MUSC 5023 — Special Problems in Music Education ........................................ 3(3-0)
Current trends in the practice of music teaching.

MUSC 5033 — Music History ........................................................................ 3(3-0)
Intensive review of the history of western music from 680-1750. (Not applicable to major in music history.)

MUSC 5034 — Music History II .................................................................. 3(3-0)
Intensive review of the history of western music from 1750 to present.

MUSC 5035 — Contemporary Music .......................................................... 3(3-0)
Music literature from impressionism to the present.

MUSC 5040 — Foundations for Graduate Study in Music Education ............ 3(3-0)
Intensive study of historical, philosophical, and psychological foundations and principles associated with the teaching of music.

MUSC 5041 — Advanced Studies in Teaching General Music ...................... 3(3-0)
Basic literature and techniques for teaching music in the general classroom at all levels.

MUSC 5042 — Music in Early Childhood Education .................................... 3(3-0)
Planning music experiences for young children in early school years, with emphasis on practical aspects in a creative and artistic approach.

MUSC 5048 — Studies in Musical Aesthetics .............................................. 3(3-0)
Major aesthetic systems as related to musical problems.

MUSC 5049 — Advanced Form and Analysis ............................................. 3(3-0)
Advanced structural and stylistic analysis of the common practice period.

MUSC 6000 — Graduate Applied Concentration ....................................... 3(3-0)
Combination of lectures and laboratory work. Prerequisite: Consent of instructor and audition.

MUSC 6003 — Analysis of Musical Styles .................................................. 3(3-0)
Analysis and composition in selected styles, 600-1650.

MUSC 6041 — Directed Study in Music Education ....................................... 3(3-0)
The student undertakes a research project on some facets of music education. Project culminates with a formal paper.

MUSC 6046 — Practicum in Music Education ............................................. 3(3-0)
Supervised study in an approved instructional setting includes evaluation of strength and opportunities for presentation.

SCIENCE EDUCATION

The Department of Natural Sciences of the College of Arts and Sciences believes that students should be provided with quality and quantifiable learning experiences needed for professional competence and to become productive citizens in a highly technical society. The Department is determined to meet the needs of the students that we serve. Consequently, science education graduates will be able to master the many academic and professional challenges found in the workplace.

This program is designed for persons holding L-4 certification or who have completed basic prerequisite course work in science education. This program leads to LEVEL 5 certification in science education.

The goals of the Department of Natural Sciences are as follows:
1. To help students understand the basic concepts and principles inherent in the body of knowledge of science.
2. To allow students the opportunity to become familiar with and comfortable using the scientific method.
3. To help develop rational thinking in our students. (Science is a cognitive tool used in all intellectual endeavors.)
4. To sensitize the future citizenry concerning the role that science and technology play in modern society to foster interests, appreciation, positive attitude, and cultural values in harmony with the scientific enterprise.

5. To prepare students for entrance into graduate and professional schools.

6. To prepare students for professional employment in the sciences, including teaching biology and chemistry.

The degree requires 36 semester hours, with 15 hours in the cognate field.

**Comprehensive Examination**

In partial fulfillment of the Master’s degree in Science Education, students are required to pass a comprehensive examination. This examination is administered the semester of expected graduation or upon completion of required coursework. A student is only eligible to take the comprehensive examination only if his/her grade point average is 3.0 or higher in Area C of the degree-planned program. Students may not take the comprehensive examination more than once in an academic semester. A third failure on the comprehensive examination results in automatic termination from the degree program.

The purpose of the comprehensive examination is to assess the student’s knowledge of learning experiences that have been introduced in the Master’s degree in Science Education (Biology and Chemistry) Programs. The exam will address specific objectives from the cognate field.

**Planned Program of Study**

The master’s degree in science education has an emphasis in biology and an emphasis in chemistry.

**Area A** - Nature of the Learner (Minimum of 3 hours required)

- PSYC 5515 Educational Psychology
- PSYC 5530 Adolescent Psychology
- PSYC 5552 Conditions of Learning

**Area B** - Program and Problems of the School (Minimum of 3 hours required)

- EDUC 5538 Curriculum Planning
- EDUC 5540 Curriculum Principles
- EDUC 5570 Strategies of Instruction in Science

**Area C** - Teaching Field Courses (Minimum of 15 hours required)

(Six hours in core and nine hours to be selected from the list of elective courses.)

