Geography-Earth Science
Undergraduate Scheduling Information
March 2022

SHIPPENSBURG UNIVERSITY

Key steps in registering for Summer / Fall classes

1. Review the registration process.

2. Scheduling for Summer and Fall 2022 terms begins on Monday, March 28, 2022.
   Be aware of your registration time window:

   - Log in to myShip > click on **Student** > click on **My Academics.**
   - Under **Registration Tools** > click on **Prepare for Registration.**
   - Select the appropriate term, look for registration window information.

3. Review major and minor degree requirements using check sheets (in this packet) and check your progress using Degree Audit.

4. Schedule an appointment with your Academic Advisor (see contact information in this packet). Students ***must*** see their academic advisor to obtain their registration PIN – you cannot register without this PIN.

5. Consider any holds and financial aid issues.
   - Log in to myShip
   - Select **My Academics** from the **Student** tab**.**
   - Under **Registration Tools**, click on **My Holds.**
   - If you have a hold, contact the office listed on the Types of Holds page to clear the hold from your record.

6. Prepare a tentative course schedule and alternative options (see worksheet in this packet). Be sure to consider course availability in future semesters as well (some courses are not offered every semester – see some key examples below).

7. If you have any problems with scheduling, please contact Tammy Myers (Dept. Secretary, Shearer Hall 104) or Dr. Woltemade (Dept. Chair).

Adding the GIS certificate, a minor, or changing your major

- Review information on this site and submit the "Declare/Change Undergraduate Major/Minor/Other Credentials" web form.
- Note: Financial aid may not cover tuition if an added minor or certificate results in taking courses beyond the standard 120-credit degree program. Please check with the financial aid office for assistance.

Key scheduling issues for Geography-Earth Science undergraduate majors

General pointers:

- Work to complete general education requirements (15 courses) in first two years
- Follow checksheets for your major/minor (below) and Degree Audit.
- Meet with your academic advisor frequently to discuss future courses, internship, graduation requirements, etc.

All GEO-ESS majors:

1. **GEO 391 Geography Seminar** – Not offered in fall 2022 – all majors intending to graduate in 2023 should plan to enroll in spring 2023.

2. Two Principles of Biology courses are offered:
   BIO 161: Cell Structure and BIO 162: Organismal Diversity.
   All Geography-Earth Science Majors should take BIO 162: Organismal Diversity.

3. Grades earned for completing **developmental courses** [MAT 050, RDG 050, ENG 050] count toward your QPA, but credits earned in those courses do not count toward the 120-credit graduation requirement.
   For example, if you were required to earn 3 credits in MAT 050 Developmental Math, then you will need to earn 123 total credits for graduation.

4. All grades earned in **performance courses** (e.g., music, marching band) count toward your QPA, but only a maximum of 3 performance credits will count toward your 120-credit graduation requirement.
   For example, if you earn 9 credits by performing in our marching band, then you will have earned 126 total credits by graduation (3 credits count, the other 6 do not).

Pre-requisites to enroll in key GEO-ESS courses

GEO 202	GIS-1	Must have earned a minimum of 15 credits
GEO 363	GIS-2	Passed GEO 202 (GIS-1) with minimum grade of C
GEO 420	GIS-3	Passed GEO 363 (GIS-2) with minimum grade of C
GEO 226	Hydrology	Passed MAT 140A/B or math placement level 5
GEO 329	Economic Geog.	Sophomore standing
GEO 391	Seminar	Senior standing (Tammy Myers must add you to this course)
GEO 397	Intro to Research	Minimum 60 credits and faculty advisor approval (Tammy Myers must add you to this course)
GEO 424	Soils	Passed ESS 110 or ESS 210
GEO 427	Sustainability	At least junior standing

Geoenvironmental majors

Geoenvironmental **Studies** major – students enrolled prior to Fall 2021
Geoenvironmental **Science** major – students enrolled Fall 2021 and later
Check Degree Audit if you are not sure

There were minor changes in the required courses when this major was updated to "Geoenvironmental Science" – be sure that you are following the correct check sheet and requirements indicated on Degree Audit. Check with your advisor if you are not sure.

Biology: You need to take 3 Biology courses with at least one at the 200+ level.
BIO 162 must be completed before scheduling a 200 level or higher BIO course.
A recommended 200-level course is BIO 242 Ecology.

Chemistry / Physics: For this requirement, you must take either two Chemistry courses (with lab) or one Chemistry course plus one Physics course (with lab).
Recommended courses:
CHM 105: Chemistry – An Observational Approach (required as Gen Ed)
CHM 121: Chem Bonding (plus CHM 125 Lab IB)
PHY 121: Intro to Physics I (plus PHY 123 Lab) (fall only)
Students interested in graduate programs in the geosciences/engineering should speak to their advisor about taking two physics classes as 6 credits of physics are often required for admission.

Required General Education courses (Geoenvironmental Science majors):

Math (Q):	MAT 117
Citizenship (S):	ESS 108
Critical Reasoning (R):	GEO 140
Natural World (N):	BIO 162 and CHM 105
Technology (T):	CSC 103 or CSC 104

Geography - GIS majors

Required General Education courses:

Math (Q):	MAT 117
Citizenship (S):	PLS 100
Critical Reasoning (R):	SOC 101
Technology (T):	CSC 104

Sustainability majors

Biology: Complete BIO 162 first, plus one 200-level or higher BIO course (recommended: BIO 242 Ecology).

Required General Education courses:

Math (Q):	MAT 117
Diversity (D):	PSY 101 *(or SOC 101 in Cat R)*
Critical Reasoning (R):	SOC 101 or ECO 113 *(or PSY 101 in Cat D)*
Natural World (N):	BIO 162
Technology (T):	ECO 102 *(unless you have taken ECO 113 – see advisor)*

Earth-Space Science or Comprehensive Social Studies/Geography majors

Advising: Please see Dr. Smith for scheduling.

