

# College of Science and Mathematics

The College of Science & Mathematics is home to the departments of Biological and Physical Sciences, Chemistry and Biochemistry, Computer Science and Information Systems and Mathematics. Staffed by faculty with exceptional teaching skills and applied research interests, these departments have gained nationwide recognition for the success of their faculty and graduates. The college's degree programs offer curricula that are state-of-the-art and challenging. Opportunities abound for students to develop a strong identity with their respective departments through student organizations and mentoring relations with the faculty.

The college offers baccalaureate degree programs in biology, biotechnology, chemistry, computer science, information systems and mathematics, a masters degree in information systems and applied computer science, and certificate programs in mathematics of computing, information technology, e-business systems, and information security and

assurance. Close, collaborative relationships exist between the departments and the Bagwell College of Education. These collaborations are reflected in the strong content areas in Biology, Chemistry, and Mathematics Education programs. Biology, chemistry, and mathematics education majors receive the same in-depth course work in the disciplines of science and mathematics as do students majoring in these fields.

Students with career interests in the sciences, mathematics, computer science or information systems will find degree programs in these areas in the College of Science & Mathematics. Those students with interests in medicine, dentistry, pharmacy, veterinary medicine, engineering, or related fields most frequently choose to pursue the pre-professional requirements in the Biological and Physical Sciences or the Chemistry and Biochemistry Department. While degree programs are not offered in these pre-professional areas, students with appropriate course selection can meet the entrance requirements

of most professional schools with a biology or chemistry degree from the College of Science & Mathematics.

Students have numerous opportunities to gain practical experience in their field. Through co-ops and internships available to students in all degree programs, they can obtain direct experience in the workplace with companies or government agencies. Our Mentor-Protégé Scholarship Program enables students to work one-on-one with faculty in undergraduate research projects in areas of mutual interest. The Center for Industrial Collaboration within the college enables students to work alongside faculty on company-sponsored applied research. Our industry-based programs give students career-related experiences that often lead directly to job offers upon graduation.

## Academic Departments

The College of Science and Mathematics houses four academic departments:

- The Department of Biological and Physical Sciences
- The Department of Chemistry and Biochemistry
- The Department of Computer Science and Information Systems
- The Department of Mathematics

### **Department of Biological & Physical Sciences**

**(770) 423-6158**

**biol@kennesaw.edu**

**<http://science.kennesaw.edu/biophys/>**

The Department of Biological and Physical Sciences offers a wide variety of courses that introduce students to the important fields of Biology, Biotechnology, and Physics. Instruction in biology and physics is well balanced by contemporary approaches to the teaching of science. The department takes great pride in its multidisciplinary approach to cell and molecular biology, organismal, field and population biology, and in its commitment to the student's understanding of how these disciplines contribute to the indispensable role of science in society.

On-campus academic courses and independent research activities, as well as off-campus co-op and internship experiences, support the department's philosophy of a "hands-on" approach to the study of science. Through these practical experiences, students are prepared for a diverse number of exciting careers in the biological sciences. By maintaining high academic standards, the Department of Biological and Physical Sciences has not only been an important educator of students destined for graduate school, medical, dental and other health-related professional schools, but, in addition, has successfully prepared well-trained graduates who can immediately enter the job market.

### **Department of Chemistry and Biochemistry**

**chem@kennesaw.edu**

**<http://science.kennesaw.edu/chem>**

The Department of Chemistry and Biochemistry offers class and laboratory instruction in all areas of chemistry including computational chemistry. The chemistry courses utilize modern instructional techniques to help students become knowledgeable of many abstract concepts in modern chemistry. The department has two degree programs which offer the students a range of options so that they will be prepared for jobs in the chemical industry; for beginning graduate studies in many areas of chemistry and biochemistry; for entrance into medical, dental, pharmacy, or other professional schools; for teaching high school chemistry; for jobs in the business end of the chemical industry; or for other possible employment areas related to chemistry. Internships and cooperative employment opportunities which give the students valuable field-related work experience are available for chemistry majors. Many students are involved in research projects with faculty which emphasizes the department's attitude that one learns best by doing. Financial aid opportunities include three scholarships, and employment as either laboratory or research assistants.

### Department of Computer Science and Information Systems

(770) 423-6005

[csis@kennesaw.edu](mailto:csis@kennesaw.edu)

<http://science.kennesaw.edu/csis>

The Department of Computer Science and Information Systems offers four degree programs: (1) a masters of science in information systems—a 36-hour applied graduate program which prepares graduates for employment within niches of the IT profession experiencing critical shortages of employees.; (2) a masters of science in applied computer science designed for experienced computing professionals who want to advance their knowledge of computing without disrupting their careers; (3) a bachelor of science in information systems; and, (4) a bachelor of science in computer science. Both baccalaureate degree programs lead to careers in the field of information technology. Although different in emphasis, each program is based on a strong technical foundation including programming principles, systems analysis, systems architecture, data communications, and database design. Both programs include an emphasis on data communications and systems development.

A certificate program in information technology is also offered through the CSIS department. This certificate is ideal for students who enjoy working with computers but do not wish to seek a degree in either computer science or information systems. It is also ideal for students who have already completed a bachelor's degree and seek the latest information technology expertise.

A certificate program in e-business systems prepares students for careers in the online world of business-to-consumer and business-to-business computing.

The certificate Information Security Assurance prepares students to protect the information and technology assets of organizations.

The department serves both traditional and nontraditional students. Many of our students work full or part-time, often in the computing field. Many are returning to school in order to finish work started many years earlier. To

serve this diverse group, the department offers a full program at night as well as during the day. The department also has an active co-op/ internship program with flexible scheduling and competitive salaries in the IT field.

### Department of Mathematics

(770) 423-6327

[math@kennesaw.edu](mailto:math@kennesaw.edu)

<http://science.kennesaw.edu/math>

<http://science.kennesaw.edu/math/mathed>

Mathematics encompasses many areas, especially in today's modern culture. The Department of Mathematics offers courses which introduce students to this broad area of knowledge and teach them how mathematics can be used to solve problems.

