BIO 104	Bioscience II	4.0
CHEM 101	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENVR 260	Environmental Science and Society	3.0
PHYS 111	Physics I	4.5
PHYS 112	Physics II	4.5

Education re	equirements	69.0 Credits
EDUC 105	Freshman Seminar	3.0
EDUC 112	Integrative Instruction	3.0
EDUC 114	Science Teaching Methods	3.0
EDUC 205	Sophomore Seminar	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
EDUC 301	Introduction to Personalized System of Instruction	3.0
EDUC 305	Junior Seminar	2.0
EDUC 310	Computer Applications in Teaching	3.0
<u>EDUC 320</u> <u>WI</u>	Professional Studies in Instruction	9.0
EDUC 322	Evaluation of Instruction	4.0
EDUC 323 W	// Diagnostic Teaching	4.0
EDUC 324	Current Research in Curriculum and Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 326 W	<u>/I</u> Language Arts Processes	3.0
EDUC 327	Learning Disabilities	3.0
EDUC 405	Senior Seminar	2.0

#### Student teaching experience

EDUC 412 WI Student Teaching	12.0
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#### **Recommended Plan Of Study**

#### **BS Education**

4 YR UG Co-op Concentration /Mathematics

Term 1		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 310		3.0
ENGL 101	Computer Applications in Teaching Expository Writing and Reading	3.0
MATH 121	Calculus I	4.0
PSY 101		
UNIV 101	General Psychology I	3.0
	The Drexel Experience	1.0
	Term Credits	15.0
Term 2		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 301	Introduction to Personalized System of Instruction	3.0
ENGL 102	Persuasive Writing and Reading	3.0
<b>INFO 108</b>	Foundations of Software	4.0
MATH 122	Calculus II	4.0
UNIV 101	The Drexel Experience	1.0
	Term Credits	16.0
Term 3		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 112	Integrative Instruction	3.0
ENGL 103	Analytical Writing and Reading	3.0
MATH 123	Calculus III	4.0
•	Free elective	3.0
	Term Credits	14.0
Term 4		Credits
BIO 102	Biology I: Cells and Tissues	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 326	Language Arts Processes	3.0
HIST 280	History of Science I	3.0
<u>MATH 200</u>	Multivariate Calculus	4.0
	Term Credits	15.0
Term 5		Credits
BIO 104	Biology II: Growth and Heredity	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
<b>MATH 201</b>	Linear Algebra	4.0
-	Term Credits	15.0
		10.0
Term 6		Credits
ECON 201	Economics I	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 428	Cultural and Historical Significance of Mathematics	3.0
PSY 320	Educational Psychology	3.0
	English (ENGL) course between 200-329	3.0
	Term Credits	14.0

Credits

<u>CHEM 101</u>	General Chemistry I	3.
EDUC 305	Junior Seminar	1.
EDUC 327	Learning Disabilities	3.
<u>MATH 220</u>	Introduction to Mathematical Reasoning	3.
PHYS 111	Physics I	4.
	Term Credits	15.
Term 8		Credit
CHEM 102	General Chemistry II	4.
EDUC 305	Junior Seminar	1.
EDUC 322	Evaluation of Instruction	4.
MATH 210	Differential Equations	4.
PHYS 112	Physics II	4.
	Term Credits	18.
Term 9		Credit
EDUC 114	Science Teaching Methods	3.
EDUC 320	Professional Studies in Instruction	9.
EDUC 325	Multimedia in Instructional Design	3.
MATH 221	Discrete Mathematics	3.
	Term Credits	18.
Term 10		Credit
EDUC 323	Diagnostic Teaching	4.
EDUC 405	Senior Seminar	1.
ENVR 260	Environmental Science and Society I	3.
MATH 311	Probability and Statistics I	4.
PHIL 251	Ethics	3.
	Term Credits	15.
Term 11		Credit
EDUC 412	Student Teaching	12.
	Term Credits	12.
Term 12		Credit
EDUC 324	Current Research in Curriculum and Instruction	3.
EDUC 405	Senior Seminar	1.
	Free electives	9.
	Term Credits	13.
	Total Credits (minimum)	180.