Chem: Earth-Space Science Education Majors must take 8 credits:
CHM 121: Chemical Bonding (with CHM 125: Lab)
CHM 122: Chemical Dynamics (with CHM 126: Lab)

Physics: Earth-Space Science Education Majors must take 8 credits:
PHY121: Introductory Physics I (with PHY 123: Lab)
PHY 122: Introductory Physics II (with PHY 125: Lab)

Honors Students

Advising: Please be sure to meet with your advisor as early as possible before scheduling.

Geography – Earth Science Course Information for Winter / Spring 2022
For the most up-to-date listing of course offerings, please check online.

Summer 2022 GEO-ESS Courses

General Education Courses	ESS 108	Intro to Enviro Sustainability (Online, Term A)
	ESS 110	Intro to Geology (Online, Term A)
	GEO 103	Geography of U.S. & Canada (Online, Term A)
	GEO 440	Field Techniques (In person @ SU, May 9-27)
	ESS 190	Coastal Hazards and Sustainability (Hybrid, CBFS, Jun 5-24)
	ESS 491	Coastal Watershed Assess. and Mgt. (CBFS, Jul 17 – Aug 5)
	ESS 494	Geology Field Course (Off campus, May 23 – Jun 24)

* CBFS = Chincoteague Bay Field Station

Fall 2022 GEO-ESS Courses

General Education Courses	ESS 108	Intro to Enviro Sustainability (Sec. 01 res. for Geo majors)
	ESS 110	Intro to Geology (Sec. 05 reserved for Geo majors)
	ESS 111	Intro to Weather and Climate
	GEO 101	World Geography
	GEO 103	Geography US and Canada
	GEO 140	Human Geography
	HON 244	Honors Introduction to Geology
Techniques Courses	GEO 202	GIS-1
	GEO 363	GIS-2
	GEO 339	Remote Sensing
	GEO 352	Cartography
	GEO 463	Applied Geophysical Imaging
Upper-level Courses	ESS 410	Sedimentary Geology & Paleoenvironments
	GEO 203	Climate, Energy, Sustainability
	GEO 244	Land Use
	GEO 313	Geography of South & SE Asia
	GEO 329	Economic Geography
	GEO 402	Medical Geography
	GEO 404	Hydrogeology
	GEO 406	Sustainable Food Systems
	GEO 415	Regional Geography Studies: Africa
Courses by advisement (min 60 credits, GPA 2.0)	GEO 360	Internship *[See important instructions below]*
	GEO 397	Intro to Research *[Advance planning with a faculty advisor and syllabus required before you can register.]*
Graduate Courses	GEO 503	Fundamentals of Geoenvironmental Research
	GEO 505	Medical Geography
	GEO 506	Sustainable Food Systems
	GEO 525	Economic Geography
	GEO 538	GIS-2
	GEO 553	Cartography

Thinking about Graduate School?

NEW: Early / Dual Admission to the MS Program in Geoenvironmental Science & Sustainability allows you to earn credits in the graduate program while you are completing a BS degree. Qualified students may double count some credits toward both BS and MS degrees in their junior and senior years and can complete the MS degree on an accelerated pace. Interested undergraduate students maintaining a GPA of at least 3.0 overall and in their major may apply to the program in their junior or senior year. Please contact Dr. Tom Feeney for information.

Internship Information

A basic outline of the most critical internship information is below. It is essential that you review the department internship web page for more detailed information.

Undergraduate students

- Must have earned at least **60 credits** with at least a **2.0 overall GPA**.
- A minimum of **3 credits** of internship are required.

Graduate students

- Minimum GPA of 3.0 required to take an internship.
- Non-thesis graduate students must complete an internship; a maximum of six credits is allowed.

All students

- The internship must relate to the student's major and educational background.
- During the advising period, consult with your faculty advisor about your interest in an internship.
- The prospective internship experience must be approved by the faculty coordinator**.**
- **A fully completed and signed "Letter of Agreement"** (also called an internship application form) **is required prior to registering for internship credits.** Students are fully responsible for completing this form and securing the signature of an appropriate organizational representative, as well as signing it themselves before presenting it to Dr. Pomeroy for his review and approval. Ask Dr. Pomeroy for assistance if you have questions about how to complete the "Letter of Agreement."
- All internships **must** also have an Affiliation Agreement in place between the University and the organization hosting the intern. You **must** consult with Dr. Pomeroy to see if there is an agreement already in place. If there is not an agreement in place, Dr.

Pomeroy will contact the organizational representative for your prospective internship and work with you on this process. It is possible that the Associate Dean will not approve your internship until this agreement in fully in place.

- Each credit hour of internship equates to 40 hours of work at your placement, so a 3-credit internship equals 120 hours of work.
- All internships are graded Pass/Fail.
- Your internship is an academic experience as well as a professional experience. As such, tuition will be charged for internship credits *just like any other academic course*. For information on tuition costs, see the Student Accounts website.

To register for your internship

- To apply for a **Summer or Fall** internship, submit your intent to apply by **March 15**.
- To apply for a **Spring** internship, submit your intent to apply by **October 15**.
- As noted above, submit the completed "Letter of Agreement" to Dr. Pomeroy for his review and approval. He will then send it for further review and approval by the Associate Dean of Arts and Sciences. After the Associate Dean approves the internship, Ms. Myers will register you for internship credits via Banner. This may require that you work closely with Dr. Pomeroy and Ms. Tammy Myers (477-1685). Please note that Ms. Myers will not register any student who does not have the required approvals.
- For questions about registration, contact Dr. Pomeroy (477-1776).