The Department of Mathematics offers programs of study leading to the Bachelor of Science in Mathematics and the Bachelor of Science in Secondary Education with a major in Mathematics Education. A certificate program in mathematics of computing is also offered. There are many employment opportunities for mathematics majors. Recently, University graduates who have majored in mathematics received the fourth highest average starting salaries, nationwide, of new and recent college graduates entering the job market and ranked by major. The three highest ranked degrees all require mathematics. Employment prospects upon graduation are further enhanced with the choice of appropriate interdisciplinary electives. Among these are courses in computer science, biology, chemistry or any of the business areas. A mathematics degree is also excellent preparation for graduate and professional school entrance examinations such as the GMAT (Graduate Management Admissions Test), GRE (Graduate Record Examination), LSAT (Law School Admissions Test) and the MCAT (Medical College Aptitude Test).

### Minors\*

- Chemistry
- Environmental Studies

\* See section on Minors for policy on and additional information regarding minors.

## Programs of Study

The College of Science and Mathematics offers the following undergraduate degrees:

- Bachelor of Science in Biology
- Bachelor of Science in Biology Education
- Bachelor of Science in Biotechnology
- Bachelor of Science in Biochemistry
- Bachelor of Science in Chemistry
- Bachelor of Science in Chemistry Education
- Bachelor of Science in Computer Science
- Bachelor of Science in Information Systems
- Bachelor of Science in Mathematics
- Bachelor of Science in Mathematics Education

## Certificate Programs

The College of Science and Mathematics offers the following certificate programs:

- Certificate in e-Business Systems
- Certificate in Forensic Chemistry
- Certificate in Information Security and Assurance
- Certificate in Information Technology
- Certificate in Mathematics of Computing

## Major in Biology, B.S.

### Bachelor of Science Degree

#### College of Science and Mathematics

#### Department of Biological and Physical Sciences

(770) 423-6158

<http://science.kennesaw.edu/biophys/>

The program of study in biology leading to a Bachelor of Science degree provides students with the opportunity to pursue a major field of concentration in biology with a background in the liberal arts. The breadth and depth of the course offerings combined with high academic standards provide students with the flexibility to concentrate on any of the many career opportunities in biology. The biology degree program will prepare students for graduate school, for professional schools in a number of health-related fields including medical, dental, pharmacy and veterinary schools, for teacher certification in biology secondary education, and for technical positions in a large number of science laboratories.

### Credit Hours

**GENERAL EDUCATION** (see previous listing of requirements) **43**

**UNIVERSITY-WIDE FITNESS FOR LIVING REQUIREMENT** **3**

### Specific General Education requirements for this major

CHEM 1211/L	General Chemistry I/Lab	4
CHEM 1212/L	General Chemistry II/Lab	4
MATH 1113	Precalculus	3
MATH 1190	Calculus I	4

**LOWER DIVISION MAJOR REQUIREMENTS (AREA F)** **17**

BIOL 2101	Introduction to the Culture and Methods of Biology	3
BIOL 2107	Biological Principles I (formerly BIOL 2201/2201L)	4
BIOL 2108	Biological Principles II (formerly BIOL 2200/2200L)	4
PHYS 1111	Introductory Physics I <u>or</u>	
PHYS 2211/L	Principles of Physics I/Lab	4
Lab/math credit from General Education		2

**UPPER DIVISION MAJOR REQUIREMENTS****42**

## I. Biology Courses:

BIOL 3300	Genetics	4
BIOL 3370/L	Ecology/Lab	4
BIOL 3380	Evolutionary Biology	3

Choose one from A and one from B:

A. Anatomy and Physiology 4

BIOL 3320/L	Plant Morphology/Lab
BIOL 3350/L	Comparative Vertebrate Anatomy/Lab
BIOL 4420/L	Plant Physiology/Lab
BIOL 4431/L	Human Physiology/Lab

B. Cell and Molecular Biology 3-4

BIOL 3338/3338L	Histology/Lab
BIOL 3340/L	Microbiology/Lab
BIOL 4410	Cell and Molecular Biology
BIOL 4465	Immunology

II. Biology Electives\* 12-13

Any upper level biology courses. (A student must have a minimum of four (4) laboratory courses: Biology 3300/3300L, BIOL 3370/3370L, one laboratory course chosen from among those listed in the Anatomy and Physiology area plus any other upper-level Biology laboratory course of the students choosing.)

III. MATH 1107 Statistics 3

IV. CHEM 3361/L	Organic Chemistry I/Lab	4
CHEM 3362/L	Organic Chemistry II/Lab	4

**RELATED STUDIES**

Any courses for which prerequisites have been met, chosen from among the following: any upper-level Biology; any upper-level Chemistry; PHYS 1112; PHYS 2212/L; PHYS 3300; PHYS 3305; PHYS 3312; PHYS 3340; ASTR 3320; ASTR 3321; SCI 3360/L; SCI 3365; any upper-level Math; COM 4405; GEOG 3305, GEOG 3315; GEOG 4405; GEOG 3300; GEOG 3320; GEOG 3330; GEOG 4410; GEOG 4415; ENGL 3140; HIST 3301; POLS 4456; other courses with prior approval of Biology/Physics Department Chair.

**6****FREE****ELECTIVES**

Any credit courses in university curriculum.

**12****PROGRAM TOTAL: 123**

\* A maximum of 8 hours (at least two different experiences) from BIOL 3398, 4400 and/or 4450 can be used to satisfy major electives. Students in Cytogenetics Technology Track are required to take BIOL 3327, 4427 and 12 hours of BIOL 3398. Credit for BIOL 3396 can be applied to Free Electives only.