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# **Physics Certification**

Bachelor of Science: 187.5 credits (Certification is for grades 7 - 12)

#### **Degree Requirements**

General education requirements		Credits
HIST 280	History of Science I	3.0
ENGL 101	Expository Writing and Reading	3.0
ENGL 102	Persuasive Writing and Reading	3.0
ENGL 103	Analytical Writing and Reading	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 200	Multivariate Calculus	4.0
MATH 201	Linear Algebra	4.0
MATH 210	Differential Equations	4.0
PHIL 251	Ethics	3.0
PSY 101	General Psychology	3.0
PSY 320	Educational Psychology	3.0
UNIV 101	The Drexel Experience	2.0
	English elective course between 200-329	3.0

#### Science requirements

BIO 102	Bioscience I	4.0
BIO 104	Bioscience II	4.0
<u>CHEM 101</u>	General Chemistry I	3.5
CHEM 102	General Chemistry II	4.5
ENVR 260	Environmental Science and Society	3.0
PHEV 145	Weather 1: Climate and Global Change	4.0
PHYS 113	Contemporary Physics I	5.0
PHYS 114	Contemporary Physics II	5.0
<u>PHYS 115</u>	Contemporary Physics III	5.0

<u>PHYS 131 WI</u>	Survey of the Universe	3.0
PHYS 211	Physics III	4.5
PHYS 222	Modern Physics	4.5
PHYS 311	Classical Mechanics I	4.0
PHYS 312	Classical Mechanics II	4.0
PHYS 316	Thermodynamics	4.0
PHYS 321	Electromagnetic Fields I	4.0
<u>PHYS 326</u>	Quantum Mechanics I	4.0

#### **Education requirements**

Eddoation requ		
EDUC 112	Integrative Instruction	3.0
EDUC 114	Science Teaching Methods	3.0
EDUC 205	Sophomore Seminar	3.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
EDUC 301	Introduction to Personalized System of Instruction	3.0
EDUC 305	Junior Seminar	2.0
EDUC 310	Computer Applications in Teaching	3.0
EDUC 320 WI	Professional Studies in Instruction	9.0
EDUC 322	Evaluation of Instruction	4.0
EDUC 323 WI	Diagnostic Teaching	4.0
EDUC 324	Current Research in Curriculum and Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 326 WI	Language Arts Processes	3.0
EDUC 327	Learning Disabilities	3.0
EDUC 405	Senior Seminar	2.0

#### Student teaching experience

EDUC 412 WI	Student Teaching	12.0
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#### Writing-Intensive Course Requirements

In order to graduate, all students beginning with the entering class of 2002/01 (fall, 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writingintensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term.

#### **Recommended Plan Of Study**

#### BS Education

4 YR UG Co-op Concentration /Physics

	· ·	
Term 1		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 310	Computer Applications in Teaching	3.0
ENGL 101	Expository Writing and Reading	3.0
MATH 121	Calculus I	4.0
<u>PSY 101</u> UNIV 101	General Psychology I	3.0
	The Drexel Experience	1.0
	Term Credits	15.0
Term 2		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 301	Introduction to Personalized Systems of Instruction	3.0
ENGL 102	Persuasive Writing and Reading	3.0
MATH 122	Calculus II	4.0
PHYS 111	Physics I	4.5
<u>UNIV 101</u>	The Drexel Experience	1.0
-	Term Credits	16.5
Term 3		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 112	Integrative Instruction	3.0
ENGL 103	Analytical Writing and Reading	3.0
<u>MATH 123</u>	Calculus III	4.0
PHYS 112	Physics II	4.5
	Term Credits	15.5
Term 4		Credits
BIO 102	Biology I: Cells and Tissues	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 326	Language Arts Processes	3.0
HIST 280	History of Science I	3.0
<b>MATH 200</b>	Multivariate Calculus	4.0
PHEV 145	Weather I: Climate and Global Change	4.0
	Term Credits	19.0
Term 5		Credits
<b>BIO 104</b>	Biology II: Growth and Heredity	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 218	Math: Methods and Content	3.0
<u>MATH 201</u>	Linear Algebra	4.0
<u>PHYS 211</u>	Physics III	4.5
	Term Credits	19.5
Term 6		Credits
EDUC 205	Sophomore Seminar	
MATH 210	Differential Equations	<u> </u>
PHIL 251	Ethics	3.0
PHYS 222	Modern Physics	4.0
PSY 330	Cognitive Psychology	4.0
<u></u>	ooginave restanology	5.0

