

LEWIS F. ROGERS INSTITUTE FOR ENVIRONMENTAL AND SPATIAL ANALYSIS

High School Counselor 2018 Packet



IESA is a National Center for
Academic Excellence in Geospatial Science Education

Lewis F. Rogers Institute for Environmental & Spatial Analysis

The Lewis F. Rogers Institute for Environmental and Spatial Analysis (IESA), a National Center of Academic Excellence in Geospatial Sciences promotes environmental and geospatial interdisciplinary education with advanced technology and collaborative learning. By choosing the B.S. degree with focus area, a minor, an associate degree pathway, or certificate program, students find the flexibility to follow their passions, while earning valuable, work-ready training through internships, community service, and research projects. IESA participates in the Academic Common Market where students from outside the state of Georgia can enroll in certain degree programs and qualify for in-state tuition.



Established in 2001, the Lewis F. Rogers Institute for Environmental and Spatial Analysis (IESA) on UNG's Gainesville Campus promotes environmental education through the use of advanced technology, interdisciplinary instruction, collaborative learning, and community service. Graduates from our degree and certificate programs have found employment at impressive rates and many go on to reputable graduate schools throughout the United States.

In summer 2017, the National Science Foundation (NSF) awarded a three-year, \$609,739 grant to IESA for a project entitled, "Applying Geospatial and Engineering Technology (AGET)." IESA students follow a curriculum built around a solid core of geospatial science and technology and related courses in areas of their interest, such as environmental science, environmental studies, engineering, education, urban planning and community development, environmental health, and the geosciences. Students find flexibility with core courses offered at five campus locations, some online course offerings that apply towards degree completion, and mentoring by faculty experts in applied geospatial techniques for a variety of disciplines.

https://www.esri.com/training/catalog/57630436851d31e02a43f125/teaching-with-gis:-introduction-to-using-gis-in-the-classroom/

If you need this document in an alternate format for accessibility purposes (e.g. Braille, large print, audio, etc.), please email allison.bailey@ung.edu.

Director's Welcome

Welcome to the Lewis F. Rogers Institute for Environmental and Spatial Analysis (IESA) at the University of North Georgia and thank you for your interest in one of our several academic programs.

Our institute offers a robust intellectual environment that engenders an exciting range of disciplinary and interdisciplinary educational experiences for undergraduate students. Our mission is to engage students in the physical and social sciences, technology, and engineering while maintaining core goals that facilitate the enrichment of students with holistic knowledge and dynamic problem-solving skills.

Students at IESA have many opportunities for real-world projects mentored by our diverse and expert faculty that allow students to be readily employed by industry, non-profit and government agencies immediately upon graduation. In addition, many IESA students are accepted into prestigious graduate programs.

IESA, a National Geospatial-Intelligence Agency (NGA) and United States Geological Survey (USGS) designated Center of Academic Excellence in Geospatial Sciences, takes great satisfaction in being a vibrant and vital asset to shaping the future of our region. Our intent is to prepare students not only with a strong foundation of scientific and technical expertise but also with a well-grounded sense of social and ethical professionalism. It is my belief that qualities, knowledge, and skills gained at IESA are those that distinguish our graduates and ensure their success.

Sincerely
H. Jeff Turk
Director and Professor of Engineering
Lewis F. Rogers Institute for Environmental & Spatial Analysis
University of North Georgia
678.717.3768 (O) 678.717.3770 (Fax)

Dual Enrollment Benefits

The following IESA sponsored courses are approved for dual enrollment students in 2018. These courses satisfy the general core curriculum requirements for any major and in Area F for the Associate of Science Degrees in Geography and Geology and in the Bachelor of Science Degree in Environmental and Spatial Analysis. The main benefit of dual enrollment classes provide high school students with both high school credits towards graduation and college credits which can be applied towards a degree to be earned at the University of North Georgia or transferred to another institution of higher learning. For more information about dual enrollment, visit the Georgia Futures website or the UNG Advising pages.

GEOG 1111K
 Introduction to Physical Geography

GEOG 1112K Weather and ClimateGEOG 1101 Human Geography

GEOG 1102 World Regional Geography

GEOL 1121K Physical Geology
 GEOL 1122K Historical Geology
 ENST 2030 Environmental Studies

GISC 2011/GISC 2011L Intro to GIS

• ENVE 2221K Environmental Science 1

All majors take a core set of classes; this chart below indicates the preferred choices for students choosing an IESA degree program and guides all students towards meeting graduation requirements.

