JACKSONVILLE STATE UNIVERSITY

DEPARTMENT OF PHYSICAL
AND EARTH SCIENCES

206 MARTIN HALL

Department Head: Reinisch
Professors: Baucom, Gregg, Gryko, Hill, Holstein, Nichols, Reinisch, Sewastynowicz, Zettili
Associate Professors: Steffy, Weinkauf
Assistant Professors: Helms, Herbert, Mwebi, Vasumathi

Within this department listing you will find information on the following programs: Anthropology (AN), Chemistry (CY), Environmental Science (ESC), Geography (GY), Geology (GL), Marine Science, and Physics (PHS).

General studies courses for Chemistry and Geography majors in the Physical and Earth Sciences Department are included in the Plan of Study for each major located after the Description of Courses for each major. All students, but especially potential transfer students, should note the specific courses required for their selected Plan of Study. For additional information, consult our Internet Home Page at http://www.jsu.edu/depart/geography/geoginto.html.

ANTHROPOLOGY (AN)

Anthropology is a broad-based field of study. Its subject matter ranges from the analysis of primitive and modern cultures throughout the world (cultural anthropology) to the examination of ancient peoples and civilizations (archaeology) to the study of human biological evolution derived from the fossil record of Africa, Europe, and Asia (physical anthropology). Students may study anthropology to develop expertise leading to careers in archaeology or to supplement a liberal arts education.

ANTHROPOLOGY MINOR. A minor in Anthropology requires a minimum of 18 semester hours, which must include AN 224, 225, 345, and 350, and 6 hours of anthropology electives.

For students pursuing the geoarchaeology track in Geography, a minor in Anthropology requires a minimum of 18 semester hours, which must include AN 224, 345, and 350. The following courses may not be used in this minor: AN 225, 344, 410, and 412.

DESCRIPTION OF COURSES

224. Introduction to Anthropology (3). Surveys the field of anthropology, including cultural anthropology, archaeology, physical anthropology, and anthropological linguistics.

225. Introduction to Archaeology (3). A study of the history, methodology, problems, and theory of archaeology including an outline of prehistoric cultural development in both the New and Old Worlds.

344. Principles of Archaeology (3). An examination of the ways in which the archaeologist recovers archaeological data. Methods, theory, actual field work, and field trips to archaeological sites will be included in this course.

345. Cultural Anthropology (3). A global survey of the dynamics of cultural systems, including subsistence, kinship, marriage, sex and gender, politics, and religion. Covers both modern and primitive societies.

347. Current Social Issues (3). An examination of how anthropology offers insight into national and international problems and events. Topics include environmental issues, poverty, crime, warfare, gender, and racism.

348. North American Indians (3). Uses archaeological and ethnographic data to describe the diversity and ingenuity of traditional North American Indian societies and their contributions to contemporary American culture.

349. Latin American Indians (3). Surveys the growth and development of Indian cultures in Mexico, Central America, and South America from prehistoric times to the present.
350. Physical Anthropology (3). An examination of human origins covering evolutionary theory, the fossil record of human ancestry, primatology, genetics, and other pertinent topics.

361. Anthropology of Sexual Behavior (3). A cross-cultural survey of sexual behavior, gender roles, and male-female relations among the world’s societies, including biological and cultural influences on sexual phenomena.

399. Anthropology Study Tour (3). Prerequisite: AN 224 or permission of the instructor. Topics, excursions, and requirements determined by department. May be duplicated for credit; however, only 3 credits may be applied toward any major or minor. Infrequently scheduled and subject to minimum and maximum numbers. Advance deposit required.

410. Archaeological Field School (3). This course is designed to provide the student field experience in methodology and techniques of archaeological data recovery. May be duplicated for credit for a total of 6 semester hours.

412. Lab Techniques in Archaeology (3). Instruction and experience in the techniques of artifact preparation, analysis, cataloging, and storage.

490. Advanced Seminar in Anthropology (3). Prerequisite: AN 224. An examination of current issues in anthropology. The content of this course will vary each semester. Students seeking admission must have advanced standing and secure approval of instructor. May be duplicated for credit for a total of 9 semester hours.

493. Independent Study (1). An opportunity for students with advanced standing to engage in special research projects in anthropology. Approval of instructor and department head required. Pass/fail grade only. May be duplicated for credit for a total of 3 semester hours.

CHEMISTRY (CY)

A Bachelor of Science in Chemistry prepares students for a diversity of careers. All program majors complete a general education and chemistry core curricula. Students seeking careers as chemists or admission to graduate programs in chemistry follow the Professional plan of study below. This plan adheres to certification guidelines of the American Chemical Society (ACS). Students pursuing the Professional plan complete the program’s core curricula and then select one of the following to complete the major: Professional Chemistry, Biochemistry, or Environmental Chemistry.

Students seeking careers that require a basic understanding of chemistry follow the General Chemistry plan of study below. Such careers include medicine, dentistry, veterinary science, pharmacy, education, forensics, patent or environmental law, technical writing, art conservation, sales, marketing or management in a chemical-related industry. The plan below consists of the program’s core curricula and 18 semester hours of 300/400-level courses, including a year of mathematics and a year of physics by advisement.