**Cognate Fields (Core)** (Minimum of 6 hours from Biology or Chemistry)

- BIOL 5501 Selected Topics in Botany
- BIOL 5502 Selected topics in Zoology
- BIOL 5503 Selected topics in Human Biology
- CHEM 5501 Inorganic Chemistry
- CHEM 5502 Organic Chemistry
- CHEM 5503 Analytical Chemistry

(Other teaching field courses will be selected from courses listed within the cognate areas with the approval of the advisors.)

**Area D** - Research and Statistics (Minimum of 3 semester hours)

- EDUC 5500 Educational Statistics
- EDUC 5501 Educational Research

**Area E** - Electives (Minimum of 3 semester hours)

- SPED 5501 Exceptional Children and Youth

**Total Hours Required** ................................................. 36 hrs

* Minimum of 9 semester hours from Areas A & B

** Required course
*** Minimum of 15 semester hours from area C (six hours of core courses are required). In the chemistry program, core courses may be omitted if a departmental proficiency exam is passed. The student would complete 15 hours of advanced courses.
+ Required for research course. Passing an examination can satisfy course requirements.
++ Required only if not previously fulfilled.

COURSE DESCRIPTIONS

BIOL 5501—Selected Topics in Botany ................................................................. 3(3-0)
This course will emphasize the principles of vascular plant function, including transduction of water and solutes, photosynthesis, respiration and hormonal regulation of growth and development.

BIOL 5502—Selected Topics in Zoology ............................................................ 3(3-0)
This course will emphasize basic concepts of invertebrate zoology. The students (in-service teachers) in the course will help determine course content based upon their specific needs.

BIOL 5503—Selected Topics in Human Biology .............................................. 3(3-0)
This course will emphasize various aspects of human morphology and physiology. The topics will be selected to reflect the interests and needs of the students participating in the course.

BIOL 5504—Ecology .................................................................................... 3(3-0)
This course will emphasize principles and concepts of modern ecology. Investigative activities will include analysis of aquatic (marine and freshwater) terrestrial ecosystems.

BIOL 5505—Biology of the Invertebrates ....................................................... 3(3-0)
Biology of the invertebrates is an advanced study of the taxonomy, anatomy, physiology, life history and ecology of invertebrates. Protozoa through the echinodermata are covered.

BIOL 5506—Genetics .................................................................................. 3(3-0)
A review of the basic principles of inheritance and classical genetics with detailed emphasis on molecular genetics, population and eugenics will be covered in this course.

BIOL 5507—Vegetation of South Georgia ...................................................... 3(3-0)
This course will include a study of the common trees, shrubs and herbs of South Georgia. Emphasis will be placed upon the angiosperms of the area. Collections will comprise a major part of the course.

BIOL 5508—Parasitology ............................................................................ 3(3-0)
A detailed study of the common parasites of man and domestic animals will be investigated in this course. Some emphasis will be placed on life cycles and vectors.

BIOL 5509—Mammalian Anatomy ............................................................... 3(3-0)
This course will involve a study of the gross and microscopic structures of various mammalian organ systems. Emphasis will reflect the needs of the students taking the course.

BIOL 5510—Microbiology ........................................................................ 3(3-0)
This course will emphasize concepts and principles of bacteria, fungi and other microbial groups. Some attention will be given to morphological, physiological and biochemical relationships in these groups.

BIOL 5511—Nonvascular Plants ................................................................. 3(3-0)
An evolutionary survey of the plant kingdom with emphasis on comparative morphology and evolution of the algae, fungi and bryophytes will be conducted in this course.

BIOL 5502—Selected Topics in Zoology ............................................................ 3(3-0)
This course will emphasize basic concepts of invertebrate zoology. The students (in-service teachers) in the course will help determine course content based upon their specific needs.

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An evolutionary survey of the plant kingdom with emphasis on comparative morphology and evolution of the algae, fungi and bryophytes will be conducted in this course.
BIOL 5512 — Vascular Plants ................................................................. 3(3-0)

This course introduces the student to the structure and development of vegetative and reproductive organs of vascular plants, especially those associated with angiosperms and gymnosperms.

BIOL 5513 — Mammalian Physiology ...................................................... 3(3-0)

This course will emphasize the homeostatic mechanisms of such organ systems as cardiovascular, nervous, gastrointestinal, respiratory and genital urinary.

BIOL 5514 — Biological Chemistry .......................................................... 3(3-0)

This course is a study of the biologically important compounds and their formation and reactions in living systems.

