Handbook for Chemistry Majors

Academic Year
2020-2021

The A. R. Smith
Department of Chemistry and
Fermentation Sciences
Appalachian State University

CHEMISTRY
The Central Science

Chemistry as a field of inquiry

Chemistry is the study of matter, often referred to as the "central science" since it interacts directly with all the other sciences. If it is *something,* then chemists can study it-learn how to make it, analyze it, determine and predict its properties or improve it. Chemistry is a well-developed science with numerous subdisciplines ranging from archeological chemistry to materials science to biological chemistry. Professional activities of chemists range from theoretical computer simulations of atomic and molecular processes to the analysis of trace quantities of contaminants in industrial polymers to the study of molecular processes that occur when the HIV virus reproduces itself.

Chemistry can involve the study of matter at a theoretical, highly mathematical level. It can also involve hands-on, practical approaches to the making of new compounds or materials, and it may involve the use of sophisticated electronic instruments that can determine the identity or amounts of chemicals present in a sample. It can be approached at the level of basic research or it can be approached as a very practical, applications-oriented science. Chemistry is a diverse field of inquiry that seeks, in the broadest sense, to understand the important processes and materials that we encounter, or should encounter, in the world around us.

Personal traits associated with success when majoring in chemistry and with the careers that often follow

The most important trait that a chemistry major, and subsequently a professional chemist, should possess is curiosity. A real, sustained curiosity about the why and how of things at the molecular level generates questions for the chemistry major such as:

What is the molecular basis for an untreated diabetic going into a coma?
What is the makeup of the dark matter of the universe?
How is polyethylene made and why is it chemically inert?
Why is there an orange afterglow at sunset?
Can chemical theory predict the most effective drug for curing cancer—and how to make it?

Other important traits include perseverance, good problem solving skills, mathematical ability, the ability to speak and write effectively, fundamental computer skills, good interpersonal skills, and deriving personal satisfaction from investigative endeavors. For certain areas of chemistry manual dexterity is also useful.

Skills acquired as a chemistry major that will be useful in other fields of endeavor

The most general transferable skills would include problem-solving skills. These include the ability to analyze complex problems as a series of simpler problems. Specific skills include mathematical and laboratory skills and techniques; communication skills; computer skills; an understanding of the utility and limitations of scientific investigations; and an appreciation of the role of chemistry in other fields.

Entry level careers for students who have majored in chemistry

Most chemistry majors will begin their careers working in a chemical laboratory. The work often involves chemical analysis. The entry-level chemist usually works in a group setting under the supervision of a research group leader. There are also entry-level jobs in organic synthesis, environmental monitoring, and chemical sales. The employer is often a private corporation but could be a governmental agency. The particular area of chemistry (such as synthesis or analysis) that a person is employed in will often depend on their interests and academic emphasis (or concentration) as an undergraduate.

Graduate school opportunities
Graduate school opportunities leading to a Masters or Ph.D. degree in Chemistry are excellent. The demand for qualified chemistry majors wishing to pursue graduate studies is very high. Most major research universities offer excellent assistantship opportunities ($15,000-$22,000 per year, with tuition waivers), and experience in our Teaching Assistant program can give you a competitive advantage when competing for these assistantships. The areas of specialization are numerous.

In most cases, a GPA of at least 3.0 (3.4 or higher for some prestigious chemistry graduate schools) and a good score on the Graduate Record Examination are required.

Other career areas
A chemistry degree can be excellent training when coupled with other academic interests. A former student combined an interest in foreign language and chemistry to secure a position as a technical librarian for a chemical research company in Europe. Another student combined an interest in computer science and chemistry to obtain a job with a company working to enable computers to read and store chemical structures. Yet another became involved in art restoration, thus pursuing interests in both art and chemistry. Another possibility is to pursue a law degree with the intent of becoming a patent attorney.

The most common alternative career is in the health sciences such as medicine, dentistry, optometry and veterinary medicine. For the students who wish to pursue these careers, the Department of Chemistry offers a Bachelor of Science chemistry major with a Biochemistry concentration. This degree and concentration consist of 36 credit hours in chemistry and 27-28 credit hours of Biology courses. Chemistry major with this combination of courses gives a student an excellent preparation for professional schools.

