

The College of Agriculture, Human and Natural Sciences

Chandra Reddy, Ph.D., Dean
Director of Research and Administrator of Extension
213 Biotechnology Building

Mission Statement: The mission of the College of Agriculture, Human and Natural Sciences at Tennessee State University is to explore the functionality of the institution's land grant status in seeking and applying knowledge in four integrated programs; Agriculture and Environmental Sciences; Biological Sciences; Chemistry and Family and Consumer Sciences as a basis for sustainable improvements in the lives of people in Tennessee, the rest of the nation and throughout the world.

General Statement: The College of Agriculture, Human and Natural Sciences is the premier land-grant unit of Tennessee State University. As such, the College undertakes teaching, research and extension functions through four academic departments — the Department of Agricultural and Environmental Sciences, the Department of Biological Sciences, the Department of Chemistry and the Department of Family and Consumer Sciences. The departments offer five Bachelor of Science degrees with majors in Agricultural Sciences, Biological Sciences, Chemistry, Family and Consumer Sciences, and Early Childhood Education. The major in Agricultural Sciences offers the following concentrations: Agribusiness, Agricultural Education, Animal Science & Pre-veterinary Medicine, Agricultural Biotechnology, Applied Geospatial Information Systems (GIS), Food Bioscience and Technology, and Plant and Soil Science. The major in Biological Sciences offers the following concentrations: General Biology, Cellular and Molecular Biology and Biology with Teacher Certification. The major in Chemistry offers the following concentrations: Professional Chemistry, Biochemistry, and Chemistry with Teacher Certification. The major in Family and Consumer Sciences offers the following majors or concentrations: Early Childhood Education (PreK-3 certification) and Family and Consumer Sciences with concentration in one of the following: Child Development and Family Relations, Design, Fashion Merchandising, Family and Consumer Sciences Education, Foods and Nutrition (Dietetics), and Food Service Management.

Departmental Requirements: The requirements for each program are listed under the respective Department.

Department of Agricultural and Environmental Sciences

Samuel Nahashon, Ph.D., Interim Department Chair
108 Lawson Hall

Faculty: D. Abbas Saleh, A. Aziz, T. Brooyles, R. Browning, A. Clardy, S. Comer, J. DeKoff, S. Dennis, D. Duseja, C. Dumeny, E. Dzantor, E. Ekanem, S. Haile, J. Hall, W. Hayslett, P. Illukpitiya, M. Lema, L. Li, T. Miller, M. Mmbaga, S. Nahashon, D. Nandwani, D. Pitchey, B. Pokharel, C. Reddy, J. Ricketts, G. Smith, S. Speight, Y. Wu, and D. Young

Departmental Goals:

1. To maintain a responsive teaching and learning environment
2. To attract, retain and graduate outstanding students
3. To advance biotechnology and biodiversity
4. To ensure the viability of small-scale agriculture
5. To protect the environment and natural resources
6. To use innovative technologies in our academic programs

Departmental objectives:

1. To recruit high quality students, follow their progress through the program, and insure that they graduate in a timely manner with high levels of achievement;
2. To produce graduates who have the capability to apply the concepts of the agricultural sciences to solving problems encountered in government, education, industry, and society in general;
3. To produce graduates who have in-depth knowledge and experience in the agricultural sciences, and expertise in their chosen field;
4. To produce graduates who are capable of evaluating and defining diverse problems, evaluating and developing feasibility studies, analyzing and interpreting data, and developing, implementing, and evaluating acceptable solutions to professional problems;
5. To produce graduates who are able to communicate information to diverse groups at all levels of expertise;
6. To produce graduates who are capable of using computer-based information systems to solve problems;
7. To produce graduates who understand their responsibility to their profession, to society in general, and to the furtherance of life-long learning;
8. To produce graduates capable of functioning successfully on multi-disciplinary teams and;
9. To produce graduates capable of further graduate studies.

Student Learning Outcomes:

1. The capability to apply the concepts in agricultural sciences to solving problems encountered in government, education, industry, and society in general;
2. In-depth knowledge and experience in the agricultural sciences in general, and expertise in their concentration of choice;
3. The capability to evaluate and define diverse problems;
4. The capability to evaluate and develop feasibility studies;
5. The capability to analyze and interpret data;
6. The capability to develop, implement, and evaluate acceptable solutions to professional problems;
7. The ability to communicate information to diverse groups at all levels of expertise;
8. The capability to use computer-based information systems to solve problems;
9. An understanding of responsibility to their profession, to society in general, and to the furtherance of life-long learning;
10. An understanding of and a commitment to personal and professional ethics;
11. The capability to function successfully on multi-disciplinary teams and;
12. The capability to successfully pursue graduate studies.