## Major in Biology Education, B.S.

### Bachelor of Science Degree

#### Leading to Certification for Grades 7-12

#### College of Science and Mathematics

#### Department of Biological and Physical Sciences

(770) 423-6158, <http://science.kennesaw.edu/biophys/>

This single field program is designed to prepare biology teachers of adolescents, largely at the secondary school level (grades 7 through 12). It leads to 7-12 teacher certification in the teaching field of biology in Georgia. Candidates complete the equivalent of a major in biology and a second major in pedagogical studies with an emphasis on teaching science.

The specific requirements for admission, retention, degree completion and teacher certification in this degree program are listed with all other teacher education programs. See Bagwell College of Education & PTEU.

## Major in Biotechnology, B.S.

### Bachelor of Science Degree

#### College of Science and Mathematics

#### Department of Biological and Physical Sciences

(770) 423-6508

<http://science.kennesaw.edu/biophys/>

This program of study, leading to a Bachelor of Science degree, is designed to meet a growing national, regional, and state need in the area of biotechnology. This program consists of four tracks, each with track-specific requirements superimposed on a set of requirements common to all four tracks. The Cytogenetics and Molecular Diagnostics tracks are both accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). The common requirements and the track-specific requirements are designed to provide graduates with a solid, conceptual foundation as well as practical laboratory skills. Students have the opportunity to pursue a track in:

- General Biotechnology
- Molecular Diagnostics
- Cytogenetics
- Forensic Molecular Biology

Each of the four tracks is designed to fit a specific market niche within the overall field of biotechnology. However, completion of any of the tracks will also result in the graduate having sufficient conceptual knowledge to pursue advanced graduate or professional degrees.

#### *Credit Hours*

**GENERAL EDUCATION** (see previous listing of requirements) **44**

**UNIVERSITY-WIDE FITNESS FOR LIVING REQUIREMENT** **3**

#### **Specific General Education requirements for this major**

COM 1109	Human Communication	3
MATH 1113	Precalculus	3
MATH 1190	Calculus I	4
CHEM 1211/L	General Chemistry I/Lab	
CHEM 1212/L	General Chemistry II/Lab	8

## Credit Hours

**LOWER DIVISION MAJOR REQUIREMENTS (AREA F) 18**

BIOL 2101	Introduction to the Culture and Methods of Biology	3
BIOL 2107	Biological Principles I	4
BIOL 2108	Biological Principles II	4
MATH 1107	Elementary Statistics	3
PHYS 1111	Introductory Physics I	4
<b>or</b>		
PHYS 2211/L	Principles of Physics I/Lab	

**UPPER DIVISION MAJOR REQUIREMENTS 22**

CHEM 3361/L	Modern Organic Chemistry I/Lab	4
CHEM 3362/L	Modern Organic Chemistry II/Lab	4
BIOL 3300	Genetics	4
BIOL 3340/3340L	Microbiology/Lab	4
BTEC 3301	Introduction to Biotechnology	3
BIOL 4486	Bioethics	3

**MAJOR TRACKS (Choose one) 27****A. General Biotechnology**

CHEM 2800/L	Quantitative Analytical Chemistry/Lab	4
CHEM 3501/L	Biochemistry I/Lab	4
BIOL 4410	Cell and Molecular Biology	3
BIOL 4431/L	Human Physiology/Lab	4
<b>or</b>		
BIOL 4420/L	Plant Physiology/Lab	4
BTEC 4501-4749	Biotechnology Lab Modules <sup>1</sup>	8-12
Electives:		0-4
BIOL 3327	Medical Genetics	
BIOL 4460	Medical Microbiology	
BIOL 4465	Immunology	
BIOL 4475	Virology	

or appropriate Seminar; Special Topics or Advanced Topics courses

**B. Cytogenetic Technology**

BIOL 3327	Medical Genetics	3
BIOL 4427	Chromosome Preparation and Analysis	3
BIOL 4431/L	Human Physiology/Lab	4
BTEC 4501-4749	Biotechnology Lab Modules <sup>2</sup>	5-9
Electives in Biotechnology		

**or**

BIOL 3398	Internship @ Cytogenetics Lab	8
Additional Electives:		0-4
CHEM 3501/L;		
BIOL 4410; or appropriate Seminar;		
Special Topics; or Advanced Topics courses)		

(Major in Biotechnology, Major Tracks-cont'd)

**Credit Hours****C. Molecular Diagnostics**

BIOL 3327	Medical Genetics	3
BIOL 4431/L	Human Physiology	4
BTEC 4501-4749	Biotechnology Lab Modules <sup>3</sup>	8-12
Electives in Biotechnology		

**or**

BIOL 3398	Internship @ Mol Diagnostics Lab <sup>5</sup>	8
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Additional Electives: 0-4

CHEM 3501/L	Biochemistry I	
BIOL 4460	Medical Microbiology	
BIOL 4465	Immunology	
BIOL 4475	Virology	
or appropriate Seminar; Special Topics or Advanced Topics courses		

**D. Forensic Molecular Biology**

CRJU 1101	Foundations of Criminal Justice	3
CRJU 3320	Criminal Investigation	3
CHEM 2800/L	Quantitative Analytical Chemistry	4
BIOL 4431/L	Human Physiology	4
BTEC 4501-4749	Biotechnology Lab Modules <sup>4</sup>	7-10
BTEC 4455	Case Studies in Forensic Science	3
Electives from select group		0-3

**FREE****ELECTIVES** Any credit courses in university curriculum. **9****PROGRAM TOTAL: 123****NOTES:**<sup>1</sup> At least 8 hours should be chosen from either the Basic Skills Category or the General Biotechnology Category<sup>2</sup> At least 8 hours should be chosen from either the Basic Skills Category or the Cytogenetic Technology Category<sup>3</sup> At least 8 hours should be chosen from either the Basic Skills Category or the Molecular Diagnostics Category<sup>4</sup> At least 7 hours should be chosen from either the Basic Skills Category or the Forensic Molecular Biology Category<sup>5</sup> Must complete specific internship requirements for certification; see coordinator for details.