A Pre-Health Professions Committee and the Director of the Pre-Health Advising office, coordinate recommendations from Appalachian to professional schools in the health sciences. Since admission to health profession schools is very competitive, a student applying to a professional school should have a minimum cumulative GPA of 3.5 and should perform above average on the national entrance examination (MCAT, DAT, VCAT or OCAT). Before applying to health profession schools, the student should have extended experience in the health-care field and also should have done community service that reflects her/his interest in human kind, such as volunteering in a homeless shelter, meals on wheels, or nursing homes. The Pre-Health Professions Committee conducts practice interviews with students in order to prepare them for their interview with the professional school. Most health profession schools request a letter of recommendation from the Pre-Health Professions Committee instead of letters of recommendation from individual faculty members. This Committee letter is based on the student's performance in required courses, scores on the National Entrance Examination, evaluations of the student provided by other faculty members, the interview with the Pre-Health Professions Committee, and the student's experience in the health field.

The benefits of a minor in chemistry
The skills acquired in the 20 s.h. of chemistry courses required for a minor would be beneficial because these skills would include problem solving skills (including the ability to analyze complex problems as a series of simpler problems); mathematical and laboratory skills and techniques; communication skills; computer skills; an understanding of the utility and limitations of scientific investigations; and an appreciation of the role of chemistry in other fields. The combination of chemical laboratory skills and training obtained through a minor in chemistry when coupled with a major in another science can often be a distinguishing characteristic for a person seeking an entry level position (particularly if the major is in an area where the job opportunities are scarce).

Additional information

Persons wishing to learn more about the requirements and opportunities of a major in chemistry are encouraged to talk with Dr. Claudia P. Cartaya-Marin, chairperson and/or members of the faculty of the Department of Chemistry. The American Chemical Society can also be contacted for career information and other information related to the profession.

The A. R. Smith Department of Chemistry
Appalachian State University
Boone, NC 28608-2036

(828) 262-3010
(828) 262-6558 FAX
http://www.chemistry.appstate.edu/

American Chemical Society
1155 Sixteenth Street, N.W.
Washington, D.C. 20036

(800) 227-5558
(202) 872-6337
http://www.chemistry.org/

GETTING STARTED

Good grades are important. In your first year at Appalachian, you will be taking courses that are very important foundations for courses you will be taking in the future. While doing well now does not assure later success, doing poorly certainly assures difficulty in future science courses.

Good grades are especially important for students thinking about pursuing a graduate degree or a first professional degree in medicine, dentistry, optometry, or pharmacy. To be competitive in seeking admission to many of these programs, the minimum GPA is in the vicinity of 3.3 to 3.5. In these very competitive times, the best positions and jobs often go to the person with the best academic record.

Building your schedule:

1. Select a set of courses that are compatible with your ability, your extra-curricular activities, and your motivation.

2. Take CHE 1101 and the accompanying lab, CHE 1110. When building your schedule, start with a chemistry laboratory section that has seats available; then select a chemistry lecture section that doesn't conflict with the lab; finally select an appropriate math course (as determined by the results of your math placement test.)

3. Depending on your MAT SAT or ACT or the results of Toledo test, take MAT 1020, or MAT 1025, Algebra and Elementary Functions, or MAT 1110 (Calculus with Analytical Geometry I). NOTE: If you do not have the appropriate math preparation you cannot take CHE 1101 until you complete MAT 1020 or higher.

4. If any questions or problems arise, or if you have difficulty enrolling in the chemistry course please don't hesitate to call Dr. Claudia P. Cartaya-Marin, the department chair, at 262-3010 or send e-mail to cartayacp@appstate.edu.

5. **For prepharmacy students:** If you intend to transfer to pharmacy school, you will not be seeking a degree from Appalachian State and you will not have to complete our core studies curriculum. All schools of pharmacy have their own requirements in the areas of social studies and humanities. Select appropriate courses that are consistent with these requirements and with item #1 above. You should take a biology course (BIO 1801) this year. Whether to take BIO 1801 the fall semester or next should be a decision based on item #1 above. If you plan to transfer to the School of Pharmacy at UNC-Chapel Hill, take an appropriate level foreign language course if this would be compatible with item #1 above. NOTE: The first course in the foreign language course sequences is usually offered in the Fall semester—to get three courses finished in two years means you have to start this semester or delay completion of the requirements.

Early Registration Advising Procedures
A.R. Smith Department of Chemistry and Fermentation Sciences

Current Chemistry Majors

1. Please make an appointment with your faculty advisor. (The departmental secretary can inform you of who that is should you forget.)