The Bachelor of Science in Chemistry requires a minimum of 128 semester hours, comprised of the following sub-requirements: 41 semester hours of state-articulated general studies courses, 23 hours of support courses; 38-45 semester hours in chemistry at the 300/400 level, including 12 semester minimum at the 300/400 level at Jacksonville State University; a minor including 6 semester hours of 300/400 level at minimum at Jacksonville State University or a second major. Fifty-two (52) semester hours of 300/400 level courses, which include those required in the major or minor, are required to complete the program. Any hours remaining to meet the 128 semester-hour program or the 52 semester-hours of 300/400-level requirements will be classified as electives. Students must earn a minimum “C” or better in each of their major or minor courses. Students entering Teacher Education must confer with the department head concerning the program of study.
CHEMISTRY MAJOR CORE REQUIREMENTS (21 semester hours)

CY 105, 107 - General Chemistry I ........................................ 4
CY 106, 108 - General Chemistry II ....................................... 4
CY 231 - Organic Chemistry .................................................. 4
CY 232 - Organic Chemistry .................................................. 4
CY 321 - Quantitative Analysis ............................................... 5

Professional Plan (ACS) Select one from Professional Chemistry, Biochemistry, or Environmental Chemistry:

A. Professional Chemistry
   CY 341 - Physical Chemistry ............................................. 4
   CY 342 - Physical Chemistry ............................................. 4
   CY 362 - Biochemistry .................................................... 4
   CY 421 - Instrumental Analysis ......................................... 5
   CY 490 - Internship or CY 497 - Senior Research ................ 1
   In this concentration, the math requirement is MS 125 and MS 126; the Physics requirement is PHS 211 and PHS 212 with labs.

   Total this option .......................................................... 39

B. Biochemistry
   CY 341 - Physical Chemistry ............................................. 4
   CY 342 - Physical Chemistry ............................................. 4
   CY 363 - Biochemistry .................................................... 4
   CY 490 - Internship (1) AND CY 492 - Biochemical Research (1)
   or
   CY 492 - (1) (1) .............................................................. 2
   In this concentration, the math requirement is MS 125 and MS 126; the Physics requirement is PHS 211 and PHS 212 with labs.

   Total this option .......................................................... 39

C. Environmental Chemistry Students strongly encouraged to minor in ESC.
   CY 341 - Physical Chemistry ............................................. 4
   CY 342 - Physical Chemistry ............................................. 4
   CY 430 - Environmental Chemistry ..................................... 3
   CY 433 - Sampling and Analysis ......................................... 4
   CY 490 Internship - or CY 493 - Envirochem Research .......... 2
   In this concentration, the math requirement is MS 125 and MS 126; the Physics requirement is PHS 211 and PHS 212 with labs.

   Total this option .......................................................... 38

D. General Chemistry Pre-medical, Pre-dental, etc.
   CY 347/347L - Concepts of Physical Chemistry ..................... 4
   300/400 CY electives by advisement .................................. 15
   In this concentration, the math requirement is MS 112 and MS 113; the Physics requirement is PHS 201 and PHS 202 with labs.

   Total this option .......................................................... 40

** by advisement

CHEMISTRY MINOR. A minor in Chemistry consists of a minimum of 24 hours of Chemistry courses, including CY 105, 106, 107, 108, 231, 232 and an additional 8 hours of 300 – 400 level chemistry electives.
### DESCRIPTION OF COURSES

101. **Fundamentals of Chemistry (3).** Lecture/3 hours. Designed to prepare students with weak backgrounds in chemistry and mathematics for CY 105. Fundamentals of chemical problem solving are stressed. Elective credit only, cannot be used to satisfy science requirements or a major or minor in Chemistry.

105. **General Chemistry I (3).** Lecture/3 hours. *Prerequisite: appropriate ACT/SAT score for MS 112. Concurrent enrollment in CY 107 is required.* Part I of a two-semester sequence. General chemistry for science majors, including basic principles and laws of chemistry. Topics include measurements, dimensional analysis, reaction and stoichiometry, periodicity, atomic structure, bonding and molecular structure, and an introduction to organic chemistry.

106. **General Chemistry II (3).** Lecture/3 hours. *Prerequisite: CY 105. Concurrent enrollment in CY 108 is required.* Part II of a two-semester sequence. Continuation of CY 105. Topics include states of matter, solutions, kinetics, equilibrium, acid-base theory, thermodynamics, and electrochemistry.

107. **General Chemistry Laboratory I (1).** Lab/3 hours. *Concurrent enrollment in CY 105 is required.* Basic principles of matter will be explored. Topics of experimentation include obtaining accurate measurements, identifying unknown substances from their physical and chemical properties, purifying matter, exploring gas laws, and performing an acid-base titration.

108. **General Chemistry Laboratory II (1).** Lab/3 hours. *Concurrent enrollment in CY 106 is required.* Topics of experimentation include qualitative analysis, exploring reaction rates, ionic equilibria, and synthesis.

109. **Elementary Organic Chemistry (4).** Lecture/3 hours. Lab/3 hours. *Not open to students for credit toward a major or minor in Chemistry. Prerequisites: CY 105 and 107.* Principles of organic chemistry with emphasis on compounds of biological importance.

164. **Physiological Chemistry (4).** Lecture/3 hours. Lab/3 hours. *Prerequisite: CY 105.* Not open to students for credit toward a major or minor in Chemistry. A brief review of organic chemistry followed by a study of the chemistry and metabolism of proteins, carbohydrates, and lipids.