## Major in Biochemistry and Chemistry, B.S.

The American Chemical Society (ACS) has continually certified the Department since 1987. The programs of study in the department lead to a Bachelor of Science degree in either Biochemistry or Chemistry. Biochemistry is the study of the structure, composition, and chemical reactions of substances in living systems. This program is an excellent choice for pre-medical students. Biochemistry is a discipline that is applied to medicine, dentistry, and veterinary medicine. Biochemistry spills over into pharmacology, physiology, microbiology, and clinical chemistry. In these areas, a biochemist may investigate the mechanism of a drug action; engage in viral research; conduct research pertaining to organ function; or use chemical concepts, procedures, and techniques to study the diagnosis and therapy of disease and the assessment of health. To receive the ACS certificate for the Biochemistry degree requires discussion with an appropriate advisor in the department.

Within the Chemistry degree program there are two tracks, depending upon the student's career goals. Completion of the Professional Chemistry track automatically earns the student a Certificate from the ACS, which recognizes them as having completed an ACS approved program. The Professional Chemistry track prepares the student for graduate school in chemistry or biochemistry and for employment in industry, government, or other agencies doing research and development, quality control, environmental studies, or other applications of chemistry and/or biochemistry. The General Chemistry track was designed to have more electives and to allow the student to prepare for professional schools (medical, dental, veterinary, pharmacy, or optometry), for a career in high school teaching, for law school (patent law), or for a position in sales or management in some chemical or biochemical industry. There is also a Forensic Chemistry curriculum under the General Chemistry track, and this track prepares students for the relatively new and exciting world of forensic science. Because of the wide range of possibilities for curricula modification in the General Chemistry track, it is very important to receive advice from an advisor during the first semester at KSU.

### (Biochemistry Degree)

**Bachelor of Science Degree**  
**College of Science and Mathematics**  
**Department of Chemistry and Biochemistry**  
**(770) 423-6159**  
<http://science.kennesaw.edu/chem>

#### *Credit Hours*

**GENERAL EDUCATION** (see previous listing of requirements) **42**

**UNIVERSITY-WIDE FITNESS FOR LIVING REQUIREMENT** **3**

#### **Specific General Education requirements for this major:**

MATH 1113	Precalculus	3
MATH 1190	Calculus I	4
PHYS 1111	Introductory Physics I w/Lab	4
PHYS 1112	Introductory Physics II w/ Lab	4

**LOWER DIVISION MAJOR REQUIREMENTS (AREA F)** **18**

CHEM 1211/L	General Chemistry I/Lab	4
CHEM 1212/L	General Chemistry II/ Lab	4
CHEM 2800/L	Quantitative Analytical Chemistry/Lab	4

(Lower division requirements , Biochemistry major-cont'd)

	<i>Credit Hours</i>
BIOL 2107            Biological Principles	4
Course credit from General Education	2

**UPPER DIVISION MAJOR REQUIREMENTS 27**

CHEM 3361/L        Modern Organic Chemistry I /Lab	4
CHEM 3362/L        Modern Organic Chemistry II/Lab	4
CHEM 3050            Basic Physical Chemistry	3
CHEM 3501/L        Biochemistry I/Lab	4
CHEM 3502            Biochemistry II	3
CHEM 3540L         Advanced Biochemistry Lab	

**or**

CHEM 4100            Direct Applied Research (on a Biochemistry-Related Topic)	2
CHEM 3110            Biological Inorganic Chemistry	3
CHEM 3105L         Inorganic Synthesis Lab	1
CHEMXXXX            Chemistry Elective	3

Choose from these courses: CHEM 3010, CHEM 4510, CHEM 4100, CHEM 3396, CHEM 3398, CHEM 4400. Other courses may be approved by department chair.

**SUPPORTING DISCIPLINES 21**

BIOL 2108            Biological Principles II	4
BIOL 3300            Genetics	4
BIOL 4415            DNA Technology	

**or**

BIOL 4410            Cell and Molecular Biology	3
BIOL 4445            Molecular Methods in Genetics	3
MATH 2202            Calculus II	4
Electives            Choose 3 hours from:	3

BIOL 3340/3340L, BIOL 4420/4420L, BIOL 4630, BIOL 4465, BIOL 4475, BIOL 3396, BIOL 3398, BIOL 4400, BIOL 4450, MATH 1107, CSIS 1020, CSIS 2300. Other courses may be approved by department chair.

**FREE**

**ELECTIVES**    Any courses in university curriculum. **12**

**PROGRAM TOTAL : 123**

**(Chemistry Degree)**

**Professional Chemistry Track**

**Bachelor of Science Degree**

**College of Science and Mathematics**

**Department of Chemistry and Biochemistry**

**(770) 423-6159**

**<http://science.kennesaw.edu/chem>**

*Credit Hours*

**GENERAL EDUCATION** (see previous listing of requirements) **42**

**UNIVERSITY-WIDE FITNESS FOR LIVING REQUIREMENT** **3**

**LOWER DIVISION MAJOR REQUIREMENTS (AREA F) 19**

PHYS 2211/2211L	Principles of Physics I/Lab (if not taken in General Education)	0 - 4
PHYS 2212/2212L	Principles of Physics II/Lab (if not taken in General Education)	0 - 4
CHEM 1211/1211L	General Chemistry I/Lab (if not taken in General Education)	0 - 4
CHEM 1110	Chemistry Career Seminar	1
CHEM 1212/1212L	General Chemistry II/ Lab (if not taken in General Education)	0 - 4
CHEM 2800/2800L	Quantitative Analytical Chemistry /Lab	4
MATH 2202	Calculus II	4
Lab/math credit from General Education <sup>1</sup>		2