2. Your advisor will provide you with your three digit Academic Advisement Number during this appointment. It is imperative that you keep track of this number in order to access the system.

New Chemistry Majors

1. Please select an advisor from the following list and inform the departmental secretary of your selection.

Faculty Member	**Office #**	**Area of Specialization**
Dr. Carol M. Babyak	GWH 459	Analytical, Environmental Chemistry
Dr. Jefferson Bates	GWH 413	Physical Chemistry
Dr. Petia Bobadova	GWH 419	Physical Chemistry
Dr. Claudia P. Cartaya-Marin	GWH 417	Organic Chemistry, Pre-Pharmacy
Dr. Jennifer P. Cecile	GWH 471	Biophysical Chemistry
Dr. Brooke E. Christian	GWH 409	Biochemistry
Dr. Megen Culpepper	GWH 357	Bioanalytical Chemistry
Dr. Michael S. Hambourger	GWH 415	Photochemistry/Energy
Dr. Libby G. Puckett	GWH 449	Analytical, Forensic Chemistry
Dr. Michael B. Ramey	GWH 451	Organic, Polymer Chemistry
Dr. Alexander D. Schwab	GWH 349	Physical Chemistry, Nanomaterials
Dr. Nicholas N. Shaw	GWH 453	Organic and Bioorganic Chemistry
Dr. Robert F. Swarthout	GWH 367A	Environmental Chemistry
Dr. Brett Taubman	GWH 363	Fermentation and Atmospheric Chemistry
Dr. Dieter Weber	GWH 401	Organic Chemistry
Dr. Christian Wallen	GWH 431	Inorganic Chemistry
Dr. Robert “B. J.” Yoblinski	GWH 359	Inorganic Chemistry

2. Make an appointment with the faculty advisor of your choice.

3. Your advisor will provide you with your three digit Academic Advisement Number during this appointment. It is imperative that you keep track of this number in order to access the system.

Honors Program in Chemistry

The A.R. Smith Department of Chemistry offers an Honors Program in Chemistry. Admission to the honors program requires completion of CHE 1101 and CHE 1102 (Introductory Chemistry I and II), CHE 2201 (Organic Chemistry I) or CHE 2101 (Fundamentals of Organic Chemistry) and a minimum grade-point average, both overall and in the major, of 3.20. To graduate with “honors in chemistry,” a student must have a minimum grade point average of 3.45, overall and in chemistry, and must take nine semester hours of chemistry honors credits with a "B" average or better. The required honors thesis in chemistry is a three-credit sequence that consists of one credit of CHE 4000 (chemistry Seminar with honors) and two credits of CHE 4510 (Chemistry Honors Thesis); the two credits for CHE 4510 must take place in two different semesters with one credit each semester. The chemistry honors thesis must be approved by two readers from the Department of Chemistry in order to graduate with honors in chemistry.
Students may arrange to take specific chemistry courses on an honors basis, either as a 410 section or by negotiating an honors contract with the course instructor before class begins. The honors contract, which was developed by the department of chemistry honors committee, allows the student to receive honors credit for a regular course in chemistry by specifying the additional assignments that the student should perform in order to receive honors credit. The departmental honors committee must approve the honors contract.
Students who are already accepted into the Honors College may opt to do either both University and Chemistry Honors or just University Honors. The Chemistry Honors Director must be notified if you intend to do both. Students who are not a part of the Honors College and wish to do Chemistry Honors may apply for admission into the program by submitting a current resume; an essay outlining your career plans, goals, and research interests; and two letters of recommendation (one must be from a chemistry faculty member) to the Honors Program Director. Once accepted in the Chemistry Honors Program, students must complete the following:

1.) The student must complete a minimum of six hours of chemistry honors courses and three hours of chemistry honors thesis credit (which includes CHE 4000 (Chemistry seminar) with honors for one credit and CHE 4510 (Chemistry Honors Thesis) for two credit hours (usually in two semesters).
2.) The student must graduate with a minimum cumulative GPA of 3.45 and a GPA of 3.45 in chemistry courses.
3.) If an honors section (410) of a chemistry course at the 2000 level or above is not available, the student must complete a minimum of one chemistry honors contract in each academic year during participation in the program. A student will not be allowed to enroll in more than one chemistry honors contract per semester.
4.) The student is expected to attend all departmental seminars during any semester in which a chemistry honors contract has been established.
5.) The student must attend at least one off-campus professional chemistry meeting in each of his/her junior and senior years if possible.
6.) The student must make at least one formal presentation either on-campus or at an off-campus professional chemistry conference or symposium.
7.) The student must submit a senior research thesis to the Department of Chemistry Honors Committee and defend it prior to the completion of the Honors Program.

