Department of Chemistry

The Department of Chemistry offers a major and minor in Chemistry and a major in Chemical Education. The major in chemistry is ideal for those that want to pursue a graduate degree in Chemistry, Education or other related field, or those that want to apply to professional schools such as pharmacy, medicine, dentistry, physician assistant, optometry, and others, or those that want to enter industry or government with a bachelor's degree. Chemistry majors take the required general chemistry and fundamental courses in inorganic, organic, physical, analytical and biochemistry and then enroll in upper-level, advanced and research courses to design a degree to fit their goals. The department's Secondary Education-Chemistry degree option leads to teacher certification.

In addition, the department offers a Dual Degree program for students pursing an engineering degree. The Dual Degree program allows students to earn a Bachelor of Science in Chemistry degree from NGCSU and a Bachelor of Science in an engineering field from an area engineering school.

The department has six full-time faculty and is well equipped in chemical instrumentation.

BACHELOR OF SCIENCE IN CHEMISTRY

Core Curriculum Requirements **60 hours**

All baccalaureate degree programs at NGCSU have as a requirement the satisfactory completion of at least 60 semester credit hours comprising the six areas of the Core Curriculum. A complete description of Areas A-E of the core curriculum can be found on page 105. Individual degree programs may specify exceptions and/or particular courses which must be taken within each Area A-E of the core curriculum. Those exceptions and/or course requirements and Area F of the core curriculum are shown below.

Area A	MATH 1113 or MATH 2450
Area B	no exceptions
Area C	no exceptions
Area D	Chemistry majors may not take CHEM 1211, 1211L, 1212, and 1212L. MATH 2400 is strongly recommended.
Area E	no exceptions

Area F. Courses Appropriate to the Chemistry Major	18 hours
CHEM 1211, 1211L, 1212, 1212L	8 hours
PHYS 2211, 2211L, 2212, 2212L	8 hours
plus one hour each from Areas A and D, or CHEM 1214, or CHEM 2200L	2 hours

Advanced placement: Credit for CHEM 1211, 1211L, 1212 and 1212L is available based on the ETS Advanced Placement Examination. See department head for details.

Courses Required for a Chemistry Major		45 or 46 hours
CHEM 2734 / 2734 L	4 hours	
CHEM 3441 / 3441L	4 hours	
CHEM 3442 / 3442L	4 hours	
CHEM 3541 / 3541L	4 hours	
CHEM 3542 /3542L	4 hours	
CHEM 4244 / 4244L	4 hours	
CHEM 4744 K	4 hours	
CHEM 3911	1 hour	
CHEM 4912	1 hour	
Advanced Chemistry electives	8 hours	
MATH 2400 / 2460	3 or 4 hours	

Minimum Math Requirement - Math 2460

U.S. and Georgia Constitution and History requirement
Foreign Language Competency at the 1002 Level
Military Science requirement for Military Students 12 hours

Electives: To bring the total number of credit hours to at least 120 hours exclusive of Physical Education activity courses. At least nine of these hours must be upper division courses.

Requirements in addition to the 120 hours:
Basic Physical Education requirements 3 hours
(Majors may choose either PHED 1000 or 3 activities courses)

Regents' Skills Test or exemption (must be taken during the first semester)

Exit Requirement: Graduating seniors will be required to take an undergraduate assessment test in Chemistry and complete an exit questionnaire which allows the department to assess the chemistry program.

BACHELOR OF SCIENCE IN CHEMISTRY
SECONDARY EDUCATION CERTIFICATION

Core Curriculum Requirements **60 hours**

All baccalaureate degree programs at NGCSU have as requirements the satisfactory completion of at least 60 semester credit hours comprising the six areas of the core curriculum. A complete description of Areas A-E of the core curriculum can be found on page 105. Individual degree programs may specify exceptions and/or particular courses which must be taken within each Area A-E of the core curriculum. Those exceptions and/or course requirements and Area F of the core curriculum are shown below.

Students must work with the Department of Teacher Education to ensure that the requirements for Teacher Certification are met, as well as work with an advisor from Chemistry.

Area A	MATH 1113 or MATH 2450
Area B	no exceptions
Area C	no exceptions
Area D	Chemistry majors may not take CHEM 1211, 1211L, 1212, and 1212L in Area D.
Area E	no exceptions

Courses for the Chemistry Major / Secondary Education Certification (79 hours)

Area F. Courses Appropriate to the Chemistry Major		18 hours
CHEM 1211, 1211L, 1212, 1212L	8 hours	
BIOL 1107 & 1108 or PHYS 1111 & 1112 or PHYS 2211 & 2212	8 hours	
Plus one hour each from Area A and D, or CHEM 1214 or CHEM 2200L	2 hours	

Professional Education (courses required for certification)		39 hours
EDUC 2110	3 hours	
EDUC 2120	3 hours	
EDUC 2130	3 hours	
CSCI 1200	3 hours	
EDUC 3002	2 hours	
EDUC 3003 / 3003L	3 hours	
LART 3106	3 hours	
EDUC 3540	3 hours	
EDUC 4000	4 hours	
EDUC 4101	3 hours	
EDUC 4103, 4104, 4105	9 hours	