**UPPER DIVISION MAJOR REQUIREMENTS 35**

CHEM 3000	Chemical Literature	2
CHEM 3100	Inorganic Chemistry	3
CHEM 3105L	Inorganic Synthesis	1
CHEM 3361	Modern Organic Chemistry I	3
CHEM 3361L	Modern Organic Chemistry I Lab	1
CHEM 3362	Modern Organic Chemistry II	3
CHEM 3362L	Modern Organic Chemistry II Lab	1
CHEM 3501	Biochemistry I	3
CHEM 3501L	Biochemistry I Lab	1
CHEM 3601	Physical Chemistry I	3
CHEM 3601L	Physical Chemistry I Lab	1
CHEM 3602	Physical Chemistry II	3
CHEM 3602L	Physical Chemistry II Lab	1
CHEM 3990	Seminar	1
CHEM 4100	Chemical Research	2
CHEM 4300	Instrumental Analytical Chemistry	2
CHEM 4300L	Instrumental Analytical Chemistry Lab	2
Chemistry Elective	Any 3000/4000 level chemistry course <sup>2,3</sup>	2

**SUPPORTING DISCIPLINES 12**

MATH 2203	Calculus III	4
MATH 3310	Differential Equations	3
Electives	Any 3000-4000 level courses other than chemistry	5

Computer Skills: Students are encouraged to take a CS course as a free elective, but considerable skills are developed with computer applications (word processor, spreadsheets, Internet, e-mail, databases, curve fitting, interfacing, etc.) in all of the labs past the freshman year.

**FREE ELECTIVES Any courses in university curriculum. 12****PROGRAM TOTAL : 123**

<sup>1</sup> MATH 1190 must be chosen as general education requirement unless credit for this course is earned as a lower division major requirement. MATH 1190 is a prerequisite for MATH 2202 in lower division major requirements and MATH 1113 is a prerequisite for MATH 1190.

(Professional Chemistry Track, cont'd)

- <sup>2</sup> Students planning graduate study in chemistry should choose, in the appropriate elective areas, CHEM 3700, and three hours of CHEM 4100. Courses in computer science and additional courses in mathematics and physics are recommended.
- <sup>3</sup> Students planning study in a health-care field are urged to choose, in the appropriate elective areas, those courses required by the appropriate professional school (see advisor for recommended courses).

## General Chemistry Track

**Bachelor of Science Degree**  
**College of Science & Mathematics**  
**Department of Chemistry and Biochemistry**  
**(770) 423-6159**  
<http://science.kennesaw.edu/chem>

		<i>Credit Hours</i>
<b>GENERAL EDUCATION</b> (see previous listing of requirements) <sup>1</sup>		<b>42</b>
<b>UNIVERSITY-WIDE FITNESS FOR LIVING REQUIREMENT</b>		<b>3</b>
<b>LOWER DIVISION MAJOR REQUIREMENTS</b>		<b>18</b>
PHYS 1111	Introductory Physics I (if not taken in General Education)	0-4
PHYS 1112	Introductory Physics II (if not taken in General Education)	0-4
CHEM 1211/L	General Chemistry I/Lab (if not taken in General Education)	0-4
CHEM 1212/L	General Chemistry II/Lab (if not taken in General Education)	0-4
CHEM 2800/L	Quantitative Analytical Chemistry/Lab	4
ELECTIVES	Any course from biology, computer science, math, physics, or foreign language	4
Lab/math credit from General Education		2
<b>UPPER DIVISION MAJOR REQUIREMENTS</b>		<b>24</b>
CHEM 3361/L	Modern Organic Chemistry I/Lab	4
CHEM 3362/L	Modern Organic Chemistry II/Lab	4
CHEM 3050	Basic Physical Chemistry	3
CHEM 3501/L	Biochemistry I/Lab	4
CHEM 3110	Bioinorganic Chemistry	3-4
Chemistry Elective Choose 3000-4000 level chemistry course(s)		5
<b>SUPPORTING DISCIPLINES</b>		<b>24</b>
Electives*		
*See advisor for proper career option and recommendations for computer skills courses.		
<b>FREE ELECTIVES</b> Any courses in university curriculum.		<b>12</b>
<b>PROGRAM TOTAL :</b>		<b>123</b>

**Forensic Chemistry Track****GENERAL EDUCATION** (see previous listing of requirements)<sup>1</sup> **42****UNIVERSITY-WIDE FITNESS FOR LIVING REQUIREMENT** **3****LOWER DIVISION MAJOR REQUIREMENTS (AREA F)** **18**

(Same as General Chemistry track except the following course replaces the four (4) hours of electives.)

BIOL 2107 Biological Principles I 4

**UPPER DIVISION MAJOR REQUIREMENTS** **27**

CHEM 3361/L Modern Organic Chemistry I/Lab 4

CHEM 3362/L Modern Organic Chemistry II/Lab 4

CHEM 3501/L Biochemistry I/Lab 4

CHEM 3050 Biophysical Chemistry 3

CHEM 3010 Pharmacological Chemistry 3

CHEM 4300/L Instrumental Analysis and Lab 4

Internship Forensic Chemistry Intern 5

**SUPPORTING DISCIPLINES** **21**

CRJU 1101 Foundations of Criminal Justice 3

CRJU 3320 Criminal Investigation 3

BIOL 2108 Biological Principles II 4

BIOL 3300 Genetics 4

BIOL 4415 DNA Technology

**or**

BIOL4490 Forensic DNA Analysis

**or**

ANTH 4490 Forensic Anthropology 3

Electives 4

**FREE ELECTIVES** Any courses in university curriculum. **12****PROGRAM TOTAL : 123**

## Major in Chemistry Education, B.S.

**Bachelor of Science Degree**  
**Leading to Certification for Grades 7-12**  
**College of Science and Mathematics**  
**Department of Chemistry and Biochemistry**  
**(770) 423-6158**  
**<http://science.kennesaw.edu/chem>**

This single field program is designed to prepare chemistry teachers of adolescents, largely at the secondary school level (grades 7 through 12). It leads to 7-12 teacher certification in the teaching field of chemistry in Georgia. Candidates complete the equivalent of a major in chemistry and a second major in pedagogical studies with an emphasis on teaching science. See a chemistry advisor for double major information (SC 409).