Required Honors Coursework

CHE 4000 with Honors – Students will complete both an oral and written proposal of research project during the course of the semester. It is strongly encouraged that you are already in a research lab the semester before you take CHE 4000.

CHE 4510 (2) – In the first semester of CHE 4510, students should focus on completing research, and focus on literature research and the completion of an introduction of their thesis. In the second semester of CHE 4510, students should be completing their research project and completing their honors thesis.

Honors Thesis Committee Make-up: A student completing both University and Chemistry Honors must have three readers to satisfy both requirements. The student will need two readers from within the Chemistry Department (Chemistry) and one reader from another department (University). A student completing just Chemistry Honors will need two readers from within the Chemistry Department.

Below is a typical four-year plan for Honors students in Chemistry. Note: This only contains coursework, including pre-requisites, that is required to stay on track for the thesis.

Fall Semester		**Spring Semester**
Year 1		**Year 1**
CHE 1101/1110 (4)		CHE 1102/1120 (4)
MAT 1110 (4)		MAT 1120 (4)
Year 2		**Year 2**
CHE 2201/2202 (4)		CHE 2202 (with Honors*)/2204 (4)
PHY 1150 (5)		PHY 1151
RC 2001		CHE 2210/2211
Year 3		**Year 3**
CHE 3301/3303 (4)		CHE 4000 with Honors (1)
CHE 3000		
begin research here or earlier		
Year 4		**Year 4**
CHE 4510 (1)		CHE 4510 (1)
CHE 4580 with Honors* (3)		

*CHE 2202 and 4580 are typically offered with 410 sections. Other Chemistry courses are offered with 410 sections and contracts are available, so a student can choose other courses to get their six credits.

Application to the A.R. Smith Department of Chemistry Honors Program

Admission into the chemistry honors program requires completion of 1102/1120, a minimum GPA of 3.20 in chemistry courses, and a minimum cumulative GPA of 3.20. Students who meet these requirements and wish to participate in the Chemistry Honors Program may apply to the Chemistry Honors Committee for admission into this program. The application is due no later than the third week of the semester in which the student is enrolled in Organic Chemistry I CHE 2201, or in Fundamentals of Organic Chemistry CHE 2101.

Name_____ Banner ID#_____

Current Address_____

Phone #_____ E-mail address_____

Chemistry Concentration_____

Please submit the following:

- A current resume
- Two letters or recommendation, one must be from a chemistry professor.
- An essay describing career plans, goals and research interests (about 500 words)

Submit the materials to:
Dr. Claudia Cartaya-Marin
A.R. Smith Department of Chemistry
Garwood Hall, room 417
525 Rivers Street, Boone
NC 28608

The Appalachian Chemical Society

Our Student Affiliate Chapter of the American Chemical Society

The Appalachian Chemical Society was chartered as a Student Affiliate Chapter of the American Chemical Society in 1977. This organization is a student club that is dedicated to education, the community, and to the A. R. Smith Department of Chemistry at Appalachian State University. The Society strives to provide a better understanding of chemistry and contributes to personal growth of students through individual participation. It also aims to acquaint members with current trends in chemistry, and to serve the Chemistry Department as well as the community.

The Society actively participates in seminars that provide useful information concerning career development and continuing education. Members also plan several trips per year to corporations that provide an insight to the world of chemistry. The Society is involved in the community through several service projects. Chemistry "magic shows" are put on at some of the local schools by the club members to help bring a fun aspect to chemistry in the classroom.

Fundraising is an ongoing project through such activities as bake sales, book sales, chemistry study guide sales, and food drives. During the past few years, funds raised by these activities have been spent on projects such as providing dinner for the homeless at a local homeless shelter and the sponsorship of a family in need at Christmas time by purchasing winter coats, clothing, and food to brighten their holiday season.

A main goal of the organization is to help maintain personal faculty/student relationships. Dessert parties, an annual Christmas party for the entire chemistry department, pizza parties, recreational rafting trips, and picnics on the Blue Ridge Parkway or at Grandfather Mountain, all contribute to making the Chemistry Department a comfortable environment for students, faculty, and staff.