Chemistry Content Courses		22 hours
CHEM 2734, 2734L	4 hours	
CHEM 3441 / 3441L	4 hours	
CHEM 3442 / 3442L	4 hours	
CHEM 4744K	4 hours	
CHEM 3911	1 hour	
CHEM 4916	1 hour	
Advanced Chemistry Elective	4 hours	

Minimum Math requirement - MATH 2450

U.S. and Georgia Constitution and History requirement
Foreign Language Competency at the 1002 Level
Military Science requirement for Military Students 12 hours

Electives: To bring the total number of credit hours to at least 120 hours exclusive of Physical Education activity courses. At least nine of these hours must be upper division courses.

Requirements in addition to the 120 hours:
Basic Physical Education requirements 3 hours
(Majors may choose either PHED 1000 or 3 activities courses)

Regents' Skills Test or exemption (must be taken during the first semester)

Exit requirement: Graduating seniors will be required to take an undergraduate assessment test in Chemistry and complete an exit questionnaire which allows the department to assess chemistry program.

Requirements for a minor in Chemistry

CHEM 2734 / 2734L	4 hours
CHEM 3441 / 3441L	4 hours
CHEM 3442 / 3442L	4 hours
Upper division chemistry elective (CHEM 3XXX-4XXX)	4 hours

DUAL DEGREE PROGRAM IN CHEMISTRY / ENGINEERING

North Georgia College & State University offers a dual degree program which allows students to receive a bachelor's degree in Chemistry from NGCSU and a bachelor's degree in engineering from the Georgia Institute of Technology in Atlanta, Georgia; Clemson University in Clemson, South Carolina; or Mercer University in Macon, Georgia. The dual degree program gives students the opportunity to develop a strong liberal arts background before completing the coursework in engineering at another institution. Typically, dual degree students attend NGCSU for three years and then the engineering school for an additional two years.

Dual Degree Requirements:
Complete the credit hours at NGCSU shown in the requirements listed below (exclusive of physical education and military courses).
Receive a recommendation from NGCSU's dual degree coordinator.

Earn a grade point average which indicates the student could satisfactorily complete the degree requirements at the second institution.

Complete a program at the second institution with the same number of credit hours as required of juniors and seniors enrolled in the standard curriculum for the degree at that school.

If the official study program at the second institution includes electives and the candidate has excess hours at NGCSU, he/she may petition for the use of these excess hours as transfer credit. Transfer credits shall not amount to more than one half of the official study program.

Core Curriculum Requirements **60 hours**

All baccalaureate degree programs at NGCSU require the satisfactory completion of at least 60 semester credit hours comprising the six areas of the core curriculum. A complete description of the core Areas A - E can be found on page 105. Individual degree programs may specify exceptions and/or particular courses which must be taken within each of the Areas A - E. Those exceptions and/or course requirements and Area F are shown below.

Area A	MATH 1113 or 2450 (3 or 4 hours)	9 hours
Area B	no exceptions	4 hours
Area C	no exceptions	6 hours
Area D	MATH 2450 or 2460, PHYS 2211, 2211L, 2212, 2212L or BIOL 1107, 1107L, 1108, 1108L	11 hours
Area E	no exceptions	12 hours

Area F. Courses Appropriate to Major Field **18 hours**

CHEM 1211, 1211L, 1212, 1212L	8 hours
For students starting with MATH 1113:	
MATH 2460, 2470, (2450 taken in Area D)	8 hours
CSCI 1301	3 hours
(excess of 1 hour)	
For students starting with MATH 2450:	
MATH 2470 (2450 taken in Area A, 2460 taken in Area D)	4 hours
CSCI 1301	3 hours
Carry over from Areas A and D	2 hours
Elective	1 hour

Courses required for the major **30 hours**

Chemistry

CHEM 2734 / 2734L	4 hours
CHEM 3441 / 3441L	4 hours
CHEM 3442 / 3442L	4 hours
Choose from: CHEM 3541 / L, 3542 / L, 4841 K, 4842 K, 4744 / L	6 -12 hours

Mathematics/Computer Science 3 - 9 hours
Choose from MATH 3000, 3650, CSCI 1302, 3100

Physics 3 - 9 hours
Choose from PHYS 3111, 3411, 3610

Foreign Language Competency at the 1002 level
Physical Education requirement 3 hours
Regents' Skills Test or exemption (must be taken during the first semester)

Recommended courses
Before transferring to the engineering school, it is recommended that dual degree students take introductory engineering courses offered by NGCSU such as Statics, Dynamics, Visual Communications, and Engineering Design.

FOR COURSES OFFERED IN
THE DEPARTMENT OF CHEMISTRY
SEE COURSE DESCRIPTIONS
Pages 249-394

CHEM
GEOL