231. **Organic Chemistry (4).** Lecture/3 hours; Lab/3 hours. *Prerequisite: CY 106.* Part I of a two-semester sequence. Structure and properties of aliphatic hydrocarbons and their halo derivatives emphasizing nomenclature, isomerism, synthesis, reactions, mechanisms and applications.

232. **Organic Chemistry II (4)** Lecture/3 hours. Lab/3 hours. *Prerequisite: CY 231.* Part II of a two-semester sequence. Structure and properties of aromatic compounds, halides, carbonyl compounds, alcohols, ethers and amines, their nomenclature, synthesis, reactions, mechanisms, spectroscopy and applications.


341. **Physical Chemistry (4).** Lecture/3 hours. Lab/3 hours. *Prerequisite: MS 125. PHS 211 and 212 are highly recommended.* Chemical thermodynamics with emphasis on understanding physical properties of pure substances and mixtures. The course covers fundamentals of classical thermodynamics with applications to phase transitions, colligative properties, and chemical equilibria.

342. **Physical Chemistry (4).** Lecture/3 hours. Lab/3 hours. *Prerequisite: MS 126. PHS 211 and 212 are highly recommended.* Fundamentals of quantum chemistry and spectroscopy. The course concentrates on fundamentals of quantum mechanics with applications to chemistry. The course also covers theoretical basis of spectroscopy, focusing on infrared, Raman, visible, and nuclear magnetic resonance techniques.
347. **Concepts of Physical Chemistry (4).** Lecture/3 hours. Lab/3 hours. **Prerequisites:** MS 112, PHS 201, 202, CY 105, 106. This algebra-based course covers fundamentals of chemical thermodynamics and molecular structure with emphasis on life-science applications.

362. **Biochemistry (4).** Lecture/3 hours. Lab/3 hours. **Prerequisite:** CY 231. Biochemical evolution, protein structure and function, flow of genetic information, enzymes, and enzyme kinetics

363. **Biochemistry (4).** Lecture/3 hours. Lab/3 hours. **Prerequisite:** CY 232. Metabolism, signal transduction, glycolysis and gluconeogenesis, citric acid cycle, oxidative phosphorylation, photosynthesis, glycogen and fatty acid metabolism.

411. **Intermediate Inorganic Chemistry (5).** Lecture/3 hours. Lab/6 hours. **Prerequisite:** CY 106. Fundamental topics in inorganic chemistry including atomic structure, chemical bonding, periodic relationships, acid-base theories, non-aqueous solvents, and reaction mechanisms.

421. **Instrumental Analysis (5).** Lecture/3 hours. Lab/6 hours. **Prerequisites:** CY 106, PHS 202. The operating principles and techniques involving the use of analytical instruments.

430. **Environmental Chemistry (3).** Lecture/3 hours. **Prerequisites:** CY 232 and 321. Introductions to water, air, and soil quality and their measurements. Introduction to the problems, regulations, treatment, and ultimate disposal of hazardous and toxic waste materials. Spill clean-up, groundwater transport, land disposal, incineration, and treatment technologies are discussed.

433. **Environmental Sampling and Analysis (4).** Three hours lecture, six hours field and laboratory work per week. **Prerequisites:** CY 231, 232, 321, 421, and ESC 300. This course will emphasize proper environmental sampling techniques (including QA/QC) and the EPA mandated analysis of various parameters, including soil, water, and air. Students will be expected to provide their own waders, hard hats, and rain suits.

435. **Advanced Topics in Chemistry (3).** Advanced study of various topics in chemistry and chemistry related fields. This course is intended to be offered once per year, and topic selections will vary from year to year. See Instructor. May be duplicated for credit for a total of 12 semester hours.

471. **Toxicological Chemistry (3).** Lecture/3 hours. **Prerequisite:** CY 232. A study of the principles of toxicology including identification of, characterization of, and risk from environmental exposures to toxic substances.

484. **Laboratory Practicum (1).** One laboratory period per week. **Prerequisites:** Consent of instructor and completion of CY 321 or 341 or 347 or 362. Students will be involved in chemical pedagogy. This may involve chemical demonstrations, tutoring, grading or development of laboratory experiments. May be duplicated for credit for a total of 3 semester hours. Pass/Fail grade only.

490. **Internship (1).** **Prerequisite:** Consent of instructor and availability of placement. Student will gain on-the-job experience with a firm or government agency. Pass/Fail grade only. Student is expected to devote a minimum of 20 hours/week to this course.

492. **Biochemical Research (1).** **Prerequisites:** CY 231, 232, 362, 363. An introduction to biochemical research. Students will be involved in an ongoing research project, learning laboratory techniques pertinent to biochemical research, how to conduct literature searches, and how to critically evaluate their own and others’ data. A minimum of 10 hours involvement per week will be expected.

493. **Environmental Chemistry Research (1).** **Prerequisites:** CY 430 and 433. The student will complete an environmental research project which will involve monitoring, sampling, and chemical analysis. A detailed paper will be required outlining the student’s findings and conclusions. A minimum of 10 hours involvement per week will be expected.
497. **Senior Research (1).** Prerequisite: Permission of instructor. The student is assigned a simple piece of fundamental research. May be duplicated for credit for a total of 3 semester hours. Pass/Fail grade only.