Dual enrollment students may also find it helpful to take English and Math courses in combination with Geography and Geology.

To meet with a STEM advisor for assistance in selecting the appropriate Geography or Geology course to meet your academic goals, please email iesa@ung.edu.

Area A: ENGL 1101/1102

MATH 1111/1113/1450 (Choose one)

Area B: Foreign Language GEOG 1101/1102

Area C: Literature and Fine Arts

Area D: GISC 2011/L and Science Sequence:

GEOG 1111K/1112K for the A.S. in Geography GEOL 1121K/1122K for the A.S. in Geology CHEM 1211/1211L + 1212/1212L for the

A.S. in Environmental Health

Area E: ENST 2030 and two other social science classes

Area F: A combination of science, GISC, Math, and cultural

geography classes as listed in the catalog. Courses taken in Areas A-E cannot be applied to Area F; simply take other course options listed.

Associate Pathways

Each of the Associate Degrees offered by the Institute of Environmental Spatial Analysis fits into the curriculum for our Bachelor's Degree. Students can start on an Associates track and transition into the Bachelor's Track.

Associate of Science (A.S.) in Core Curriculum with Pathway Courses related to Environmental Health



Environmental Health is concerned with the work/home/business environment as it affects humans. According to the American Public Health Association, environmental health professionals monitor upstream factors influencing the health of all who are downstream. Working in environmental health ensures that both natural and anthropogenic environments are safe.

The Environmental Health pathway is a curriculum designed to prepare students to transition into the Bachelor of Science in Environmental and Spatial Analysis at the University of North Georgia or to transfer to another four-year institution in order to pursue further study in environmental public health. Students who complete the Associate of Science in Environmental Health and wish to continue their undergraduate studies at UNG should make an appointment with their academic advisor to explore the Environmental Studies or Interdisciplinary concentration area and discuss which directed electives are most relevant to the field of environmental health.

After completing core classes, students in the Environmental Health pathway are required to take the following courses plus 7 credit hours of major specific electives. AP Credit may apply for some of these courses dependent upon the student's score. High school students may elect to take some of these courses through dual enrollment to get a head start on degree completion.

- BIOL 1107K Principles of Biology I
- CHEM 1211 Principles of Chemistry I
- CHEM 1211L Principles of Chemistry I Laboratory
- ENVE 1103 Introduction to Environmental Professions

Associate of Science (A.S.) in Core Curriculum with Pathway Courses related to Geography



Geography pathway courses focus on the spatial analysis of the interrelationship between humans and their natural environments linking physical sciences and social sciences. Geographers use maps, scientific observations, data, and technology to explain the spatial arrangement of physical features and human activities on Earth's surface. Physical geography, human geography, and Geographic Information Systems or Sciences (GIS) are the three primary areas in the discipline of geography. Physical geography studies physical features and patterns on Earth's surface. Human geography explores human activities and social patterns. GIS integrates geographic concepts and data with computer programs and a variety of analytical tools.

This Associate of Science (A.S.) in Geography particularly prepares students with solid knowledge in the essentials of physical geography, weather and climate, fundamental skills in GIS or regional geography with a focus on the strategic region of East Asia. Electives can be chosen from other geography courses, geospatial science courses, environmental studies, geology, or other earth science courses.

This pathway is a curriculum designed to prepare students to transition into the Bachelor of Science in Environmental and Spatial Analysis at the University of North Georgia or another four-year institution. Students who complete the Associate of Science in Geography and wish to continue their undergraduate studies at UNG should make an appointment with their academic advisor to explore the Earth System Science or Environmental Studies concentration area and discuss which directed electives are most relevant to the field of geography. After completing core classes, are required to take the following courses plus 7 credit hours of major specific electives. AP Credit may apply for some of these courses dependent upon the student's score. High school students may elect to take some of these courses through dual enrollment to get a head start on degree completion. Note: GISC courses are not currently approved for dual enrollment programs in Georgia.

- GEOG 1111K Introduction to Physical Geography
- GEOG 1112 Introduction to Weather and Climate
- GEOG 1112L Introduction to Weather and Climate Lab
- GISC 2011 Geographic Information Science
- GISC 2011L Geographic Information Science Lab

Associate of Science (A.S.) in Core Curriculum with Pathway Courses Related to Geology



Geology is the study of the Earth. Geology describes planets' composition and the processes operating within and on its surface, its history and life. Geologists seek to understand these processes and answer practical questions using a wide array of scientific and engineering techniques ranging from field mapping, geophysical measurements, geochemical analyses, biological studies, earth and space-bound remote sensing.