The specific requirements for admission, retention, degree completion and teacher certification in this degree program are listed with all other teacher education programs. See Bagwell College of Education & PTEU.

## Major in Computer Science, B.S.

**Bachelor of Science Degree**  
**College of Science and Mathematics**  
**Department of Computer Science and Information Systems**  
**(770) 423-6005**  
**<http://science.kennesaw.edu/csis>**

The program in computer science (CS) provides a blend of the foundations of CS and applications in the information technology (IT) industry. The CS program emphasizes the study of computer systems architecture, software development, and data communications. Core technology areas include programming, computer architecture, operating systems, data communication, systems analysis and design, database applications, and project management. This is supported by a strong foundation in computing principles such as the design of programming languages, data structures, and operating system principles. The program includes a significant mathematics component and mathematics concepts are incorporated into many of the major courses. A certificate in Mathematical Foundations of Computing is also available. CS majors are strongly advised to take advantage of this new option for credentialing their academic accomplishments.

Graduates of the CS program are prepared for a variety of careers in CS and IT, especially in software design and in the IT industry. Example job titles from KSU graduates of the CS program include information technology specialist, programmer analyst, software engineer, software developer, and software consultant. This program also prepares students for graduate studies in IT-related fields.

### *Credit Hours*

**GENERAL EDUCATION** (see previous listing of requirements) **44**

**UNIVERSITY-WIDE FITNESS FOR LIVING REQUIREMENT** **3**

**Specific General Education requirements for this major**

Math: CS majors are encouraged to take Math 1190 Calculus I as the first math course. However, it is acceptable to start with Math 1113 Pre-calculus.

Science: CS majors should take either physic sequences, that is PHYS 1111,1112, or PHYS 2211, 2211L, 2212, 2212L.

**LOWER DIVISION MAJOR REQUIREMENTS (AREA F) 16**

MATH 2202	Calculus II	4
CSIS 2300	Principles of Computing <sup>1</sup>	3
CSIS 2301	Programming Principles I	3
CSIS 2302	Programming Principles II	3
CSIS 2520	Introduction to Data Communications	3

**UPPER DIVISION MAJOR REQUIREMENTS 40**

CSIS 3150	Programming Languages	3
CSIS 3310	Database Design and Management	3
CSIS 3401	Introduction to Data Structures	3
CSIS 3402	Advanced Data Structures and Algorithms	3
CSIS 3510	Organization and Architecture	3
CSIS 3530	Operating Systems	3
CSIS 3600	Systems Analysis and Design	3
CSIS 4500	Data Communications Protocols	3
MATH 3322	Discrete Modeling I	3
MATH 3332	Probability and Statistics	3
MATH 4322	Discrete Modeling II	3
<u>or</u> MATH 3260	Linear Algebra	
COM 3385	Organizational Presentation	3
<u>or</u> ENGL 3140	Writing in the Professions	
PHYS 3340	Digital and Analog Electronics	4

**MAJOR ELECTIVES – Degree Program Tracks: 12**

Choice of one track:

**Systems Track**

CSIS 4130	Parallel and Distributed Architecture and Algorithms	3
CSIS 4560	Distributed Object Technology	3
CSIS 4730	Real-Time Systems and Simulation	3
CSIS 4850	Senior Project	3

**Object-Oriented Software Development Track**

CSIS 3650	Object Oriented Software Development	3
CSIS 4620	Object-Oriented Methods	3
CSIS 4650	Advanced Object-Oriented Software Development	3
CSIS 4850	Senior Project	3

**FREE**

**ELECTIVES** Any courses in the university curriculum. **8**

**PROGRAM TOTAL: 123**

## Major in Information Systems, B.S.

### Bachelor of Science Degree

College of Science and Mathematics

Department of Computer Science and Information Systems

(770) 423-6005

<http://science.kennesaw.edu/csis>

The program in information systems (IS) provides a sound foundation in information technology (IT) principles and practice. The emphasis is on applications of information technology rather than the computer itself. Core technology areas include programming, computer architecture, operating systems, data communication, systems analysis and design, database applications, and project management. The program of study also includes practical statistics, IT organizations, and financial systems. The program also includes a significant general business component, as business topics are integrated into many IS courses.

Graduates of the IS program are prepared for a variety of careers in IS and IT, especially in the design, implementation, and management of IT projects. Example job titles from KSU graduates of the IS program include network integration, application support, client services analyst, project technologist, and database administrator. The program also prepares students for graduate study in IT, business and related fields.

### Credit Hours

**GENERAL EDUCATION** (see previous listing of requirements) **42**  
(IS majors must take MATH 1101 and MATH 1106 to count towards their degree requirements)

**UNIVERSITY-WIDE FITNESS FOR LIVING REQUIREMENT** **3**

**LOWER DIVISION MAJOR REQUIREMENTS (AREA F)** **18**

ACCT 2100	Introduction to Financial Accounting	3
ACCT 2200	Introduction to Managerial Accounting	3
CSIS 2300	Principles of Computing	3
CSIS 2301	Programming Principles I	3
CSIS 2302	Programming Principles II	3
CSIS 2520	Introduction to Data Communication	3

**UPPER DIVISION MAJOR REQUIREMENTS** **30**

CSIS 3210	Project Management	3
CSIS 3310	Introduction to Database Systems	3
CSIS 3510	Computer Organization and Architecture	3
CSIS 3530	Operating Systems	3
CSIS 3600	Systems Analysis and Design	3
CSIS 4830	IS Integrated Project	3
CSIS 4840	Information Resource Management & Policy	2
CSIS 4841	IT Connections Lecture Series	1
ENGL 3140	Professional Writing in the Disciplines	3
MATH 3400	Computer Applications in Statistics	3
MGT 3100	Management and Behavioral Sciences	3

**MAJOR ELECTIVES** (Six 3-hour classes chosen from): **18****Business Electives** (Students must take at least one but not more than three from):