Term 7		Credit
CHEM 101	General Chemistry I	3.
EDUC 305	Junior Seminar	1.
EDUC 327	Learning Disabilities	3.
PHYS 131	Survey of the Universe	3.
	English (ENGL) course between 200-329	3.
	Term Credits	13.
Term 8		Credit
CHEM 102	General Chemistry II	4.
EDUC 305	Junior Seminar	1.
EDUC 322	Evaluation of Instruction	4.
PHYS 311	Classical Mechanics I	4.
	Term Credits	13.
Term 9		Credit
EDUC 320	Professional Studies in Instruction	9.
EDUC 325	Multimedia in Instructional Design	3.
PHYS 312	Classical Mechanics II	4.
-	Term Credits	16.
Term 10		Credit
EDUC 323	Diagnostic Teaching	4.
EDUC 405	Senior Seminar	1.
ENVR 260	Environmental Science and Society I	3.
PHYS 217	Thermodynamics	4.
	Term Credits	12.
Term 11		Credit
EDUC 412	Student Teaching	12.
	Term Credits	12.
Term 12		Credit
EDUC 114	Science Teaching Methods	3.
EDUC 324	Current Research in Curriculum and Instruction	3.
EDUC 405	Senior Seminar	1.
PHYS 321	Electromagnetic Fields I	4.
PHYS 326	Quantum Mechanics I	4.
	Term Credits	15.
	Total Credits (minimum)	182.



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# **Environmental Education Certification**

Bachelor of Science: 186.0 credits (Certification is for grades K - 12)

#### **Degree Requirements**

#### General education requirements

General education requirements		Credits
ECON 201	Economics I	4.0
HIST 285	Technology in Historical Perspective	3.0
HIST 280	History of Science I	3.0
ENGL 101	Expository Writing and Reading	3.0
ENGL 102	Persuasive Writing and Reading	3.0
ENGL 103	Analytical Writing and Reading	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	
PHIL 251	Ethics	3.0
PSY 101	General Psychology	3.0
PSY 320	Educational Psychology	3.0
<u>UNIV 101</u>	The Drexel Experience	2.0
	English elective course between 200-329	3.0
	Elective	3.0

Science requirements		Credits
BIO 102	Bioscience I	4.0
<u>BIO 104</u>	Bioscience II	4.0
<u>CHEM 101</u>	General Chemistry I	3.5
CHEM 102	General Chemisty II	4.5
<u>ENVR 272</u>	Physical Geology	4.0
ENVR 270	History of Life on Earth	4.0
<u>ENVR 284 WI</u>	Ecology I: Physiological and Population Ecology	5.0
ENVR 286 WI	Ecology II: Communities and Ecosystems	5.0

<u>ENVR 260</u>	Environmental Science and Society	3.0
ENVR 261	Environmental Science and Society Laboratory	1.0
ENVR 310	Environmental Data Analysis	3.0
ENVR 330	Aquatic Ecology	3.0
<u>ENVR 390</u>	Marine Ecology	3.0
PHEV 145	Weather 1: Climate and Global Change	4.0
PHEV 146	Weather 2: Analysis and Forecasting	4.0
PHEV 441	Issues in Global Change I: Seminar	2.0
<u>PHYS 111</u>	Physics I	4.5
PHYS 112	Physics II	4.5
<u>PHYS 131 WI</u>	Survey of the Universe	3.0

#### **Education requirements** Credits EDUC 105 Freshman Seminar 3.0 EDUC 112 Integrative Instruction 3.0 EDUC 114 3.0 Science Teaching Methods EDUC 205 Sophomore Seminar 3.0 EDUC 216 **Diversity and Today's Teacher** 3.0 EDUC 218 Math: Methods and Content 3.0 EDUC 301 Introduction to Personalized System of Instruction 3.0 EDUC 305 Junior Seminar 2.0 EDUC 310 **Computer Applications in Teaching** 3.0 EDUC 320 WI **Professional Studies in Instruction** 9.0 EDUC 322 **Evaluation of Instruction** 4.0 EDUC 323 WI **Diagnostic Teaching** 4.0 EDUC 324 **Current Research in Curriculum and Instruction** 3.0 **EDUC 325** Multimedia in Instructional Design 3.0 **EDUC 326 WI** Language Arts Processes 3.0 EDUC 327 3.0 Learning Disabilities EDUC 405 Senior Seminar 2.0

#### Student teaching experience

EDUC 412 WI	Student Teaching	12.0
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#### **Recommended Plan Of Study**