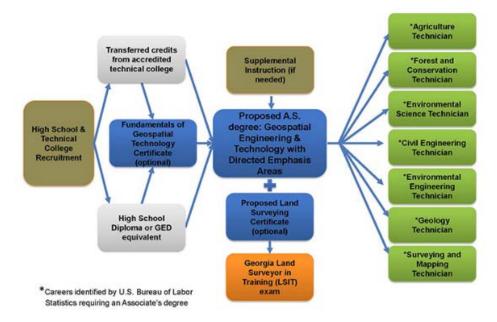
The aim of geology is to ensure the future of humanity and the environment by understanding our planet's past through identifying and discovering new energy and material resources including freshwater from both terrestrial and extraterrestrial sources; forecasting and mitigating geologic hazards (such as earthquakes, volcanic eruptions, tsunamis, and landslides); formulating possible solutions to slow down anthropogenic climate change; educating the public and stakeholders on stewardship of the environment; and assisting policy and decision makers with the guiding principle that "civilizations exist by geological consent, subject to change without notice" by Will Durant.

This Associate of Science (A.S.) Degree in Geology is a curriculum designed to prepare students to transition into the Bachelor of Science in Environmental and Spatial Analysis at the University of North Georgia or to transfer to another four-year institution. After completing core classes, are required to take the following courses plus 10 credit hours of major specific electives. AP Credit may apply for some of these courses dependent upon the student's score. High school students may elect to take some of these courses through dual enrollment to get a head start on degree completion.

- CHEM 1211 Principles of Chemistry I
- CHEM 1211L Principles of Chemistry I Laboratory
- CHEM 1212 Principles of Chemistry II
- CHEM 1212L Principles of Chemistry II Laboratory
- MATH 1450 Calculus I
- GEOL 1121K Physical Geology
- GEOL 1122K Historical Geology

Associate of Science (A.S.) in Core Curriculum with Pathway Courses Related to Geospatial Engineering Technology

AGET Technician Career Pathways



UNG has developed a new Associate of Science starting in Fall 2018. The goal -- to meet the demand for highly skilled and educated technicians in the burgeoning field of geospatial technology. Students enrolled in GET will be prepared for careers in fields such as land-use planning, flood plain mapping, environmental protection, precision farming and national security. GET funding provides an open lab for student use on the Gainesville campus to allow students free access to technology, tools, and tutoring to aid in academic success.

Lab Hours

5:30 p.m 9:30 p.m.
5:30 p.m 9:30 p.m.
3:00 p.m 7:00 p.m.
8:00 a.m 2:00 p.m.



Environmental Spatial Analysis (B.S.)

The Bachelor of Science in environmental spatial analysis (ESA) is designed to produce graduates with skills that meet the needs of employers in geospatial technology fields with little or no further training by employers. The ESA degree is composed of a focused curriculum built on a firm foundation in geographical information science (GIS) and supported by courses in remote sensing and information technology. Students in this program receive hands-on experience with the latest technological tools; such as LiDar, surveying equipment, unmanned aviation systems (drones), aerial imagery cameras, Trimble and GPS receiver units, and use/develop mobile applications for smart devices. The latest software and satellite imagery is provided to students in order to assist in the analysis of data and to visual that data on maps.All ESA majors take the following required courses, plus the courses dedicated to their chosen area of interest. Courses taken in Associate Pathway programs prepare students with foundational knowledge for these upper level courses.

Required Major Courses
ENVE 1103 - Introduction to Environmental Professions
GISC 2012K - Fundamentals of Spatial Analysis
GISC 2201K - Fundamentals of Cartography and Earth Measurement
GISC 2202K - Fundamentals of Data Acquisition and Management
GISC 2203K - Fundamentals of Remote Sensing
ENVE 2771K - Graphics and Information Visualization
GISC 3011K - Cartography and Earth Measurement
GISC 3012K - Global Navigation Satellite Systems
GISC 3200K - Python Programming for GIS
GISC 4011K - Data Acquisition & Management
GISC 4350K - Remote Sensing of the Environment
GISC 4470K - Spatial Analysis
GISC 4601K - Spatial Analysis for Society



Bachelor Degree Focus Areas

Earth Systems Engineering Focus

This multi-disciplinary focus area is for those students who may wish to select their directed electives from courses which are applicable to working as a geospatial professional within engineering industries such as civil, environmental, geologic, agriculture, and ocean engineering, and others which are principally focused on earth related systems and projects.