BIOL 5515 — Selected Topics in Biology .................................................... 3(3-0)

This course will enhance and reinforce biological concepts and principles for biology teachers. Emphasis will also be placed on biology methodology and computer utilization for middle grades and secondary teachers.

BIOL 5516 — Innovative Developments in Biology ..................................... 3(3-0)

This course will address biological concepts in the areas of cell biology, genetics and metabolism for middle grades and secondary teachers. Emphasis will be placed on increasing teachers’ knowledge and understanding in identifying, applying and analyzing recent biology concepts, processes and principles and increasing teachers’ understanding and skills in using the methods of science through the use of open-ended investigations.

BIOL 5517 — Selected Topics in Ecology ................................................... 3(3-0)

This course will address ecological concepts in northern, middle and coastal areas of Georgia for middle grades and secondary teachers. Emphasis will be placed on addressing current ecological issues that incorporate hands-on field activities into the learning process.

BIOL 5518 — Biotechnology ................................................................. 3(3-0)

This course will emphasize the study of gene structure and regulation. Consideration will be given to DNA structure and replicating, RNA transcription and processing, protein synthesis and the mechanisms which regulate gene expression. Emphasis will be placed on the study of the above topic using application of the new biotechnology.

BIOL 5519 — Plant Biology ................................................................. 3(3-0)

Particular attention will be placed on the identification, selection and use of materials for correlating the study of plants with other subjects. The teacher will develop a base of knowledge that will enhance his/her effectiveness in planning and executing laboratory and field exercises in botany that complement lecture presentation.

BIOL 5520 — Evolution and the Nature of Science .................................. 3(3-0)

The nature of science and the fundamentals governing its origin will be presented in relation to current problems affecting the maintenance of life on earth. Special emphasis will be placed on the interaction of biological and cultural evolution and the alternatives to extinction that challenge contemporary man.

CHEM 5501 — Inorganic Chemistry ...................................................... 3(3-0)

This course will emphasize periodic relationship of the elements and their compounds, including those less commonly encountered. Bonding, reaction mechanism, complexes and stereochemistry are among the topics discussed.

CHEM 5502 — Organic Chemistry ...................................................... 3(3-0)

Organic chemistry is the study of the structure and reactivities of organic compounds, including a discussion of molecular structure-spectral interpretation.

CHEM 5503 — Analytical Chemistry ...................................................... 3(3-0)

This course will emphasize solution equilibrium as applied to volumetric and gravimetric analysis. Methodologies of selective ion analysis and absorption spectroscopy separation will be investigated, also.
CHEM 5521 — Physical Chemistry ................................................................. 3(3-0)
This course will emphasize principles and thermodynamics, molecular structures, kinetics and quantum theory as a basis for interpreting and interrelating the properties of matter.

CHEM 5523 — Advanced Analytical Chemistry ........................................ 3(3-0)
This course is designed to introduce the advanced theories and methods of analytical chemistry.

CHEM 5524 — Instrumental Methods of Analysis ........................................ 3(3-0)
This course will emphasize the special advanced concepts of instrumental measurements of physical and chemical properties.

CHEM 5525 — Special Topics in Organic Chemistry .................................... 3(3-0)
Special topics in organic chemistry will emphasize the needs and interests of the students and faculty in organic chemistry based on the needs of the course participants. Topics that may be considered are stereoisomerism, heterocycles, alkaloids, organic mechanisms and structure-activity relationships.

PHYS 5500 — Earth Science ........................................................................ 3(3-0)
Exploration of basic concepts and processes in the earth sciences. Content areas include astronomy, geology and meteorology. Strategies of teaching earth science in the middle and high schools will be explored, also.

PHYS 5501 — Foundations of Physical Science ........................................... 3(3-0)
Foundations of Physical Science is the study of basic principles of physical science and their relation to the teaching of science in the elementary school.

PHYS 5530-5531 — Introductory Physical Science ...................................... 3(3-0)
This course is designed to prepare students to learn introductory physical science in the secondary school. This course updates and enlarges the student's knowledge in physical science and familiarizes him/her with the materials and methods utilized in I.P.S.

PHYS 5547 — Introduction to Oceanography .............................................. 3(3-0)
This course emphasizes physical, chemical, geologic and biologic characteristics of the oceans and the interaction between the hydrosphere, atmosphere and biosphere.

PHYS 5548 — Introduction to Astronomy .................................................. 3(3-0)
This course will emphasize topics related to the theory and consideration of planets, the solar system, stars, galaxy and universe, including the study of constellations, historical overview, astronomy and laws of planetary motion.