Geography – Earth Science Faculty contacts

Name	Office	Ext.	Email
Dr. Mike Applegarth	SRH 211	1712	mtappl@ship.edu
Dr. Sean Cornell	SRH 005A	1310	srcornell@ship.edu
Dr. Scott Drzyzga	SRH 208	1307	sadrzy@ship.edu
Dr. Allison Feeney	SRH 112	1319	aefeen@ship.edu
Dr. Thomas Feeney	SRH 106	1297	tpfeen@ship.edu
Dr. Kurt Fuellhart	SRH 210	1309	kgfuel@ship.edu
Dr. Tim Hawkins	SRH 207	1662	twhawk@ship.edu
Dr. Russ Hedberg	SRH 212	1515	rchedberg@ship.edu
Dr. Claire Jantz	RLH 203	1399	cajant@ship.edu
Dr. Paul Marr	SRH 110	1656	pgmarr@ship.edu
Dr. George Pomeroy	SRH 113	1776	gmpome@ship.edu
Dr. Janet Smith	SRH 103	1757	jssmit@ship.edu
Dr. Christopher Woltemade	SRH 108	1143	cjwolt@ship.edu
Dr. Joseph Zume	SRH 111	1548	jtzume@ship.edu
Ms. Tammy Myers, secretary	SRH 104	1685	tlmyers@ship.edu

Key documents included below

Geography-Earth Science Course Election Record
(Note: This form is to be used only as an aid when preparing your schedule)

NAME:_____ **SUID#**_____

MAJOR:_____

1) Students **must** meet with their academic advisor before scheduling to receive their PIN#. You will **not** be able to submit your schedule unless you have your PIN#.

2) Students can schedule using any computer that has access to Banner during their scheduling window.

3) Students **will not** be permitted to schedule if they have a hold (parking ticket, phone bill, physical examination for the Health Center, etc.). Holds must be cleared by the appropriate office (i.e. parking ticket – University Police) before your appointment time expires.

4) To add closed or restricted courses, students must go to the appropriate academic department office **during their appointment time** for an override code in Banner**.**

5) PRIMARY COURSE REQUEST

Dept. No.	Course No.	Section No.	Course Title	Time	M	T	W	Th	F	Credits

Total credits to be scheduled

ALTERNATE COURSE REQUESTS

Dept. No.	Course No.	Section No.	Course Title	Time	M	T	W	Th	F	Credits

Faculty	Course #	Course Name	Days	Time
Hedberg	ESS 108-01	Intro Env. Sustainability (Restricted to GEO majors)	TR	12:30-1:45
Hedberg	ESS 108-02	Intro Env. Sustainability	TR	2:00-3:15
Jantz	ESS 108-03	Intro Env. Sustainability	MWF	10:00-10:50
Jantz	ESS 108-04	Intro Env. Sustainability	MWF	1:00-1:50
Cornell	ESS 110-01	Intro Geology	MWF	10:00-10:50
Cornell	ESS 110-02	Intro Geology	MWF	11:00-11:50
Feeney T	ESS 110-03	Intro Geology	MWF	1:00-1:50
Feeney T	ESS 110-04	Intro Geology	MWF	8:00-8:50
Feeney T	ESS 110-05	Intro Geology (Restricted to GEO majors)	MWF	9:00-9:50
Zume	ESS 111-01	Intro Weather & Climate	MWF	8:00-8:50
Zume	ESS 111-02	Intro Weather & Climate	MWF	9:00-9:50
Zume	ESS 111-03	Intro Weather & Climate	MWF	10:00-10:50
Cornell	ESS 410	Sedimentary Geology & Paleoenvironments	MW	2:00-3:15
Marr	GEO 101-01	World Geog	MW	3:30-4:45
Marr	GEO 101-02	World Geog	MW	5:00-6:15
Marr	GEO 101-03	World Geog	TR	5:00-6:15
Pomeroy	GEO 101-04	World Geog	MWF	8:00-8:50
Pomeroy	GEO 101-05	World Geog	MWF	9:00-9:50
Applegarth	GEO 103-01	Geog of U S and Canada	M	6:30-9:15
Applegarth	GEO 103-02	Geog of U S and Canada	MW	2:00-3:15
Applegarth	GEO 103-03	Geog of U S and Canada	W	6:30-9:15
Drzyzga	GEO 103-04	Geog of U S and Canada	TR	11:00-11:50
Drzyzga	GEO 103-05	Geog of U S and Canada	TR	9:30-10:45
Feeney A	GEO 140-01	Human Geography	TR	12:30-1:45
Feeney A	GEO 140-02	Human Geography	TR	2:00-3:15
Feeney A	GEO 202-01	GIS-I: Intro to GIS	TR	11:00-11:50
Hedberg	GEO 202-02	GIS-I: Intro to GIS	TR	9:30-10:45
Hawkins	GEO 203	Climate, Energy, Sustainability	MWF	11:00-11:50
Pomeroy	GEO 244	Land Use	MW	2:00-3:15
Pomeroy	GEO 313	Geog of South & SE Asia	MWF	1:00-1:50
Drzyzga	GEO 329/525	Economic Geography	MW	3:30-4:45
Applegarth	GEO 339	Remote Sensing	MW	3:30-4:45
Feeney A	GEO 352/553	Cartography	TR	5:00-6:15
Drzyzga	GEO 363/538	GIS II: Inter Gis	MW	5:00-6:15
Marr	GEO 402/505	Medical Geography	TR	2:00-3:15
Feeney T	GEO 404	Hydrogeology	TR	12:30-1:45
Hedberg	GEO 406/506	Sustainable Food Systems	F	1:00-3:45
Zume	GEO 415	Regional Geo Studies (Africa)	MW	5:00-6:15
Hawkins	GEO 503	Fundamentals of Geo Res	M	6:30-9:15
Cornell	HON 244	Honors Intro Geology	MW	3:30-4:45

GEOGRAPHY-EARTH SCIENCE PROGRAM

NAME:_____

GEOENVIRONMENTAL STUDIES MAJOR – B.S.