ACCT 3100	Intermediate Financial Accounting & Auditing
ACCT 3300	Accounting Information Systems
ACCT 4150	Auditing and Assurance
COM 3385	Organizational Presentation
FIN 3100	Principles of Finance
MGT 4160	Organizational Behavior
MKGT 3100	Principles of Marketing

**Non-Business Electives** (The remaining major electives are chosen from):

CSIS 3150	Programming Languages
CSIS 3550	Unix Administration & Security
CSIS 3401	Introduction to Data Structures
CSIS 4210	EDP Audit and Control
CSIS 4300	Web Development
CSIS 4310	Database Implementation Applications
CSIS 4400	Directed Study
CSIS 4420	Local Area Networks
CSIS 4500	Data Communication Protocols
CSIS 4510	Computer Law
CSIS 4515	Computer Ethics
CSIS 4555	Electronic Business Systems
CSIS 4575	Technology Commercialization
CSIS 4490	Special Topics in Information Systems
ISA 3100	Introduction to Information Security and Assurance
ISA 3200	Applications in Information Security and Assurance
ISA 3300	Policy and Administration in Information Security and Assurance
ISA 3350	Computer Forensics

**FREE ELECTIVES** Any courses in the university curriculum. **12****PROGRAM TOTAL: 123**

## Major in Mathematics, B.S.

**Bachelor of Science Degree**  
**College of Science and Mathematics**  
**Department of Mathematics**  
**(770) 423-6327**  
**<http://science.kennesaw.edu/math>**

The program of study leading to the Bachelor of Science degree in Mathematics allows students great flexibility in designing a course of study which will provide a solid foundation in the application of analytical, geometrical, and numerical methods in problem solving and logical deduction. Mathematics majors will work closely with a faculty advisor in formulating a course of study which has Mathematics as its centerpiece but which also includes courses in computer science and in another area of concentration based on the student's interests and career goals. During the Senior year, students will complete a capstone experience which might be an internship, a project, or a course which provides a synthesis of the various concepts and skills which have been mastered during the program.

### *Credit Hours*

**GENERAL EDUCATION** (see previous listing of requirements)\* **42**

**UNIVERSITY-WIDE FITNESS FOR LIVING REQUIREMENT** **3**

**LOWER DIVISION MAJOR REQUIREMENTS (AREA F)** **18**

MATH 2202	Calculus II	4
MATH 2203	Calculus III	4
CSIS 2301	Programming Principles I	2
Guided Electives <sup>1</sup>		6
Math-Science overflow from General Education Core		2

**UPPER DIVISION MAJOR REQUIREMENTS (AREA F)** **18**

MATH 3260	Linear Algebra	3
MATH 4361	Modern Algebra	3
MATH 4381	Real Analysis	3
Capstone Experience		3
Two of the following three Applied Math courses:		6
MATH 3310	Differential Equations	
MATH 3322	Discrete Modeling I	
MATH 3332	Probability and Statistical Inference	

**MAJOR ELECTIVES** (any three of the following courses) **9**

MATH 3310	Differential Equations	
MATH 3322	Discrete Modeling I	
MATH 3332	Probability and Statistical Inference	
MATH 3333	Analysis of Variance and Regression	
MATH 3261	Computational Linear Algebra	

MATH 4345	Numerical Methods
MATH 4322	Discrete Modeling II
MATH 4400	Directed Study
MATH 4490	Special Topics in Mathematics
MATH 3396	Cooperative Study (at most 3 hours)
MATH 3398	Internship (at most 3 hours)
MATH 4416	Teaching of Mathematics (7-12) (at most 3 hours)
MAED 4475	Student Teaching Mathematics (7-12) (at most 3 hours)

**INTERDISCIPLINARY ELECTIVES**

Overflow from lower division major requirement for CSIS 2301	1	<b>21</b>
Other Interdisciplinary Electives	20	

Twenty hours of Interdisciplinary Electives will be taken to form a cohesive unit that reflects and complements the student's mathematical interests and career goals. The courses may be taken from any department (including Mathematics) but must reflect the student's area of emphasis. Approval of a faculty advisor and the Mathematics Department Chair will be required in determining allowable selections. At least 15 hours must be taken at the upper level (3000 level or above) and at least three hours in computer science (above CSIS 2301) must be taken.

**FREE**

**ELECTIVES** Any course in the university curriculum. **12**

**PROGRAM TOTAL: 123**

- 1 Guided Electives will be selected from among freshman and sophomore level courses based upon student interests and career goals and requiring the approval of a faculty advisor and the Mathematics Department Chair. Students who do not place directly into CSIS 2301 will take CSIS 2300 as one of these electives.

## Major in Mathematics Education, B.S.

**Bachelor of Science Degree  
Leading to Certification for Grades 7-12  
College of Science & Mathematics  
Department of Biological and Physical Sciences  
(770) 423-6158  
<http://science.kennesaw.edu/math>**

This single field program is designed to prepare mathematics teachers of adolescents, largely at the secondary school level (grades 7 through 12). It leads to 7-12 teacher certification in the teaching field of mathematics in Georgia. Candidates complete the equivalent of a major in mathematics and a second major in pedagogical studies with an emphasis on teaching mathematics.

The specific requirements for admission, retention, degree completion and teacher certification in this degree program are listed with all other teacher education programs. See Bagwell College of Education & PTEU.

## Certificate in e-Business Systems

**Department of Computer Science and Information Systems (CSIS)**  
**(770) 423-6005**

**<http://science.kennesaw.edu/csis>**

The Certificate in e-Business Systems is designed for those students with an understanding of the importance of Information Technology (IT) and its applications in the expanding field of electronic business (e-business). The e-business systems program emphasizes the skills and knowledge necessary to design, create, administrate, and maintain e-business systems. Students who have an existing background in Information Technology will find it possible to earn the certificate while pursuing their current degree programs.