Earth Systems Science Focus

Earth systems science is a multidisciplinary academic field that integrates physical, earth and biological sciences.



Environmental Studies Focus

Environmental studies is an interdisciplinary academic field which studies human interaction with the environment for solving complex problems. It is a field of study that examines the natural and built environment via anthropology, sociology, psychology, history, policy, ethics and geospatial perspectives.

Geospatial Technology Focus

Geographic information science (GIS), remote sensing, and global navigation satellite systems are used in wide-ranging applications such as environmental management, engineering, planning, transport/logistics, public utilities, business, public health and social sciences.

Interdisciplinary Focus

To meet the needs of students with special career or educational goals in mind, students may select other directed electives offered by IESA or a related program. Generally, students who select this interdisciplinary focus have multiple interests and combine significant coursework from related focus areas to create a customized plan of study to meet a career path or prerequisites for a graduate degree program. Many students who choose this program have an interest in military intelligence, cybersecurity, urban planning, government service, or national resources.

Career Info for Environmental and Spatial Analysis

Most GIS and environmental professionals work full time, which is at least 40 hours per week. Individuals can expect both fieldwork and indoor work. When working outside, you may stand for long periods and often walk long distances, sometimes in bad weather. Handheld technologies are used in the field; data analysis is completed in the computer lab. Some technicians fly UAVs (drones) to collect aerial imagery of environmental conditions and then process the imagery with their other mapping data. Demand for surveying services is closely tied to construction activity, and job opportunities will vary by geographic region, often depending on local economic conditions. Increasing use of geographic technologies and data will drive employment growth in the careers of surveying, mapping technicians, geographers, environmental engineering, urban planning and community development.

Careers & Salaries

Most work full time, which is at least 40 hours per week. Individuals can expect both field work and indoor work. When working outside, you may stand for long periods and often walk long distances, sometimes in bad weather.

Survey & Mapping Technicians:

median annual wage per year \$42,010 / \$20.20 per hour (2015)

Surveyors: median annual wage per year \$58,020 / \$27.89 per hour (2015)

Geographers: median annual wage per year \$74,260 / \$35.70 per hour (2015)

Bureau of Labor Statistics, U.S.

Department of Labor, Occupational
Outlook Handbook , 2016-2017

Edition

Career Roadmaps

Career Roadmaps help students understand the relevance between education and the workforce. The roadmaps are aligned with the Georgia Department of Education Career Clusters and Career Pathways that highlight the connection between career clusters in high schools and college majors at UNG.

Roadmaps related to Environmental Spatial Analysis:

Environmental Systems

Internship Opportunities at IESA

The credit-bearing internship provides students an opportunity to work in an off-campus internship for academic credit. Students obtain valuable experience by applying their knowledge and skills in geospatial technologies in the real world work environment.

For more info: Contact Dr. Yu Sun at yu.sun@ung.edu or 678-717-3806.

ArcNews Spring 2017

Discovering GIS as a Career Choice

Crossing Borders

A column by Doug Richardson, Executive Director, American Association of Geographers

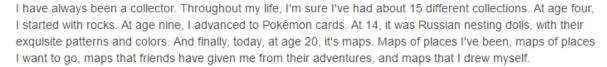


One of the pleasures of my job as executive director of the American Association of Geographers (AAG) is getting to work with young people seeking their way in life. Sometimes that means participating in their explorations of considering a career in geography or GIS. As seasoned professionals, we often forget how passionate and creative young people are in the search for meaning in their work and lives.

Nina Feldman, a student intern at the AAG, recently recounted, during a speech she delivered at the Library of Congress, her journey of discovery that led her to study GIS. I was so impressed by this touching account of her career search that I would like to share a version of it. I hope her words resonate with other young people considering a career path in geography or GIS.

This is what Feldman had to say:

For me, GIS was a discovery process, not a clear-cut choice. GIS in its basic definition is "a computer-based system that collects, analyzes, and distributes spatial data and information." However, to me, it is much more than that. It is a collection of data that represents people's lives, experiences, and significance.