**PLAN OF STUDY**

**BACHELOR OF SCIENCE**

**MAJOR: CHEMISTRY WITH PROFESSIONAL CONCENTRATION**

**AND PHYSICS MINOR**

**FRESHMAN YEAR**

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<td>EH 101</td>
<td>EH 102</td>
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<td>EH 141</td>
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<tr>
<td>MS 125, Calc I</td>
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<tr>
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**SOPHOMORE YEAR**

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**JUNIOR YEAR**

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**SENIOR YEAR**

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**TOTAL HOURS: 128**
## PLAN OF STUDY
### BACHELOR OF SCIENCE
#### MAJOR: CHEMISTRY WITH GENERAL CONCENTRATION
##### FOR PRE HEALTH PROFESSIONAL AND BIOLOGY MINOR

### FRESHMAN YEAR

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**Total Hours:** 14

### SOPHOMORE YEAR

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**Total Hours:** 15

### JUNIOR YEAR

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<tr>
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**Total Hours:** 16

### SENIOR YEAR

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<tr>
<td>General electives 300+</td>
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**Total Hours:** 17

**Total Hours:** 128

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\(^1\) Choose either HY 101, 102 or HY 201, 202.

\(^2\) Choose from ART 202, DR 242, MU 233, OR FL 101.

\(^3\) Choose from EH 201, 202, 203, 204, 219, 231, 232.

\(^4\) Choose from AN 224, EC 221, 222, GY 120, 220, PSC 100, PSY 201, 222, SY 221.

\(^5\) Choose from PCS 213, 222, PE 109, MSC 113, 115, 116, 151-150.
ENVIRONMENTAL SCIENCE (ESC)

The minor in Environmental Science (ESC) will be of value to majors seeking jobs involving environmental planning, safety, compliance, or oversight functions. Prior to enrolling in any of the ESC courses, a student must have completed a two-semester sequence of coursework in two of the following disciplines: BY, CY, GL, or GY, PHS.

The ESC minor consists of the following core of required courses: 15 hours

- ESC 300 - Intro to Environmental Science .................................................. 3
- ESC 310 - Environmental Laws and Regulations ............................................ 3
- ESC 321 - Environmental Systems ................................................................. 3
- ESC 460 - Quality Assurance/Quality Control .................................................. 3
- ESC 490 - Environmental Auditing ................................................................ 3

Students complete the minor by completing three of the following electives (9 semester hours)

- BY 303 – Biological Conservation ................................................................. 3
- CY 471 – Toxicological Chemistry ................................................................. 3
- ESC 330 - Principles of Hazardous Materials Mgt ............................................. 3
- ESC 480 - Environmental Impact Statements ................................................. 3
- ESC 495 – Risk Analysis .............................................................................. 3
- PHS 327 - Elementary Radiation Physics ......................................................... 3

Total Hours ........................................................................................................ 24

DESCRIPTION OF COURSES

300. **Introduction to Environmental Science (3).** An overview of environmental science principles, environmental and health effects of pollutants, and a discussion of possible solutions that can be implemented to minimize or eliminate damage to Earth.

310. **Environmental Laws and Regulations (3).** *Prerequisite: ESC 300.* In-depth study of selected environmental regulations relating to hazardous substances and wastes, clean air and clean water, and origins in statutory law.

321. **Environmental Systems (3).** *Prerequisite: ESC 300.* An introduction to the engineering systems and equipment used to protect our air, water, and soils. This non-mathematical course is designed to prepare individuals from various disciplines to understand the selection, basic design, application, and effectiveness of environmental engineering systems.

330. **Principles of Hazardous Materials Management (3).** *Prerequisites: CY 105 and 106.* An introduction to the identification and management of hazardous materials encountered in the workplace, school, or home. This course will focus on management approaches, including education and training, engineering systems, task performance practices, administrative procedures, emergency response plan preparation, and first responder actions that can be used to minimize exposures and consequent health and environmental effects.

460. **Quality Assurance/Quality Control (3).** *Prerequisite: Permission of Instructor.* This course is designed to equip the student with a firm understanding of QA/QC techniques in the environmental field. This will be accomplished through the use of simple statistical methods and a study of the EPA requirements for sampling and analysis of environmental parameters.

480. **Environmental Impact Statements (3).** *Prerequisites: ESC 300, 310, 321, 330, and 400.* The National Environmental Policy requires that potential environmental impacts of proposed projects be evaluated and presented in the form of an Environmental Impact Statement (EIS). This course reviews the EIS format and the collaborative procedures used to produce an EIS.

490. **Environmental Auditing (3).** Overview of systematic auditing techniques with a focus on regulatory compliance, liability, environmental awareness and ethics. This course will also cover process mapping as a tool of auditing, the new international standards (ISO 14000) and their implications on future industrial activities.
495. **Risk Analysis (3).** An in-depth study of methodologies for human and environmental risk analysis, with a focus on hazardous chemical releases. Case studies will illustrate current field techniques.

**GEOGRAPHY (GY)**

Geography serves as a bridge between the physical and social sciences. Emphasis is on the nature and distribution of environmental systems, human activities, relations between them, and their variation from place to place. Geography’s uniqueness is not derived from the subject matter studied, but from the discipline’s technical and methodological approach to the locational analysis of phenomena.