Each year since 1993 the Appalachian Chemical Society has been awarded national recognition with either Commendable or Honorable Mention Club designation by the American Chemical Society, recognizing all the effort that has been put forth to make our organization an outstanding one. Currently the Appalachian Chemical Society is comprised of over 20 members, and the current faculty advisor, Dr. Jefferson Bates.

The Appalachian Chemical Society, like most organizations, cherishes many traditions, and one is of great significance. Some twenty years ago, a T-shirt was designed displaying a periodic chart and an Appalachian State University logo on the back. The symbol of the first element of the chart, hydrogen, was displayed on the front. Each year since that time, a similar T-shirt has been produced and sold as a very popular fund-raiser item. This year the element will be vanadium (or the very popular combination of As and U) and the Society members will choose appropriate colors for the printing in the fall semester. The shirt is a popular item among students, faculty, and alumni, and it reminds us of the history of our organization. Ordering information can be provided by the advisor, Dr. Jefferson Bates, batesje@appstate.edu

The Forensic Science Club

The purpose of the forensic science club is…

- To provide a forum for all students and interested community members to advance the understanding of forensic science. This will be achieved through guest speakers, field trips, and interactive laboratories.
- To promote greater awareness of forensic science to the school and community and to educate others about forensic science.
- To serve the needs and interests of ASU students and community members interested in forensic science.
- To encourage students in their educational pursuits
- To strengthen the presence of forensic science students on campus and their participation in campus activities.
- To maintain ties between the campus forensic science students and local personnel involved in forensics and criminalistics.

Advisor: Dr. Libby G. Puckett (Puckettlg@appstate.edu)

Teaching Assistants in Introductory Chemistry Laboratories

The A.R. Smith Department of Chemistry provides the opportunity for students who have satisfactorily completed Chemistry 1102and 1120 to serve as teaching assistants (TAs) in Chemistry 1110 or 1120 Laboratory. To qualify for this important role, students must first be recommended by a faculty member of the Department of Chemistry. Each nominee is then interviewed by the Introductory Chemistry Coordinator and, if selected to become a TA, is given training in preparation for assisting in the Introductory Chemistry Laboratory. Performance of the TA is graded on a satisfactory or unsatisfactory (S/U) basis. The course carries a one-semester hour credit.

The Teaching Assistant helps deliver instruction in many ways while assisting in the laboratory. First, the TA is asked to police and enforce departmental safety rules. In doing so, the TA's presence will dramatically improve laboratory safety for all persons in the lab.

More importantly, however, the TA is able to provide additional instruction, beyond that offered by the faculty member, to the students who are learning the routine handling and manipulation of chemicals and glassware. Furthermore, by answering student questions and providing insight during a particular experiment, the TA often helps the beginning student discover solutions to problems encountered by CHE 1101-1102 students in the laboratory.

In reality, though, Teaching Assistants themselves realize the greatest benefit from this experience. Future employers want more than just technically competent personal. They actively seek scientists who have developed the ability to interact and communicate with co-workers in a productive and positive manner. Routine academic classroom work simply cannot provide or develop the invaluable leadership experience of interacting with fellow classroom students from a position of responsibility.

Because a peer is often less intimidating to students in the lab, the TA will frequently be sought out to answer "simple" or "routine" questions. This often opens an avenue of communication that may lead to more complex or more detailed explanations. This constant communication serves to develop the "people skills" that the TA will find profitable upon graduation. Being a TA develops a marketable skill that money simply cannot buy.

If you are interested in becoming a Teaching Assistant, talk to your CHE 1102 professor and ask the Introductory Chemistry Coordinator, Dr. Wendy Lewis (lewiswl2@appstate.edu), about the program.

Employment Opportunities in the Department of Chemistry

Many students find that working a few hours each week in the department can be rewarding in a number of ways, and the department encourages interested advanced students to become involved. The department offers a number of part-time employment opportunities each semester to qualified students who become Stockroom employees to assist with laboratory preparations and other technical operations.

Stockroom Assistants prepare materials (chemicals, supplies, and equipment) for nearly all laboratory courses offered by the Department of Chemistry and perform routine stockroom maintenance including shelving chemicals and glassware, assisting with inventory, and repairing equipment. Stockroom Assistants also distribute materials to students and faculty while on duty at the stockroom window.