#### **BS Education**

4 YR UG Co-op Concentration /Environmental Education

Term 1		Credits
EDUC 105	Freshman Seminar	1.0
EDUC 310	Computer Applications in Teaching	3.0
ENGL 101	Expository Writing and Reading	3.0
MATH 121	Calculus I	4.0
PSY 101	General Psychology I	3.0
<u>UNIV 101</u>	The Drexel Experience	1.0
	Term Credits	15.0
Term 2		Credits
CHEM 101	General Chemistry I	3.5
EDUC 105	Freshman Seminar	<u> </u>
EDUC 301	Introduction to Personalized Systems of Instruction	3.0
ENGL 102	Persuasive Writing and Reading	3.0
MATH 122	Calculus II	4.0
UNIV 101	The Drexel Experience	1.0
-	Term Credits	15.5
		10.0
Term 3		Credits
CHEM 102	General Chemistry II	4.5
EDUC 105	Freshman Seminar	1.0
EDUC 112	Integrative Instruction	3.0
ENGL 103	Analytical Writing and Reading	3.0
MATH 123	Calculus III	4.0
_	Free elective	3.0
	Term Credits	18.5
Torus 4		Oredite
Term 4 BIO 102	Biology I: Cells and Tissues	Credits 4.0
EDUC 205	Sophomore Seminar	4.0
EDUC 326	Language Arts Processes	3.0
HIST 280	History of Science I	3.0
PHYS 111	Physics I	4.5
	Term Credits	15.5
		10.0
Term 5		Credits
BIO 104	Biology II: Growth and Heredity	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 218	Math: Methods and Content	3.0
ENVR 260	Environmental Science & Society I	3.0
ENVR 261	Environmental Science & Society I Lab	1.0
<u>PHYS 112</u>	Physics II	4.5
	Term Credits	16.5
Term 6		Credits
ECON 201	Economics I	4.0
EDUC 205	Sophomore Seminar	1.0
EDUC 216	Diversity and Today's Teacher	3.0
PSY 320	Educational Psychology	3.0
	English (ENGL) course between 200-329	3.0
		0.0

	Term Credits	14
Ferm 7		Credi
DUC 305	Junior Seminar	1
DUC 327	Learning Disabilities	3
NVR 284	Ecology I: Physiological and Population Ecology	5
<u>HEV 145</u>	Weather I: Climate and Global Change	4
HIL 251	Ethics	3
<u>PHYS 131</u>	Survey of the Universe	3
	Term Credits	19
Ferm 8		Credi
DUC 305	Junior Seminar	1
DUC 322	Evaluation of Instruction	4
NVR 272	Physical Geology	4
NVR 286	Ecology II: Communities and Ecosystems	5
PHEV 146	Weather II: Analysis and Forecasting	4
	Term Credits	18
Ferm 9		Cred
DUC 114	Science Teaching Methods	
DUC 320	Professional Studies in Instruction	ç
DUC 325	Multimedia in Instructional Design	3
	Term Credits	15
Ferm 10		Cred
DUC 323	Diagnostic Teaching	4
DUC 405	Senior Seminar	1
NVR 310	Environmental Data Analysis	
NVR 330	Aquatic Ecology	
PHEV 141	Atmospheric Science I: Climate and Global Change	3
	Term Credits	1.
erm 11		Cred
DUC 412	Student Teaching	12
	Term Credits	12
erm 12		Cred
DUC 324	Current Research in Curriculum	Creu
DUC 405	Senior Seminar	
NVR 270	History of Life on Earth	4
NVR 390	Marine Ecology	
IST 285	Technology in Historical Perspective	
	Term Credits	1

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# **Minor in Education**

The minor in Education provides a structured academic opportunity for students who wish to add a fundamental understanding of the field of education as well as practical knowledge in the art and science of teaching and learning to their undergraduate experience.

Designed for students with a strong interest in education and training, the minor will not necessarily lead to the student being recommended for a state teaching certificate. However, should a student decide to also pursue a teaching certificate as a component of his or her major—or in post-baccalaureate work— the courses required for the minor are applicable to Pennsylvania State certification.

The minor in is comprised of eight required courses totaling 26.0 credits.

Required courses		Credits
EDUC 216	Diversity and Today's Teacher	3.0
EDUC 301	Introduction to Personalized System of Instruction	3.0
EDUC 321	Professional Studies in Instruction	3.0
EDUC 322	Evaluation of Instruction	4.0
EDUC 323 W	<u>/I</u> Diagnostic Teaching	4.0
EDUC 324	Current Research in Curriculum and Instruction	3.0
EDUC 325	Multimedia in Instructional Design	3.0
EDUC 327	Learning Disabilities	3.0