PHYS 5549 — Weather and Climate .......................................................... 3(3-0)
This course emphasizes an introduction to the study of the profiles and dynamics of air masses and an overview of system to climatic effects and global distribution of climates.

PHYS 5551 — Mathematics of Physics I .................................................... 3(3-0)
This course will emphasize algebra of vectors, vector calculus, divergence, gradient, curl, line integrals, surface integrals, divergence of theorem of Gauss, Stokes' theorem, conservative fields, orthogonal curvilinear coordinates, matrices and eigenvalue problems.

PHYS 5552 — Mathematics of Physics II .................................................. 3(3-0)
This course will emphasize derivation and solution of partial differential equations of physics, wave equation and Laplace's equation, Schroedinger's equation, power series solution of ordinary differential equations, and special functions of mathematics physics, Fourier series, Sturm-Liouville system, complex analysis and integration will be considered, also.

PHYS 5564 — Science Concepts ............................................................... 3(3-0)
Focus on the understanding and application of scientific processes and major concepts relevant to the teaching of middle childhood science.
PHYS 5645 — Physics for Secondary School Teachers ........................................... 3(3-0)
This course is designed to both refresh and enlarge the high school teacher's knowledge of general physics.

PHYS 5646 — Modern Physics for Secondary Teachers I ........................................... 3(3-0)
This course is designed to provide students an introduction to special relativity, quantum mechanics and atomic structure. Prerequisite: general physics.

PHYS 5647 — Modern Physics for Secondary Teachers II ........................................... 3(3-0)
This course is designed to provide students an introduction to x-ray spectra, molecular structure, solid-state physics, nuclear structure and nuclear reactions. Prerequisite: PHYS 5646

PHYS 5660 — Classical Mechanics I ................................................................. 3(3-0)
This course will emphasize elements of Newtonian mechanics, motion of particles in various dimensions, motion of system of particles, rigid bodies, gravitational and coordinate systems.

PHYS 5661 — Classical Mechanics II ................................................................. 3(3-0)
This course will emphasize mechanics of continuous media, Lagrange's equations, tensor algebra, inertia and stress tensors, rotation of a rigid body and theory of small vibrations. Prerequisite: consent of instructor.

PHYS 5670 — Electricity and Magnetism I ......................................................... 3(3-0)
This course will emphasize electrostatics, steady currents and the magnetic properties of matter.

PHYS 5671 — Electricity and Magnetism II ......................................................... 3(3-0)
This course will emphasize the development of field theory leading to Maxwell's equations, plane waves and solutions of Maxwell's equations. Prerequisite: consent of instructor.

PHYS 5681 — Introduction to Quantum Mechanics ........................................... 3(3-0)
This course will emphasize Schrödinger's theory of quantum mechanics; solutions of Schrödinger's equation; perturbation theory; one-electron atoms; magnetic moments, spin and relativistic effects; identical particles and multi-electron atoms.

PHYS 5685 — Seminar in the Teaching of Physics ........................................... 3(3-0)
This course will emphasize methods of teaching physics stressing the planning of curricula and laboratory programs.

SPECIAL EDUCATION

The M.Ed. degree programs in Special Education lead to LEVEL 5 certification in Interrelated Special Education (mildly disabled) and Intellectual Disabilities (MR). Any person who has L-4 certification in a teaching field, or who has completed a four-year degree program outside the field of teaching and meets the other admission criteria, may pursue the master's level programs. A degree in intellectual disabilities leads to certification in mental retardation. (Add-on certification requires a passing score on Praxis I for admission and a passing score on Praxis II prior to the practicum.)

Degree Program Requirements

I. Interrelated

Area A - Nature of the Learner 3 hrs

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECEC 5500</td>
<td>Child Development</td>
<td>3</td>
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<tr>
<td>EDUC 5555</td>
<td>Clinical Approach to Classroom Analysis</td>
<td>3</td>
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<tr>
<td>PSYC 5509</td>
<td>Introduction to Behavior Modification</td>
<td>3</td>
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<tr>
<td>PSYC 5515</td>
<td>Educational Psychology</td>
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<td>PSYC 5520</td>
<td>Developmental Psychology</td>
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<td>PSYC 5555</td>
<td>Conditions of Learning</td>
<td>3</td>
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<tr>
<td>SPED 5542</td>
<td>Behavior Modification for Special Education</td>
<td>3</td>
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