Geography-Earth Science (42+ Cr)

Geoenvironemtnal Core (15 Cr)

- ESS 355 Meteorology (if ESS111, see †)
- ESS 210 Phy. Geology (If ESS110, see ‡)
- GEO 224 Soils
- GEO 226 Hydrology
- GEO 391 Geography Seminar

Geography Electives (6 Cr)

- GEO 230 Economic Geography
- GEO 244 Land Use
- GEO 305 Geography of Europe
- GEO 308 Geography of Latin America
- GEO 310 Transportation Geography
- GEO 313 Geography of South-Southeast Asia
- GEO 314 Industrial Geography
- GEO 317 Geography of East Asia
- GEO 320 Historical Geography
- GEO 322 Urban Geography
- GEO 415 Regional Geographic Studies
- GEO 450 Geography-Geology Field Studies*

Geoenvironmental Complex Systems (9 Cr)

- ESS 404 Applied Meteorology/Climatology
- ESS 410 Sed Geology & Paleoenvironments
- ESS 413 Mineral and Rock Resources
- ESS 442 Environmental Geology
- ESS 452 Coastal Env Oceanography
- ESS 490 Selected Topics
- GEO 301 Introduction to Biogeography
- GEO 306 Geomorphology
- GEO 402 Medical Geography
- GEO 404 Hydrogeology
- GEO 421 Environmental Law
- GEO 444 Environmental Land Use Planning
- GEO 446 Water Resource Management
- GEO 450 Geography-Geology Field Studies*
- GEO 490 Selected Topics

Geoenvironmental Electives (3+ Cr)

- ESS 212 Historical Geology
- ESS 214 Geology of National Parks
- ESS 220 Oceanography
- GEO 203 Climatology
- GEO 306 Geomorphology
- GEO 397 Intro to Research
- GEO 450 Geography-Geology Field Studies*

Geoenvironmental Electives cont. (3+ Cr)

- GEO 490 Selected Topics
- Marine Science Consortium Course

Technique Electives (6+ Cr)

- GEO 202 GIS I: Intro to GIS
- GEO 339 Remote Sensing
- GEO 352 Cartography
- GEO 363 GIS II: Intermediate GIS
- GEO 420 GIS III: Advanced GIS
- GEO 425 Image Processing
- GEO 440 Field Techniques
- GEO 441 Quantitative Methods
- GEO 463 Applied Geophysical Imaging

Internship (3+ cr)

- GEO 360 Internship (2.0 GPA, Junior status)

Allied Sciences (10+Cr)

(R) Recommended courses

Biology (6-7 Cr)

- BIO 142 Intro to Ecology
- (R) BIO 208 Field Biology
- BIO 210 Field Zoology (*162 req*)
- (R) BIO 242 Ecology (*162 req*)
- BIO 442 Aquatic Ecology (*162 req*)
- (R) BIO 448 Field Botany and Plant Tax (*162 req*)

Chemistry/Physics (4 Cr)

- CHM 121 Chemical Bonding
- CHM 125 Lab IB Stoichiometry and Reactions (1)
- CHM 122 Chemical Dynamics
- CHM 126 Lab IIB Equilibrium and Instruments (1)
- (R) PHY 121 Intro Physics (3) + 123 Lab (1)

*Only 3cr for category, 6cr total for major.

† If ESS111 taken, sub GEO203 or ESS404.

‡ If ESS110 taken, sub ESS212, GEO306 or ESS214.

General Education Requirements (45 CR)

Courses filled-in below are ***DIRECTED general education classes that MUST be taken for the major.*** All other general education courses can be chosen from the list on the back of this page.

Foundations [a] ***(15 cr total)***	Cr	Course(s)
U	3	
W	3	
O	3	
H	3	
Q	3	MAT 117

[a] *One course in each area are required.*

Interconnections ***(9 cr total)***	Cr	Course(s)
D[b]	3+	
G[b]	3+	
F	e	

[b] *At least 1 course each from D and G.*

Citizenship[c] ***(6 cr total)***	Cr	Course(s)
S	e	
E	e	
R	e	

[c] *1 course from two different categories.*

Natural World ***(9cr total)***	Cr	Course(s)
N[d]	6+	BIO 162 and CHM 105
T	e	CSC 103 or 180

[d] *BIO 162 and CHM 105 required. Either CSC 103 or 180 also required.*

Creativity ***(6 cr total)***	Cr	Course
L[e]	3	
A	e	
C	e	

[e] *At least 1 L course.*

February 12, 2020

GEOGRAPHY-EARTH SCIENCE PROGRAM

NAME:_____

GEOENVIRONMENTAL SCIENCE MAJOR – B.S.

Geography-Earth Science (45+ Cr)

Geoenvironemtnal Core (15 Cr)

- ESS 111 Intro to Weather and Climate
- ESS 110 Intro to Geology
- Geo 202 GIS I: Intro to GIS
- GEO 226 Hydrology
- GEO 391 Geography Seminar

GEO/ESS Electives and Complex Systems (total 27+ cr)

Geography Electives (3+ Cr)

- GEO 244 Land Use
- GEO 305 Geography of Europe
- GEO 308 Geography of Latin America
- GEO 310 Transportation Geography
- GEO 313 Geography of South-Southeast Asia
- GEO 314 Industrial Geography
- GEO 317 Geography of East Asia
- GEO 320 Historical Geography
- GEO 322 Urban Geography
- GEO 329 Economic Geography
- GEO 415 Geography of Africa
- GEO 450 Geography-Geology Field Studies*

Geoenvironmental Electives (3+ Cr)

- ESS 212 Historical Geology
- ESS 214 Geology of National Parks
- ESS 220 Oceanography
- GEO 203 Climate, Energy, and Sustainability
- GEO 306 Geomorphology
- GEO 397 Intro to Research
- GEO 450 Geography-Geology Field Studies*
- GEO 490 Selected Topics
- Marine Science Consortium Course

Technique Electives (3+ Cr)