The department offers four concentrations within the major and a Geography minor. The Plan of Study for a Geography major—General Geography option—follows the Description of Geography Courses. Plans of study for other Geography major options are available on our Internet Home Page.

The Bachelor of Science in Geography degree offered by the Department of Physical and Earth Sciences requires an overall minimum of 128 semester hours comprised of the following sub-requirements: 30+ hours Geography, including 12 hours 300/400 level courses at JSU; a minor including 6 hours 300/400 level courses at JSU; 41 hours of state articulated general studies courses; 23 hours of support courses; and 52 hours of 300/400 level courses which include those required in the major and minor. Any hours remaining to meet the 128 hours minimum or the 52 hours minimum 300/400 will be classified as electives. A student must earn a minimum “C” or better in each of his/her major and minor courses.

Student complete the major by choosing one of the following four concentrations:

I. **General Geography.** This concentration provides the greatest flexibility for degree-seeking students who find geography interesting and also for those intending to go on to graduate school. Students choosing this option should work closely with an advisor in selecting electives appropriate to their goals.

   GY 208 - Map Reading ........................................3
   GY 220 - Human Geography ........................................3
   GY 250 and 251 - Physical Geography and labs (252, 253) ......8 OR
   GL 241 and 242 - Physical & Historical Geology
   and labs (243, 244) .................................................8
   GY 300/400 level electives ......................................18
   Total hours using this concentration .........................32

II. **Geoarchaeology.** This concentration is best suited to students wishing to combine advanced coursework in Physical Geography and/or Geographic Techniques with applied field and lab courses in archaeology.

   Required Courses:
   GY 208 - Map Reading ........................................3
   GY 220 - Human Geography ........................................3
   GY 250 and 252 - Physical Geography and lab .................4 OR
   GL 241 and 243 - Physical Geology and lab .....................4
   GY 315 - Research Methods I ....................................3
   GY 316 - Research Methods II ....................................3
   GY 490 - Colloquium ..............................................1
   AN 225 - Introduction to Archaeology ............................3
   AN 344 - Principles of Archaeology ...............................3
   AN 410 - Archaeological Field School ............................3
   AN 412 - Lab Techniques in Archaeology .......................3
   Choose any two for a total of 6 hours:
   GY 302 - Principles of Remote Sensing
   GY 307 - Geographic Information Systems
   GY 308 - Cartography: Map Design
   GY 431 - Topics in Physical Geography
   GY 451 - Advanced Cartography/GIS
   Total hours using this concentration .........................35
III. Geographic Techniques. This concentration is best suited for students who seek to enter a highly technical job market upon graduation. A minor in Mathematics and/or Computer Science is strongly recommended.

Required Courses:
- GY 208 - Map Reading ....................................................3
- GY 220 - Human Geography ....................................................3
- GY 315 - Research Methods I ....................................................3
- GY 316 - Research Methods II ....................................................3
- GY 490 - Colloquium .............................................................1
- GY 250/252 or GY 251/253 ....................................................4
- or GL 241/243 or GL 242/244

Electives Courses: Choose 15 hours from the following:
- GY 302 - Principles of Remote Sensing ........................................3
- GY 307 - Geographic Information Systems ....................................3
- GY 308 - Cartography: Map Design .............................................3
- GY 312 - Public Service Mapping ..............................................3
- GY 406 - Digital Image Analysis ................................................3
- GY 451 - Advanced Cartography / GIS (up to 5 times) .................3

Total hours using this concentration ........................................32

IV. Cultural Resource Management. This concentration is best suited to students seeking careers involved with preserving and protecting archaeological and historical resources.

Required Courses:
- GY 208 - Map Reading ....................................................3
- GY 220 - Human Geography ....................................................3
- GY 315 - Research Methods I ....................................................3
- GY 316 - Research Methods II ....................................................3
- GY 490 - Colloquium .............................................................1
- GY 250/252 or GY 251/253 ....................................................4
- or GL 241/243 or GL 242/244
- AN 225 - Intro to Archaeology ................................................3
- AN 412 - Lab Techniques in Archaeology ....................................3
- GY 307 - Geographic Information Systems ....................................3
- GY 308 - Cartography: Map Design .............................................3
- GY 460 - Principles of Cultural Resource Management ...............4
- GY 465 - Cultural Resource Mgmt. Field Tech ..........................3

Total hours using this concentration ........................................36

GY 401, 403, and 480 cannot be used as upper division electives in Geography. They can be used as general upper division electives toward graduation.

GEOGRAPHY MINOR. A minor in Geography requires a minimum of twenty-three (23) semester hours and must include GY 120 OR 220; GY 250, GY 252 and GY 251, GY 253 OR GL 241, GL 243 and GL 242, GL 244; GY 208. In addition, nine (9) hours of 300/400 courses must be chosen.

DESCRIPTION OF COURSES

120. World Regional Geography (3). This course examines major world regions, each the unique result of interaction between an environmental setting and human social and economic activity.

208 Map Reading (3). An introduction to basic map reading and analysis involving symbol identification, coordinate location, and direction and distance measurement. Emphasis is upon using the topographic map.

210. Earth and Space Science (3). The study of earth systems including weather, climate, the lithosphere, soils and biomes.