While providing a valuable service to the Department, Stockroom Assistants gain experience in a demanding environment similar to a "real world" chemical workplace. Good interpersonal skills, diplomacy, and effective time management are required of Stockroom Assistants in addition to a minimum level of technical ability. Experience has shown that working in the chemistry stockroom helps develop these characteristics while the student progresses through the curriculum toward earning a degree in chemistry.

A potential Stockroom Assistant must be punctual, dependable, efficient, courteous, and able to function with composure at all times. Typically, Ms. Sigmann who is the Stockroom Director of Operations recruits future employees following their successful completion of CHE 2210 Quantitative Analysis. In all cases, recommendations are required from current or former chemistry instructors. If you are interested in becoming a Stockroom Assistant, talk to your chemistry professor about a recommendation and stop by the chemistry stockroom in GWH 310 or ask Ms. Sammye Sigmann (room GWH 365) about these opportunities or stop by the Chemistry Office located in GWH 417.

The A. R. Smith Scholarships in Chemistry

The A. R. Smith Scholarships in Chemistry are available to undergraduate chemistry majors at Appalachian State University. The Scholarships are awarded to those students who are declared chemistry majors and who have demonstrated academic excellence at Appalachian. Freshman and sophomores who *intend* to major in chemistry may also apply if they satisfy the requirements stated below. Special consideration will be given to those students who are actively engaged in research with a chemistry department faculty member.

Applicants must submit a typed one-page statement describing career plans and goals or alternatively, a summary of research participation. A personal interview may be scheduled if the Scholarship Committee deems this necessary. Recipients of these awards must have and maintain a minimum grade point average of 2.60 in the chemistry major and must be making satisfactory progress toward the degree in chemistry. The Scholarship Committee will also consider the student's overall performance in making its recommendations.

Scholarships may be renewed each semester. Students must apply each semester, must be making satisfactory progress and must have maintained the necessary grade point average to be eligible for renewal. Applications and additional information are available from the A. R. Smith Department of Chemistry at (828) 262-3010 and on the department web page.

The Jake Whitacker Memorial Scholarship

The Department of Chemistry and Fermentation Sciences offers a memorial scholarship in honor of Appalachian student Jake Whitaker. Jake was an exceptional Appalachian student pursuing a double major in both chemistry and biology. In addition, Jake also participated in academic research and service to the department.

This memorial scholarship is awarded once per academic year to an exceptional rising senior chemistry major. Applicants must have satisfactorily completed at least 75 credit hours and have an overall cumulative grade point average of at least 3.0 (out of 4.0). Priority will be given to qualified chemistry/biology double majors. Research experience in either chemistry and/or biology will be viewed favorably.

For consideration, applicants must submit a typed, one-page statement describing how they best fit the criterion for this scholarship. The Scholarship Committee will consider the overall academic performance of the applicant and the quality of the one page application. The Scholarship Committee may contact the faculty member who signed this application and the research advisor for additional input.

The Lloyd L. Hobbs Memorial Scholarships for the Physical Sciences

These endowed scholarships are established as a memorial to Lloyd L. Hobbs by Mrs. Ella Hobbs. Applicants must be rising juniors or seniors who demonstrate and maintain satisfactory academic progress by having a 3.0 grade point average. In addition, applicants must have a verifiable need for financial aid and must be majoring in an area of the Physical Sciences within the College of Arts and Sciences at Appalachian.

The awards are directed to be renewable based upon verification of satisfactory academic progress as evidenced by maintaining a 3.0 grade point average. The Office of the Dean of the College of Arts and

Sciences collects applications and nominations and then conducts the selection process in accordance with established guidelines. For additional information, please contact the College of Arts and Sciences at (828) 262-3076 or the A. R. Smith Department of Chemistry at (828) 262-3010.

The Glaxo Women in Science Scholarships

The Glaxo Foundation has established an endowment which makes available two $1000 scholarships for full-time women students at Appalachian who are majoring in and planning a career in the sciences. The purpose of the endowment is to recognize outstanding scholarship, to provide an incentive for women science students to enter the science profession, and to provide students with a woman scientist mentor at Glaxo.

The award is directed to be renewable based upon reapplication, reselection, and verification of satisfactory academic performance (3.0 grade point average). Preference in the awarding of this scholarship should accrue to female freshman applicants who would likely be eligible to receive the award in subsequent years. Second preference would be for sophomores, then juniors and seniors who have not received awards in previous years. The student's grade point average must remain at 3.0 or better to be eligible to continue receiving the award, and Glaxo Scholars who remain eligible will be given preference in receiving the award in subsequent years.