- GEO 339 Remote Sensing
- GEO 352 Cartography
- GEO 363 GIS II: Intermediate GIS
- GEO 420 GIS III: Advanced GIS
- GEO 425 Image Processing
- GEO 440 Field Techniques
- GEO 441 Quantitative Methods
- GEO 463 Applied Geophysical Imaging

Geoenvironmental Complex Systems (12+ Cr)

- ESS 404 Applied Human-Climate Interaction
- ESS 410 Sed Geology & Paleoenvironments
- ESS 413 Mineral and Rock Resources
- ESS 442 Environmental Geology
- ESS 452 Coastal Env Oceanography
- ESS 490 Selected Topics
- GEO 301 Introduction to Biogeography
- GEO 306 Geomorphology
- GEO 402 Medical Geography
- GEO 404 Hydrogeology
- GEO 421 Environmental Law
- GEO 424 Soils
- GEO 427 Sustainability
- GEO 444 Environmental Land Use Planning
- GEO 446 Water Resource Management
- GEO 450 Geography-Geology Field Studies*
- GEO 490 Selected Topics

Electives from any category above (6+ Cr)

Internship (3+ cr)

- GEO 360 Internship (2.0 GPA, Junior status)

Allied Sciences (10+Cr)

(R) Recommended courses

Biology (6-7 Cr)

- BIO 142 Intro to Ecology
- (R) BIO 208 Field Biology
- BIO 210 Field Zoology (*162 req*)
- (R) BIO 242 Ecology (*162 req*)
- BIO 442 Aquatic Ecology (*162 req*)
- (R) BIO 448 Field Botany and Plant Tax (*162 req*)

Chemistry/Physics (4 Cr)

- CHM 121 Chemical Bonding
- CHM 125 Lab IB Stoichiometry and Reactions (1)
- CHM 122 Chemical Dynamics
- CHM 126 Lab IIB Equilibrium and Instruments (1)
- (R) PHY 121 Intro Physics (3) + 123 Lab (1)

*Maximum 3cr for category, 6cr total for major.

General Education Requirements (45 CR)

Courses filled-in below are ***DIRECTED general education classes that MUST be taken for the major.*** All other general education courses can be chosen from the list on the back of this page.

Foundations [a] ***(15 cr total)***	Cr	Course(s)
U	3	
W	3	
O	3	
H	3	
Q	3	MAT 117

[a] *One course in each area are required.*

Interconnections ***(9 cr total)***	Cr	Course(s)
D[b]	3+	
G[b]	3+	
F	e	

[b] *At least 1 course each from D and G.*

Citizenship[c] ***(6 cr total)***	Cr	Course(s)
S	e	ESS 108
E	e	
R	e	GEO 140

[c] *1 course from two different categories.*

Natural World ***(9cr total)***	Cr	Course(s)
N[d]	6+	BIO 162 and CHM 105
T	e	CSC 103 or 104

[d] *BIO 162 and CHM 105 required. Either CSC 103 or 104 also required.*

Creativity ***(6 cr total)***	Cr	Course
L[e]	3	
A	e	
C	e	

[e] *At least 1 L course.*

GEOGRAPHY-EARTH SCIENCE PROGRAM

NAME:_____

GEOGRAPHY, GEOGRAPHIC INFORMATION SYSTEMS MAJOR – B.S.

Geography-Earth Science (39+ Cr)

Required Geography Core (15 Cr)

- GEO 105 Physical Geography
- GEO 202 GIS I: Intro to GIS
- GEO 244 Land Use or 322 Urban Geography
- GEO 329 Economic Geography
- GEO 391 Geography Seminar

GIS Core Courses (12 Cr)

(all are required)

- GEO 339 Remote Sensing
- GEO 352 Cartography
- GEO 363 GIS II: Intermediate GIS
- GEO 420 GIS III: Advanced GIS

GIS Technical Electives (6 Cr)

(select 2)

- GEO 425 Image Processing
- GEO 440 Field Techniques I
- GEO 441 Quantitative Methods
- GEO 463 Applied Geophysical Imaging
- GEO 4____ Geography 400 Level Elective

Geography Content Electives (3cr)

(Select 1)

- GEO 244 Land Use
- GEO 301 Biogeography
- GEO 310 Transportation Geography
- GEO 322 Urban Geography
- GEO 427 Environmental Sustainability
- GEO 444 Env Land Use Planning

Internship (3+ Cr)

- GEO 360 Internship

Must have 2.0 overall and major GPA, and Junior status.

Allied Sciences (18 Cr)

Social Sciences (6 Cr)

(select 2)

- PHL 332 Ethical Issues and Comp Tech
- PLS 231 State and Local Government
- PLS 271 Introduction to Public Administration
- PLS 331 City Politics and Administration
- PLS 431 Pennsylvania Local Government
- SOC 220 Social Stratification
- SOC 346 City and Community
- SOC 363 Population Problems

Art/Computer Science/IMS (9+ Cr)

- ART 217 Computer Design I
- CSC 110 Computer Science I (3) + CSC 106 Lab (1)
- CSC 111 Computer Science II (4)
- CSC _____ by advisement
- MIS 142 Business Computer Systems
- MIS 240 Intro to Programming Concepts
- MIS 300 Info Tech and Business Operations
- MIS 355 Database Applications

Math (3+ Cr)

(select 1)

- MAT 140A College Algebra (4)*
- MAT 140B College Algebra (3)*
- MAT 175 Precaculus
- MAT 211 Calculus
- MAT 225 Discrete Mathematics

Technical Writing (3 Cr)

(required)

- ENG 238 Technical/Professional Writing

* MAT 140B is for students with a math placement level of 4 or higher and is the standard algebra course. MAT 140A is for students with a math placement level 3.

General Education Requirements (45 CR)

Courses filled-in below are ***DIRECTED general education classes that MUST be taken for the major.*** All other general education courses can be chosen from the list on the back of this page.