220. Human Geography (3). The study of social and cultural patterns, emphasizing the arrangement and diversity of economic, social, political, religious, and demographic culture traits.
250. Physical Geography I: Atmospheric Patterns and Processes (3). *Concurrent enrollment in GY 252 lab is required.* Study of the function and distribution of the interrelated processes that shape Earth’s weather and the classification and distribution of Earth’s climates.

251. Physical Geography II: Landscape Patterns and Processes (3). *Concurrent enrollment in GY 253 lab is required.* Study of Earth’s soils, biomes and physiographic regions with emphasis on the processes that formed them and their global patterns.

252. Physical Geography Laboratory I (1). *Concurrent enrollment in GY 250 is required.* One two-hour lab per week. Experiments focus on weather, energy and moisture budgets, and climatic classification.

253. Physical Geography Laboratory II (1). *Concurrent enrollment in GY 251 is required.* One two-hour lab per week. Exercises focus on study of the physical properties of soils, the analysis of biomes, the use of topographic maps to identify land surface features and the identification of physiographic regions.


308. Cartography: Map Design (3). *Prerequisite: GY 208.* Two hours of lecture, two hours of lab. Introduction to computer-assisted map making, emphasizing principles of map design.

312. Public Service Mapping (3). *Prerequisite: GY 307.* Examines the tools and methods provided by geographic Information science for planning and maintaining public service. Consideration includes crime analysis and mapping, emergency and disaster response, environmental management, geographic distribution of health problems and facilities, parcel and infrastructure maintenance and mapping, analysis of networks, and predictive modeling.

315. Research Methods I (3). *Prerequisites: EH 101 and 102, GY 250 and 252 or 251 and 253 or GL 241 and 243, and GY 220.* Design and preparation of a geographic research proposal, with emphasis on problem identification, methodology design and literature review. Fall semester only.

316. Research Methods II (3). *Prerequisite: GY 315.* Design and preparation of the graphics and statistical analysis portions of a geographic research proposal. Spring semester only.

320. Political Geography (3). A study of the spatial aspects of political phenomena from the international to the local scale. Suggested background: GY 220.

331. Climatology (3). *Prerequisite: GY 250.* A study of climates, how they are classified, and their effect upon human activity.

333. Meteorology (3). *Prerequisite: GY 250.* The study of weather types and their causes, weather instrumentation, the construction and interpretation of weather maps, analog and synoptic forecasting, and weather modification.

341. Economic Geography (3). A survey of the factors which influence the location of economic activities with emphasis on the application of various elementary techniques designed to determine the relative economic potential of any place.

351. Advanced Regional Study (3). Examination of the interrelations among various physical and cultural elements that make regions of the world distinctive. Regional focus varies. See instructor. May be duplicated for credit for a total of 12 semester hours.

399. Geography Study Tour (3). *Permission of instructor required.* Topics, excursions, and requirements determined by department. May be duplicated for credit; however, only 3 credits may be applied toward any major or minor. Infrequently scheduled and subject to minimum and maximum numbers. Advance deposit required.
401. Practicum in Geography (3). Consent of instructor required. This course provides opportunity to gain on-the-job experience with a firm or government agency. Pass/Fail grade only. May be duplicated for credit for a total of 6 semester hours.

403. Independent Study (1). Permission of instructor required. This course gives the advanced student opportunity to pursue directed research. May be duplicated for credit for a total of 3 semester hours. Pass/Fail grade only.


422. Geographic Views of History (3). Use of the geographic perspective to examine facets of World, United States, and Alabama history.

431. Topics in Physical Geography (3). Advanced geographic study of various facets of the natural environment. Topic selection varies. See instructor. May be duplicated for credit for a total of 12 semester hours.

444. Topics In Environmental Conservation (3). In-depth examination on various conservation Issues. Topic selection varies; see Instructor. May be duplicated for credit for a total of nine semester hours.

451. Advanced GIS (3). Prerequisites: GY 307 and permission of instructor required. Advanced training in selected geographic techniques. Topic selection varies. See instructor. May be duplicated for credit for a total of 15 semester hours.

460. Principles of Cultural Resource Management (4). Three hours lecture/two hours lab per week. Concurrent enrollment in Lab is required. Prerequisite: AN 225. A study of the legislation base of CRM as well as the archaeological, architectural history, and oral history aspects of CRM investigations.

465. Cultural Resource Management Field Techniques (3). Prerequisite: GY 460. Students acquire skills in those field methodologies in archaeology, architectural history, and oral history used by CRM specialists. Taught during summer terms, the course meets 20 hours per week.

475. Natural Hazards (3). Prerequisites: GY 250 and 251 or GY 250 and GL 241. An introduction to natural hazards, their causes, distribution and impacts. Focus on human perception, vulnerability and risk analysis.

480. Geography Laboratory Practicum (1). Permission of Instructor. Four hours of laboratory per week. Students learn to utilize pieces of equipment and demonstration techniques while assisting an instructor to prepare and conduct lab sessions. Pass/Fail grade only. May be duplicated for credit for a total of 2 semester hours.

490. Colloquium (1). Prerequisite: a completed piece of research must be submitted prior to enrollment in this course. Results of a basic research project in geography are presented in a conference setting using PowerPoint or equivalent software. Permission of instructor required. Pass/Fail grade only.