As I watched my wall of maps grow along with my desire to learn, I had a feeling this wasn't just a phase.

It started after the first day in my Introduction to GIS and Cartography class. I called my mom, all bubbly and thrilled, saying, "Mom! I just got out of my GIS class, and it was so much fun! We got to make our own maps about population changes in Vietnam. And we did it all on one computer program!" She excitedly responded, "Aw, honey, that's so great! I'm so happy for you!" There was a pause. "What is GIS?"

Since that day, I've answered that question many times. But no matter how I phrased it, I always got an unsure nod with a confused face. Only a few months' prior, I would have been dazed and befuddled by those three letters as well.

When people ask what is so great about GIS, it's difficult for me to clearly explain because I'm still learning about it myself. And that in itself creates a sense of discovery. With advancements in technology and the development of new ideas, the opportunities for GIS seem boundless. This is why I love it. Watching this progress unfold keeps me captivated in this emerging field.

I came to realize that what I thought was just a simple mapmaking program is so much more. It's a process that takes complex information and simplifies it to make sense of a chaotic world. GIS is an awe-inspiring tool that can help solve real-world problems.



In addition to my coursework, my work experiences have solidified my interest in geography and GIS. I was lucky to have the opportunity to work as an intern with Doug Richardson at the American Association of Geographers and John Hessler at the Library of Congress last summer. Between the two positions, there was never a dull moment.

I remember my first day walking into the Library, when John brought me to where I'd be working. It was a big room with a computer, a few chairs, and a table stretching around the entire room with piles and piles of papers, books, binders, and notes. On the opposite wall were stacks of boxes, some taller than me. At first, I was a bit stumped. What was I supposed to be doing here? But then John explained to me that in these were the personal archives of Roger Tomlinson, the "father" of GIS, and I would be able to comb through and organize them. I've never been more excited to see a room full of boxes.

For the rest of the summer, I was flipping through seminars, organizing case studies, piling up binders, and labeling over 100 boxes. I couldn't have been happier. Because even though I wasn't working with computers handling data or spatially analyzing satellite images, I was able to grow my passion, knowledge, and appreciation of GIS by organizing the past of its founder.

In my hours of filing and labeling I had time to think about my own future and potential careers. I found myself thinking about how my dad made up his mind on becoming a physical therapist. He said that in medical school, he would walk around the hospital in Brooklyn, passing by all types of doctors, but physical therapists were the only ones that always had smiles on their faces.

I want my job to be like that. I want everyone to be happy and smiling. And even in times of stress or sadness, they would never once think about quitting their jobs.

I've heard so many incredible stories over the years from professors and supervisors—from living for months in the jungle as a cartographer to working with permafrost in the Arctic. From the inescapable heat to the bitter cold, these people have gladly dedicated their lives and work to "collect, analyze, and distribute spatial data" in the most amazing ways.

Every day, more people are thinking of ways to use GIS to solve problems around the world. Throughout college, all the people I met—from professors to interns, cartographers to map enthusiasts—have all had that same passion: a passion that drove them to discover something new, to see the world through a different lens.

In the end, why did I choose GIS as my career?
Ultimately, it came down to a feeling. I knew I was meant for this field as I sat in the computer lab for hours, perfecting a map, having the time of my life. All I need is a pair of headphones and a window of ArcMap, and I feel whole.

I know that I still have much to learn and discover. But one thing I know for sure is that I can't wait to add some more memories and maps to my collection.



For more information about careers in geography and GIS, contact Doug Richardson.

Read other articles in the "Crossing Borders" series.

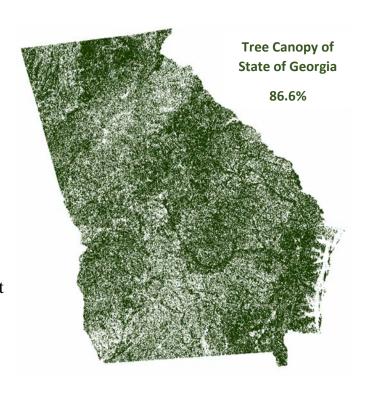
Certificates: A Great Add On!

Earth Science Certificate

Earth science describes the planet's features, patterns, composition and the processes operating within and on its surface, its history, and life. Earth scientists seek to understand these and answer practical questions using a wide array of scientific and engineering techniques ranging from field mapping, geophysical measurements, geochemical analysis, biological studies, and remote sensing. The aim of earth science is to ensure the future of humanity and the environment by understanding our planet's past and present through identifying and discovering new energy and material resources.