Foundations [a] ***(15 cr total)***	Cr	Course(s)
U	3	
W	3	
O	3	
H	3	
Q	3	**MAT 117**

[a] *One course in each area are required.*

Interconnections ***(9 cr total)***	Cr	Course(s)
D[b]	3+	
G[b]	3+	
F	e	

[b] *At least 1 course each from D and G.*

Citizenship[c] ***(6 cr total)***	Cr	Course(s)
S	e	**PLS 100**
E	e	
R	e	**SOC 101**

[c] *PLS 100 and Soc 101 required.*

Natural World ***(9cr total)***	Cr	Course(s)
N[d]	6+	
T	e	**CSC 104**

[d] *At least 2 courses from N. CSC 104 required.*

Creativity ***(6 cr total)***	Cr	Course
L[e]	3	
A	e	
C	e	

[e] *At least 1 L course.*

GEOGRAPHY-EARTH SCIENCE PROGRAM

NAME:_____

SUSTAINABILITY MAJOR – B.S. *(with concentration in Environmental Conservation)*

Geography-Earth Science (42+ Cr)

Sustainability Core (6 Cr)

- ESS 108 Intro Env Sustain ***or*** BIO 145 Env Bio
- GEO 427 Environmental Sustainability

Concentration Core (9 Cr)

- GEO 202 GIS I: Intro to GIS
- GEO 329 Economic Geography
- GEO 391 Geography Seminar

Sustainability Systems (9 Cr)

- GEO 203 Climate, Energy, & Sustainability
- ESS 214 Geology of Nat Parks (ESS 110 or 210)
- GEO 301 Intro to Biogeography
- ESS 404 Applied Human-Climate Interactions
- ESS 413 Rock and Min Res (ESS 110 or 210)
- ESS 442 Env Geology (ESS 110 or 210)
- ESS 451 Coastal Env Oceanography
- GEO 406 Sustainable Food Systems
- GEO 444 Environmental Land Use Planning
- GEO 446 Water Resources Management
- GEO 450 Geography-Geology Field Study*, **

Human Sustainability Electives (6 Cr)

- GEO 140 Cultural Geography
- GEO 244 Land Use
- GEO 310 Transportation Geography
- GEO 322 Urban Geography

Techniques Course Electives (9 Cr)

- GEO 339 Remote Sensing
- GEO 352 Cartography
- GEO 363 GIS II: Intermediate GIS
- GEO 420 GIS III: Advanced GIS
- GEO 425 Image Processing
- GEO 440 Field Techniques
- GEO 441 Quantitative Methods**
- GEO 450 Geography-Geology Field Study *, **
- GEO 463 Applied Geophysical Imaging

Internship (3+ Cr)

- GEO 360 Internship (2.0 GPA, Junior status)

*Only 3cr for category, 6cr total for major.

** Strongly recommended course.

Note: Prerequisits are in parentheses.

Allied Sciences (18+Cr)

** = Recommended

Biology (3 Cr)

- BIO 205 Marine Biology (BIO 162)
- BIO 210 Field Zoology (BIO 162)
- BIO 208 Field Biology (BIO 162)
- BIO 230 Botany (BIO 161, 162)
- BIO 242 Ecology** (BIO 162)
- BIO 245 Marine Ecology (BIO 162)
- BIO 442 Aquatic Ecology (BIO162)
- BIO 444 Conservation Biology (BIO 242)

Psychology and Sociology (6 Cr)

- PSY 350 The Psychology of Sustainability** (PSY 101)
- SOC 265 Global Society (SOC 101)
- SOC 346 City and Community (SOC 101)
- SOC 354 Social Move and Social Change (SOC 101)
- SOC 363 Population Problems (SOC 101)
- SOC 440 Leader in Global Society (SOC 101)

Economics and Business (3 Cr)

- ECO 345 The Eco of Growth & Develop (ECO 102)
- ECO 355 Environmental Economics** (ECO 102)
- MGT 447 Business and Society
- MIS 142 Business Computer Systems
- MIS 242 Design and Dev of User Info Sys (MIS 142)
- SCM 420 Global Logistics Systems (SCM 330 rec.)

English, History, and Communication (6 Cr)

- ENG 238 Technical Writing
- ENG 359 Native American Literature
- ENG 438 Technical Prof Writing II (ENG 238)
- HCS 345 Environmental Communication**
- HIS 358 American Environmental History**

Options Matrix

Option 1: (Cat D) PSY101 (Cat T) ECO102 (Cat R) Other
Option 2: (Cat D) Other (Cat T) ECO102 (Cat R) SOC101
Option 3: (Cat D) PSY101 (Cat T) ECO102 (Cat R) SOC101
Option 4: (Cat D) PSY101 (Cat T) Other (Cat R) ECO113

General Education Requirements (45 CR)

Courses filled-in below are ***DIRECTED general education classes that MUST be taken for the major.*** All other general education courses can be chosen from the list on the back of this page.

Foundations [a] ***(15 cr total)***	Cr	Course(s)
U	3	
W	3	
O	3	
H	3	
Q	3	MAT 117

[a] *One course in each area is required.*

Interconnections ***(9 cr total)***	Cr	Course(s)
D[b]	3+	PSY101
G	3+	
F	e	

[b] *PSY101 (or SOC101 in Cat R). At least 1 course each from D and G.*

Citizenship[c] ***(6 cr total)***	Cr	Course(s)
S	e	
E	e	
R[c]	e	SOC101 or ECO113[†]

[c] *SOC101 (or PSY101 in Cat D) required. At least 1 course each from 2 different categories.*

[†] *Students taking ECO113 cannot take ECO101, 102. See Options Matrix.*

Natural World ***(9cr total)***	Cr	Course(s)
N[d]	6+	BIO162
T	e	ECO 102[†]

[d] *BIO 162 required, plus 1 additional courses from N.*

† Students taking ECO101, 102 cannot take ECO113. See Options Matrix.