PLAN OF STUDY
BACHELOR OF SCIENCE

MAJOR: GENERAL GEOGRAPHY

FRESHMAN YEAR

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**TOTAL HOURS: 128**

1. Choose either HY 101, 102 or HY 201, 202.
2. Choose from ART 202, DR 242, MU 233, or FL 101.
4. Choose from BY 101 and 103, CY 105 and 107, GL 242 and 244, PHS 201 and 203.

## GEOLOGY (GL)

A two-semester sequence of geology is offered which can be used to meet the University general studies natural science requirement. Students interested in earth science are encouraged to consider a major/minor in Physical Geography.

### DESCRIPTION OF COURSES

241. **Physical Geology (3).** *Concurrent enrollment with GL 243 is required.* Modern concepts of the Earth’s physical composition, crustal structures, and the internal/external forces acting on them.

242. **Historical Geology (3).** *Concurrent enrollment with GL 244 is required.* Study of the Earth’s evolution, including changes in its crust, surface features, atmosphere, and life forms.

243. **Physical Geology Lab (1).** *Concurrent enrollment in GL 241 is required.* One two-hour lab per week. Emphasis on rock/mineral identification and the study of landforms through topographic and geologic map interpretation.

244. **Historical Geology Lab (1).** *Concurrent enrollment in GL 242 is required.* One two-hour lab per week. Study of Earth history using geologic maps and the fossil record of plant and animal development.

483. **Geology Lab Practicum (1).** *Prerequisite: permission of instructor.* Students learn how to use various pieces of equipment and lab demonstration techniques while assisting an instructor to prepare and conduct lab sessions. Pass/Fail grade only. May be duplicated for credit for a total of 2 semester hours.
MARINE SCIENCE

Courses taken in Marine Science are offered only at the Sea Lab of the Marine Environmental Sciences Consortium on Dauphin Island. Courses taken at the Sea Lab may be used for elective credit toward graduation, but will not count toward any major or minor offered by the department. For course description of other courses taught at the Sea Lab, see listing in the Biology Department. Students requiring further information about Sea Lab programs should consult with the program advisor in the Biology Department.

DESCRIPTION OF COURSES

329. Coastal Climatology (2). Introduction to physical factors resulting in climatic conditions of coastal regions, emphasis on the northern Gulf of Mexico.

390. Marine Geology (4). Prerequisite: GL 241 or consent of instructor. A study of the geology of the ocean basins, with special emphasis on the continental shelves, their sediments, and the sedimentary processes at work there.

PHYSICS (PHS)

Jacksonville State University offers a minor in Physics. Students in the sciences, mathematics and computer science will find this program a valuable complement to their majors.

PHYSICS MINOR. Requirements for a minor in Physics include PHS 211, 213, 212, 214, 301 and nine hours in Physics 300+. These courses will be selected in conference with a Physics program advisor.

DESCRIPTION OF COURSES

COURSES WITH NO PHYSICS OR MATH PREREQUISITES

327. Elementary Radiation Physics (3). This course is intended for any student interested in radiation safety and specifically for students in Physics, Chemistry, Pre-medicine, Pre-dentistry, Nursing, Biology, and Archaeology. The course objective is to provide individuals with the knowledge and procedures necessary to minimize exposures to ionizing and non-ionizing radiation and to understand the physiological and environmental effects of radiation. Instruction will include lectures, discussions, demonstration, and laboratory exercises.

350. Physics in Music (3). This course will explore the physics involved in music. A variety of questions with sound and music will be explored. What physical properties can be used to describe sound? How do musical instruments produce sound? What are the physical reasons that instruments playing the same note sound different? How does sound travel through space? Why does your voice sound so different on a recording? Students will be encouraged to generate and explore their own questions. Some class periods will be devoted to a hands-on look at ideas. This course is designed to be descriptive in nature rather than highly mathematical. No math or physics prerequisites.

371. Astronomy (4). 3 hours lecture/3 hours lab per week. A survey of the structure and evolution of the universe, from planets to stars and galaxies. Questions about the nature of science, limits to current knowledge, and the influence of space science will be addressed. The course culminates in individual in-depth explorations of particular aspects of astronomy.

INTRODUCTORY PHYSICS COURSES AND THEIR MATH PREREQUISITES

201. College Physics I (3). Prerequisites: MS 112, 113. Concurrent enrollment in PHS 203 is required. This course is the first half of a two-semester sequence that introduces basic concepts in physics. Beginning with mechanics and motion, we develop methods for mathematically describing the way objects move and predicting their future movement. The course proceeds to study wave motion with springs, strings, water, sound, and light. Does not count toward the Physics minor.
202. **College Physics II (3).** Prerequisite: PHS 201. Concurrent enrollment in PHS 204 is required. The second half of this sequence of courses begins by studying electricity and basic circuits, followed by magnetism. A section on light, including lenses and mirrors, follows. The behavior of light waves such as rainbows and soap bubbles will also be explored. Finally, topics from quantum mechanics and special relativity are introduced to give students a flavor of the revolutionary nature of these topics in their original scientific setting. Does not count toward the Physics minor.

203. **College Physics Lab (1).** Concurrent enrollment in PHS 201 is required. Two laboratory hours each week. Concepts of physics developed in the associated courses will be studied through the use of hands-on activities. Students will work in groups to explore topics in motion, mechanics, waves, and sound.

204. **College Physics Lab II (1).** Concurrent enrollment in PHS 202 is required. Two laboratory hours each week. Concepts of physics developed in the associated courses will be studied through the use of hands-on activities. Students will work in groups to explore topics in electricity, magnetism, optics, and modern physics.