The Office of the Dean of the College of Arts and Sciences collects applications and nominations and then conducts the selection process in accordance with established guidelines. For additional information, please contact the College of Arts and Sciences at (828) 262-3076 or the A. R. Smith Department of Chemistry at (828) 262-3010.

The Jonathan K. Perryman Memorial Scholarship for the Sciences

This endowed scholarship is established as a memorial to Jonathan K. Perryman, a 1966 chemistry alumnus of Appalachian. The scholarship guidelines specify that applicants must be rising juniors or seniors majoring in one of the following areas: Biology, Chemistry, Geology, Mathematics, or Physics. Recipients must demonstrate satisfactory academic achievement by having and maintaining a 3.0 grade point average. In addition, recipients must be full-time students with a course load of at least 12 semester hours.

The award is directed to be renewable based upon verification of satisfactory academic performance as evidenced by maintaining a 3.0 grade point average and continuation of progress toward a degree in one of the majors named above. The Office of the Dean of the College of Arts and Sciences collects applications and nominations and then conducts the selection process in accordance with established guidelines. For additional information, please contact the College of Arts and Sciences at (828) 262-3076 or the A. R. Smith Department of Chemistry at (828) 262-3010.

The Richard A. Thomas Memorial Scholarship for Arts and Sciences

This endowed scholarship is established as a memorial to Richard A. Thomas. The scholarship guidelines specify that applicants must demonstrate a verifiable need for financial support and that a financial aid form must be on file. Applicants must have completed the freshman year at Appalachian and must be pursuing a major within the College of Arts and Sciences. In addition, applicants must display success and progress in academics, leadership potential, and co-curricular activities.

The award is directed to be renewable based upon reapplication and reselection. Mrs. Alice T. Thomas,

the donor who established this scholarship endowment, would genuinely appreciate a letter from scholarship recipients detailing their background and ambitions. The Office of the Dean of the College of Arts and Sciences collects applications and nominations and then conducts the selection process in accordance with established guidelines. For additional information, please contact the College of Arts and Sciences at (828) 262-3076 or the A. R. Smith Department of Chemistry at (828) 262-3010.

Undergraduate Certificate in Forensic Science

Description:

Forensic science as a discipline has seen an enormous increase in attention in the last few years. The widespread appeal of crime scene investigation and forensic science has left us with a unique opportunity to generate interest in the physical and biological sciences and has created a staggering increase in enrollment in all existing forensic programs and the development of new programs around the country. Appalachian's Forensic Science Program has been restructured to incorporate interdisciplinary, lab-based coursework in forensic chemistry. Due to its inherent inquiry-based nature, forensic science is typically an attractive field of study to many different types of students. The Undergraduate Certificate in Forensic Science is designed to give students hands-on experience with modern instrumentation that would train students for future careers in chemistry or in forensic analysis. The Undergraduate Certificate in Forensic Science requires 10 semester hours of the following: CHE 2400: Introduction to Forensic Chemistry and Criminalistics, CHE 4630: Forensic Toxicology and CHE 4800: Forensic Microscopy. **A cumulative GPA of 2.5 or higher in those three courses is required for the undergraduate certificate.** Below are descriptions of each course.

Audience:

This certificate may be obtained by any student who completes the specified 10 hours of coursework, *provided that they meet the pre-requisites for the required courses*. This may include Chemistry majors with varying concentrations, Biology majors, Criminal Justice majors, and other science majors. As for off-campus students, the Introduction to Forensic Chemistry and Criminalistics course (CHE 2400) will be provided in an on-line format during the fall semester. To complete the certificate, at least one spring semester will be spent on campus at ASU.

Required courses:

CHE 2400: Introduction to Forensic Chemistry and Criminalistics (3); Fall only, Prerequisite: CHE 1102
CHE 4800: Forensic Microscopy (4); Spring only; Prerequisite: BIO 1110 or 1801, PHY sequence, and CHE 1102
CHE 4630: Forensic Toxicology (3); Spring only; Prerequisite: CHE 2101 or 2202

Research Opportunities for Undergraduate Students

The A.R. Smith Department of Chemistry offers research opportunities to their chemistry majors. Students may make an appointment with Dr. Claudia P. Cartaya-Marin, Chair of the Chemistry Department, to receive information about undergraduate research opportunities.