Creativity ***(6 cr total)***	Cr	Course
L[e]	3	
A	e	
C	e	

[e] *At least 1 L course.*

Geography-Earth Science Minor (21 Cr)

Required (9 cr)

GEO or ESS 100-level course	
GEO or ESS 200- or 300-level course	
GEO or ESS 400-level course	

Electives (12 cr)

GEO or ESS course by advisement	
GEO or ESS course by advisement	
GEO or ESS course by advisement	
GEO or ESS course by advisement	

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GEOGRAPHY-EARTH SCIENCE PROGRAM Name:_____

SUSTAINABILITY MINOR

Sustainability Minor (21 Cr)

Sustainability Core (6 credits)

Required:

GEO 427 Environmental Sustainability

Select 1:

ESS 108 Conservation of Natural Resources

BIO 145 Environmental Biology

Sustainable Systems (Select 1)

ESS 214 Geology of National Parks

ESS 404 Applied Human-Climate Interactions

ESS 413 Rock and Mineral Resources

ESS 442 Environmental Geology

ESS 451 Coastal Environmental Geography

GEO 405 Environ. Conserv. and Mgmt. in PA

GEO 444 Environmental Land Use Planning

GEO 446 Water Resources Management

GEO 450 Geography-Geology Field Study

Biology (Select 1)

BIO 205 Marine Biology (BIO 162)

BIO 210 Field Zoology (BIO 162)

BIO 208 Field Biology (BIO 162)

BIO 230 Botany (BIO 161, 162)

BIO 242 Ecology* (BIO 162)

BIO 245 Marine Ecology (BIO 162)

BIO 442 Aquatic Ecology (BIO162)

BIO 444 Conservation Biology (BIO 242)

Psychology and Sociology (Select 1)

PSY 350 The Psychology of Sustainability* (PSY 101)

SOC 265 Global Society (SOC 101)

SOC 346 City and Community (SOC 101)

SOC 354 Social Movements and Social Change (SOC 101)

SOC 363 Population Problems (SOC 101)

SOC 440 Leader in Global Society (SOC 101)

Economics and Business (Select 1)

ECO 345 The Economics of Growth & Development (ECO 102)

ECO 355 Environmental Economics* (ECO 102)

GEO 230 Economic Geography

MGT 447 Business and Society

MIS 142 Business Computer Systems

MIS 242 Design and Dev of User Info Systems (MIS 142)

SCM 420 Global Logistics Systems (SCM 330 rec.)

English, History, and Communication (Select 1)

ENG 238 Technical Writing

ENG 359 Native American Literature

HCS 345 Environmental Communication*

HIS 358 American Environmental History*

Note: Prerequisits are in parentheses.

* Strongly recommended classes.

GEOGRAPHY-EARTH SCIENCE PROGRAM Name:_____

GIS Minor (18 Cr)

Required Courses

GEO 202 GIS I	
GEO 363 GIS II*	
GEO 420 GIS III*	

Allied Techniques (select 2)

GEO 339 Remote Sensing	
GEO 352 Cartography	
GEO 425 Image Processing	
GEO 440 Field Techniques	
GEO 441 Quantitative Methods	
Geo 463 Applied Geophysical Imaging	

* Course has a prerequisit.

Geo-ESS Courses (select 1)

ESS 210 Physical Geology	
ESS 220 Oceanography	
GEO 226 Hydrology	
GEO 244 Land Use	
GEO 301 Introduction to Biogeography	
GEO 310 Transportation Geography	
GEO 322 Urban Geography	
GEO 329 Economic Geography	
GEO 444 Environmental Land Use Planning	

Note: At least 2 courses within the minor must be from the 300-400 level.

GEOGRAPHY-EARTH SCIENCE PROGRAM

Geographic Information Systems Certificate (12cr)

Student Name:

Required Courses:	Completed
GEO 202: GIS I - Introduction to Geographic Information Systems	
GEO 363: GIS II - Intermediate Geographic Information Systems	

Select 2 of the following courses:	
GEO 339: Remote Sensing	
GEO 352: Cartography	
GEO 420: GIS III: Advanced Geographic Information Systems	
GEO 425: Image Processing	
GEO 440: Field Techniques	
GEO 441: Quantitative Methods	
GEO 463: Applied Geophysical Imaging	

Adding a GIS Certificate to Your Degree Program

To add the 12 credit hour GIS certificate to your current degree program please visit the link below:
http://www.ship.edu/Registrar/Declaration_of_Study/

Scroll down to "Student Information":

1. Fill in your student information.

Under "Current Majors, Minors, or Certificates":

2. Check the box corresponding to your CURRENT major.
3. Check the box corresponding to your CURRENT minor, if applicable.
   (Select "None" if you do not have a minor)
4. Check the box corresponding to any of your CURRENT certificate programs.
   (Select "None" if you are not currently enrolled in a certificate program)

Under "Section II: Program of Study":

5. Scroll down to "Certificates to add:"
6. Check the box labeled: Geographic Information Systems (AS-UCRT-GECT)
7. Scroll down to the bottom of the page and click the **SUBMIT** button.

Adding a GIS Certificate and you are a Non-Degree student:

Please see the Admissions Office (Old Main office 105).