211. **Physics for Scientists and Engineers I (4).** Prerequisite: MS 125. Concurrent enrollment in PHS 213 is required. This course is the first of two semesters designed to introduce the basic concepts of physics. The first semester will concentrate on the area of physics called Newtonian mechanics that is used to work with macroscopic (ordinary-sized) objects. Beginning with mechanics and motion, we develop methods for mathematically describing the way objects move and predicting their future movement. The course proceeds to study wave motion with springs, strings, water, sound, and light. We will take advantage of the power of calculus to depict movement by weaving its structure into our physical laws and theories. Since the development of both calculus and Newtonian mechanics by Sir Isaac Newton, calculus and physics have been intertwined and students in this course will see these close connections. Credit will not be granted for both 201 and 211.

212. **Physics for Scientists and Engineers II (4).** Prerequisites: PHS 211, MS 126. Concurrent enrollment in PHS 214 is required. The second semester of this sequence begins by studying electricity and basic circuits, followed by magnetism. A section on light including lenses and mirrors follows. The behavior of light waves such as rainbows and soap bubbles will also be explored. Finally, topics from quantum mechanics and special relativity are introduced to give students a flavor of the revolutionary nature of these topics in their original scientific setting. Once again, calculus will be used throughout the course. Credit will not be granted for both 202 and 212.

213. **Elementary Laboratory Techniques I (1).** Concurrent enrollment in 211 is required. Two laboratory hours each week. Concepts of physics developed in the associated courses will be studied through the use of hands-on activities. Students will work in groups to explore topics in motion, mechanics, waves, and sound.

214. **Elementary Laboratory Techniques II (1).** Concurrent enrollment in 212 is required. Two laboratory hours each week. Concepts of physics developed in the associated courses will be studied through the use of hands-on activities. Students will work in groups to explore topics in electricity, magnetism, optics, and modern physics.

**COURSES FOR WHICH PHS 202 OR 212 ARE PREREQUISITES**

383. **Special Topics (3).** This course will explore a topic of current interest in the field of physics. May be taken twice for a total of 6 semester hours.

411. **Laboratory Practicum (1).** Four hours of laboratory per week. Students learn to utilize pieces of equipment and demonstration techniques while assisting an instructor to prepare and conduct lab sessions. This course may be repeated for a maximum of four semesters for a total of 4 semester hours. Not for credit toward a minor.
COURSES FOR WHICH PHS 211, 213, 212, 214 ARE PREREQUISITES

301. Modern Physics (3). Explore the two 20th century revolutions in physics: quantum mechanics and special relativity. We will study the evidence that led to the acceptance of each of these theories and some of the implications of these theories. Both quantum mechanics and relativity have become part of the popular culture. This course offers the opportunity to understand their ideas in their original context and see how popular culture’s usage differs from scientific usage.

303. Classical Mechanics (3). This course investigates various aspects of classical mechanics including: kinematics and dynamics of motion, rigid bodies, oscillatory motion, central forces and gravitation, and Lagrangian and Hamiltonian formulations of classical mechanics

343. Electromagnetism I (3). Prerequisite: MS 227. Electric and magnetic fields will be studied. What are their origins? What features of nature affect the nature and strength of the fields? What are some of their effects? Maxwell’s equations unifying all of electricity and magnetism will be seen in their full glory.

443. Electromagnetism II (3). Prerequisite: PHS 343. Continuing the study begun in PHS 343, changing electromagnetic fields are investigated. These changing fields form electromagnetic waves in free space and matter that exhibit all of the standard behaviors of waves. Thus, topics will include reflection and refraction of electromagnetic waves, guided waves, and the field of a moving charge.

491. Quantum Mechanics I (3). Prerequisites: PHS 301, 343, MS 344. This course extends the investigation of quantum mechanics begun in PHS 301 to include the full mathematical development of the theory. Basic tools including linear operators and matrices will be used to explore physical systems such as a particle in a box, a linear harmonic oscillator, the hydrogen atom, and a one-dimensional crystal.

492. Quantum Mechanics II (3). Prerequisites: PHS 491. This course deals with a number of topics pertaining to non-relativistic quantum mechanics including: addition of angular momentum, identical particles and multi-electron atoms, time-independent approximation method and applications, time-dependent perturbation theory and scattering theory.

DEPARTMENT OF POLITICAL SCIENCE AND PUBLIC ADMINISTRATION (PSC)

220 BREWER HALL

Department Head: Lawson Veasey
Professors: Veasey
Associate Professor: Lester, Owens
Assistant Professors: Barnett, Hathaway, Krejci, Taylor, Saeki

The Department of Political Science and Public Administration offers a variety of courses for students in the liberal arts, pre-law, and professional education curricula. A wide range of courses is available for those preparing for careers in law, government, politics, international affairs, business, communications, and many other fields.

The Political Science major requires thirty hours of political science, including Political Science 100, 102, and at least six hours from each of the three fields (Theory and Methodology, American Government, and Global Studies) listed below, plus six hours of political science electives. In addition to the thirty hours of political science, Criminal Justice 101 is required. The Political Science minor requires twenty-one semester hours, including Political Science 100, 102, and at least three hours from each of the three fields listed below, plus six hours of political science electives.