### *Credit Hours*

#### **Required Courses:**

IT 4525	Electronic Commerce	3
CSIS 4300	Web Development	3
CSIS 4555	Electronic Business Systems	3
CSIS 4830	IS Integrated Project	3

**One elective from the following:** 3

CSIS 4500	Data Communication Protocols
CSIS 4510	Computer Law
CSIS 4515	Computer Ethics

**PROGRAM TOTAL: 15**

## Certificate in Forensic Chemistry

**Department of Chemistry and Biochemistry**  
**(770) 423-6158**

**<http://science.kennesaw.edu/chem>**

The Certificate in Forensic Chemistry is designed to give students the credentials to function in a forensic science laboratory as part of a team to solve legal problems requiring specific training in chemistry. With the proper choice of electives, the certificate can be earned by someone pursuing a degree in chemistry, biochemistry, or biology. The field of Forensic Chemistry is an exciting application of chemistry that helps serve the judicial system of our country. Modern developments in chemical instrumentation allow for detection of trace amounts of chemical evidence and people completing this certificate will be well trained to use these techniques.

### *Credit Hours*

#### **Required Courses:**

CHEM 4300/L	Instrumental Analysis	4
CHEM 4490	Forensic Chemistry	3
CRJU 3320	Criminal Investigation	3
BIOL 4415	DNA Technology	3
CHEM 3398	Forensic Chemistry Intern	3

**PROGRAM TOTAL: 16**

## Certificate in Information Security and Assurance

**Department of Computer Science and Information Systems (CSIS)  
(770) 423-6005**

**<http://science.kennesaw.edu/csis/>**

The Certificate in Information Security and Assurance (ISA) is designed for students with an interest in Information Security and its application in the expanding field of technology. The ISA program emphasizes the skills and knowledge necessary to protect and inspect systems, and to detect and react to threats to the security of information in those systems. Students will find it possible to earn the certificate while pursuing their current degree programs with minimal preparatory work.

**Credit Hours**

9

**Core:**

ISA 3100	Principles of Information Security and Assurance
ISA 3200	Applications in Information Security and Assurance
ISA 3300	Policy & Administration in Information Security and Assurance

**Plus one track (6 hours from the following):**

6

**TRACK 1. Computer Forensics and Investigation**

ISA 3350 Computer Forensics

**and either**

CJ 3320 Criminal Investigations

**or**

POLS 4411 Criminal Law

**TRACK 2. Technical Security**

CSIS 3550 Unix Administration & Security

**and**

CSIS 4500 Data Communications Protocols

**TRACK 3. Computer Law and Ethics**

CSIS 4510 Computer Law

**and**

CSIS 4515 Computer Ethics

**TRACK 4. Security Audit**

ACCT 3300 Accounting Information Systems

**and either**

CSIS 4210 EDP Audit & Control

**or**

ACCT 4150 Audit & Assurance

**TRACK 5.\* Applied Security**

One elective from the above tracks or:

CSIS 4420 Local Area Networks

IT 4525 Electronic Commerce

Certificate in Information Security and Assurance, Track 5-cont'd)

MGT 3100	Management and Behavioral Sciences
<u>and either</u>	
ISA 3398	Internships in Information Security and Assurance
<u>or</u>	
ISA 3396	Coop in Information Security and Assurance

**PROGRAM TOTAL: 15**

Note: the request for the Applied Security will be evaluated to ensure that the Internship/Coop matches the knowledge and context of the elective selected.

## Certificate in Information Technology

**Department of Computer Science and Information Systems (CSIS)  
(770) 423-6005  
<http://science.kennesaw.edu/csis/itcert>**

Information technology (IT) is rapidly becoming as important to career entry and advancement as oral and written communication. In fact, recruiting experts believe that even a small amount of technology savvy and knowledge opens doors for anyone entering today's work place. This certificate is ideal for students who enjoy working with computers but do not wish to seek a degree in either computer science or information systems. It is also ideal for students who have already completed a bachelor's degree and seek the latest IT expertise. Students with degrees in fields such as accounting, biology, foreign language, English, and sociology will find that the addition of these important IT skills will make them far more marketable.

The IT certificate will offer KSU students knowledge and experience with the latest tools and technologies. Topics include web technologies, database technologies, and electronic commerce. Students are required to receive at least a "C" in courses in order to receive the certificate.

***Credit Hours***

**Required Course:**

CSIS 2300	Principles of Computing or equivalent	3
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**Choose 3 from the following (9 semester hours):** 9

CSIS 1020	Introduction to Programming Principles (3)
IT 3300	Web Technologies (3)
IT 3500	Database Technologies (3)
IT 3700	IT Management (3)
IT 4525	Electronic Commerce (3)

**Choose 1 applied learning experience (3 semester hours):** 3

IT 3396	Cooperative Study
IT 3398	Internship
IT 4400	Directed study with an applied emphasis

(Certificate in Information Technology-cont'd)

XX 3398	from major discipline
XX 3396	from major discipline
XX 4400	directed study with an applied emphasis from major discipline

**PROGRAM TOTAL: 15**

## Certificate in Mathematics of Computing

**Department of Mathematics (770) 423-6327**  
**<http://science.kennesaw.edu/math>**

The certificate in Mathematics of Computing is designed for students with an interest in the role of computing in applied mathematics. This certificate program emphasizes the algorithms, methods, and models (graphical and otherwise) used to find complex mathematical solutions through extensive computing.

### *Credit Hours*

**Required Courses:**

CSIS 2301	Programming Principles I	3
MATH 326	Linear Algebra with Applications	3
MATH 3322	Discrete Modeling I	3
MATH 3332	Probability and Statistical Inference	3

**One of the following courses in order to complete a sequence:** 3

MATH 2203	Calculus III
MATH 3261	Computational Linear Algebra
MATH 3333	Analysis of Variance and Regression
Math 4322	Discrete Modeling II

**One additional elective from the following:** 3

MATH 3261	Computational Linear Algebra
MATH 3310	Continuous Modelling: Differential Equations
MATH 3333	Analysis of Variance and Regression
MATH 4322	Discrete Modeling II
MATH 4345	Numerical Methods

**PROGRAM TOTAL: 18**