Shippensburg University
Marine Science Minor Advising Worksheet

Why a Marine Science Minor? Some facts…

- The world ocean is the **single most important feature of our planet**! It exists at the nexus of the Earth's complex systems and it is critical that we understand its role on our planet.
- Oceans regulate climate, circulate massive quantities of water, gases, and heat around the globe, and **produce upwards of 85% of the oxygen we breathe**. Oceans also absorb many of the pollutants we emit including greenhouse gases and moderate our climate. Their vast biodiversity offers a frontier for novel medicines, and oceans provide the primary food supply for more than 1.5 billion people globally.
- The **world's oceans are Earth's most valuable asset**, contributing $70 trillion dollars in production annually and an additional $30 trillion in ecosystem services that benefit humanity.
- In the U.S. $1.5 trillion in cargo moves through U.S. seaports and only 14% of coastal counties produce more that 45% of U.S. GDP.
- More than **3 million U.S. jobs are dependent on oceans** and Great Lakes resources and 3.2 billion people live and work within 60 miles of the sea.
- NOAA ***reported employment growth in the ocean economy by 2.7% relative*** to the 1.7% rate found nationally in six job sectors dependent on natural ocean resources. These include: 1) living resources, 2) marine transportation, 3) marine engineering and construction, 4) mineral extraction, 5) ship and boat building, and 6) recreation and tourism.
- The oceans and Great Lakes are critical to Pennsylvania's economy. PA has 3 major ports that provide $50 billion dollars to the Commonwealth's economy.
- ***Our students should have every opportunity to not only take part in this workforce, but to graduate prepared to lead the way*** in delivering and managing more sustainable, multi-disciplinary solutions to the challenges we face from climate change, biologic and natural resources, natural hazards, and other contemporary issues.

Who should minor in Marine Science?

- The Marine Science Minor is designed to complement the liberal arts training of Shippensburg University students, especially those majoring in STEAM fields.
- The minor provides an ***opportunity for any Shippensburg student*** to obtain an interdisciplinary education in Marine Science that will complement their major.

What can you do with the minor?

- When combined with another major, the minor will provide students an excellent foundation for the workforce or graduate school.
- Graduates are uniquely positioned to work in geoenvironmental and biological sciences, coastal development, land use and resource management, environmental engineering, marine research, education, international relations, aquariums, aquaculture and fisheries, and more.
- Workforce projection data indicate that jobs will be available in a growing number of industries, governmental agencies, educational organizations, non-profits, and within both commercial industries and consulting arenas.

What about the curriculum?

- The interdisciplinary program focuses on ocean and coastal environments, their natural resources, biology, hazards, and contemporary geoenvironmental and conservation issues.
- The curriculum provides a foundation in ocean sciences focusing on content, technologies, and skills that enable students to investigate problems in marine science including natural systems evolution, ecology, resources, hazards, sustainability, resource management, and resiliency.

What will you learn?

- Upon completion of the Marine Science minor, students will be able to demonstrate:
    - content knowledge of foundational concepts and contemporary issues in marine sciences and how these impact humans and are impacted by human activities;
    - knowledge of the geography and physiography of marine, coastal, and marginal seas, and associated natural resources;
    - knowledge of the biological diversity of marine, coastal, and marginal seas, their ecology and ecosystem services, and how biodiversity responds to environmental change and human exploitation through time;
    - proficiency in the use of the scientific method and common laboratory, field techniques and equipment used to solve marine science related problems pertinent to resource and sustainable management of ocean assets.

Program Advising Checksheet

19 Credit Marine Science Minor

To declare the minor: students need to have 30 credits earned and a GPA of 2.0 or higher.

Minor students must:

- successfully complete at least 19 credits
- complete at least 6 credits in 300 or higher level coursework
- complete at least 6 credits at the Chincoteague Bay Field Station (or in other marine-coastal field-based courses by advisement)
- complete a capstone from the three options below

Note:

* indicates courses taught at Chincoteague Bay Field Station in summer programs!

Required Courses:	7 Credits	When?	Pre-requisites?
BIO 162 Principles of Biology	4 cr	Fall or Spring	NO
ESS 220 Oceanography	3 cr	Fall Only	ESS 110/210 or any Chemistry
Foundations of Marine Science Courses (select 2)	**6 Credits**		
ESS 212 – Historical Geology	3 cr	Spring Only	ESS 110/210
ESS 190 – Selected Topics	3 cr	Summer (primarily)	NO
ESS 340 – Marine Geology*	3 cr	Summer	ESS 110/210
BIO 190 – Selected Topics	3 cr	On occasion	By advisement
BIO 205 – Marine Biology*	3 cr	Summer	BIO 162
BIO 245 – Marine Ecology*	3 cr	Summer	BIO 162

Advanced Marine Geoscience / Marine Biology Courses (select 1)	3 Credits		
GEO 332 – Field Methods in Oceanography*	3 cr	BIO 401 – Coral Reef Ecology*	3 cr
GEO 336 – Coastal Geomorphology*	3 cr	BIO 402 – Marine Evolution & Ecology*	3 cr
GEO 360 – Internship (by advisement)	3 cr	BIO 413 – Marine Ichthyology*	3 cr
GEO 450 – Regional Geography / Geology Field Study	3 cr	BIO 417 – Coastal Herpetology*	3 cr
ESS 397- Intro to Research (by advis)	3 cr	BIO XXX – Marine Mammals*	3 cr
ESS 404 – Applied Meteorology & Climatology – or GEO 203 Climatology	3 cr	BIO XXX – Marine Botany*	3 cr
ESS 410 – Sedimentary Geology & Paleoenv.	3 cr	BIO XXX – Marine Ichthyology*	3 cr
ESS 490 – Special Topics (by advis.)	3 cr	BIO 442 – Aquatic Ecology	3 cr
BIO 315 – Marine Invertebrates*	3 cr	BIO 444 – Conservation Biol*	3 cr
BIO 393 – Special Topics (by advis)	3 cr	BIO 462 – Invertebrate Zoo.	3 cr
BIO 391 or 392 – Internship (by advis)	3 cr	BIO 463 – Vertebrate Zoo.	3 cr
BIO 397/8 – Intro. to Research (by advis)	3 cr		

Marine Science Capstone (select 1)	3 Credits
Option A: Course-based capstone – ESS 451 or GEO 450 or BIO 401 or BIO 547 or by advis.	3 cr
Option B: Research-based capstone – ESS 397 OR ESS 475 OR BIO 397 OR BIO 398	3 cr
Option A: Internship-based capstone – GEO 360 OR BIO 391 OR BIO 392	3 cr

Special thanks to our partner: Chincoteague Bay Field Station of the Marine Science Consortium