Environmental Science Certificate

Watershed characterization and management is a relatively new, holistic approach that is currently being used nationally to address water quality and quantity issues. The watershed approach is a coordinated framework for environmental management that focuses on public and private sector efforts to address the highest priority problems within hydrologically-defined geographic areas (watersheds) taking into consideration both ground and surface water flow.



Environmental Studies Certificate

Environmental studies has been a growing field for several decades, particularly since the creation of the Environmental Protection Agency (EPA) in the 1970's. With the increasing need for continued examination of environmental practices, it is necessary to understand the interplay between the environment and the human dimension.

Fundamentals of Geospatial Technology Certificate

Location is a fundamental attribute of all features. Professionals in a wide range of disciplines are utilizing geospatial technologies to collect, manage, and analyze geographic information for a deeper understanding of our world. In many careers, applied knowledge of geospatial technology has become a presumed prerequisite and allows users to determine unique and informative knowledge for myriad industries.

Geographic Information Science Certificate

Professionals in a wide range of disciplines are utilizing GIS to collect, manage, and analyze geographic information for a deeper understanding of our world. In many careers, applied knowledge of geospatial technology has become a presumed prerequisite. In many corporations, GIS professionals are part of the IT department. Students with an interest in a career in computer science would be more job ready if also prepared to use software applications for GIS.

Space Studies Certificate

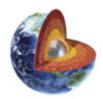
A certificate in space studies introduces students to the operational complexities of space ventures. Space activity is a multi-disciplinary industry and coursework in space studies allows students to correlate the space experience to several fields of study. Often political, legal, ethical, historical, scientific and technological aspects are considered when studying space ventures.

Surveying Certificate (Coming Fall 2018)

A certificate in surveying prepares students to meet the industry demands for surveying technicians in the state of Georgia. Courses focus on applied skills specific to the field of surveying and are combined with either the Associate Pathway in Geospatial Engineering Technology or the B.S. in Environmental Spatial Analysis to meet industry standards in surveying.

Get involved with Student Clubs!

GeoScience Association



Our primary function is to create opportunities for students interested in geosciences to further their interests and build relationships with other students with similar interests. We work with the geology department to maintain the university's rocks, minerals, and fossils collection and we also maintain close ties to the Geospatial Alliance club

for continuing education opportunities in Geographic Information Science. Special topics lectures have included but are not limited to: medical geology, planetary geology, mineralogy and GIS, and environmental geology.

GeoSpatial Alliance



The purpose of the Geospatial Alliance is to promote further educational and networking opportunities for students in the many fields of study that incorporate Geospatial Technology (GST). The specific objectives are: Discussing of current issues in geospatial science and technology, networking with the regional geospatial community, scheduling field trips and invited speakers to increase knowledge of the GST field, exploring the interconnections between GST and other disciplines, and promoting awareness of geospatial technologies and applications through educational outreach.

Engineering Club



An academic and professional networking opportunity for the engineering students at the University of North Georgia Gainesville campus. This club is open to all engineering majors and will address general aspects of the engineering profession with a special emphasis groups of those interested in the earth related engineering fields and a group of those interested in the mechanical related engineering fields. The engineering club may often partner with associated clubs such as the geospatial alliance, geoscience and other clubs for activities and events.

Student Chapter of the American Institute for Professional Geologist



The American Institute of Professional Geologists (AIPG) was founded in 1963 to promote the profession of geology and to provide certification for geologists as a vehicle for establishing a standard of excellence for the profession.

IESA Homepage: https://ung.edu/institute-environmental-spatial-analysis/index.php

Admissions: https://ung.edu/landing/admissions.php

Financial Aid & Scholarships: https://ung.edu/financial-aid/index.php

Tuition & Fees: https://ung.edu/business-office/index.php

Application Deadlines

Spring Semester

November 1st

Fall & Summer

Early Action: November 15th

Regular Admissions: February 15th

Associate Degree Seeking Students: March 15th

Dual Enrollment Deadlines

Spring: November 1

Summer: March 15

Fall: March 15



Schedule a School Visit with Education Outreach Coordinator:

Dr. Allison Bailey, Associate Professor allison.bailey@ung.edu