General Statement:

The curricula in the Department of Agricultural and Environmental Sciences are designed to provide both liberal and specialized education for students who seek to advance their education in the field of agriculture. The program in liberal education involves the social sciences, the natural sciences, the humanities and the arts, and is designed to prepare students to understand and function in a very complex environment. The specialized program is designed to provide understanding and training in the complex scientific field of agriculture. The overall program offers curricula leading to the Bachelor of Science (B.S.) degree in Agricultural Sciences, with concentrations in Agribusiness, Agricultural Education, Animal Science/Pre-Veterinary Medicine, Agricultural Biotechnology, Food Bioscience and Technology, Geospatial Information Systems, and Plant and Soil Science.

No grade less than "C" in any major course (Agricultural Sciences course) will be accepted as credit toward meeting departmental requirements.

Upper Division Policy

Students majoring in Agricultural Sciences must gain upper division status before enrolling in any upper division courses (3000 & 4000 levels). Upper division courses taken prior to being given upper division status may not be accepted towards the B.S. degree. Students may be admitted to the upper division after completing at least 60 degree-level lower division credits (as set out in the curriculum) with a minimum cumulative grade point average (GPA) of 2.0. It is the responsibility of the student to submit a formal petition to the department. Such petition will be reviewed by a departmental committee to ensure that all criteria have been met.

Departmental Requirements:

- For Bachelor of Science Agricultural and Sciences

Major Core: A minimum of 17 semester hours including, AGSC 1200, 1410, 2010 or 2020, 2040, 4500, 4710, and UNIV 1000.

General Education: 41 semester hours including: Communications – 9 hours – ENGL 1010,1020, COMM 2200; Humanities and/or Fine Arts – 9 hours – ENGL 2010-2024 (3 hours), ART 1010, MUSC 1020, or PHIL 2010; Social & Behavioral Sciences – 6 hours – SOCI 2010, PSYC 2010 or ECON 2010 & 2020; History – 6 hours – HIST 2010, 2020 or 2030; Natural Sciences – 8 hours – CHEM 1110/1111 & 1120/1121 or BIOL 1110/1111 and 1120/1121 and Mathematics – 3 hours – MATH 1110.

Bachelor of Science Degree in Agricultural Sciences Concentration in Agri-business Suggested Four Year-Plan

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	ENGL 1020	3
ENGL 1010	3	MATH 1830	3
MATH 1110	3	AGSC 1200	3
AGSC 1410	3	AGSC 2020	3
AGSC 2010	3	Humanities Elective	3
AGSC 2040	3		
	<u>16</u>		<u>15</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ENGL 2010-2018	3	BIOL 1020, 1021	4
BIOL 1010, 1011	4	HIST 2020	3
HIST 2010	3	COMM 2200	3
ACCT 2010	3	AGSC Elective	3
ECON 2010	3	ECON 2020	3
	<u>16</u>		<u>16</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
AGSC 3000	3	AGSC 3010	3
AGSC 3040	3	AGSC 3030	3
AGSC 3120	3	AGSC 3130	3
Humanities Elect.	3	MGMT 3010	3
AGSC Elective	4	AGSC Elective	3
	<u>16</u>		<u>15</u>

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
AGSC 4010	3	AGSC 4020	3
AGSC 4500	3	AGSC 4040	3
AGSC 4710	1	AGSC 4080	3
Electives	3	Electives	3
Guided Electives	3	AGSC 4720	1
	<u>13</u>		<u>13</u>

Bachelor of Science Degree in Agricultural Sciences Concentration in Agricultural Education Suggested Four-Year Plan

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	ENGL 1020	3
ENGL 1010	3	AGSC 1200	3
AGSC 1410	3	MUSC 131	3
AGSC 2010	3	CHEM 1110/1111	4
MATH 1110	3	AGSC 2410	3
BIOL 1110/1111	4		
	<u>17</u>		<u>16</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ECON 2010	3	PSYC 2010	3
HIST 2010	3	EDIC 2010	3
COMM 2200	3	HIST 2020	3
AGSC Elective	3	ENGL 2010/2020	3
PSYC 2420	3	AGSC Elective	3
	<u>15</u>		<u>15</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
EDSE 3330	3	EDCI 3110	3
AGSC 2040	3	AGSC 3050	3
AGSC 3460	3	AGSC 3601	3
EDRD 4910	3	AGSC 3060	3
PSYC 3120	3	AGSC Guided Elective	3
	<u>15</u>		<u>15</u>

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
AGSC 3070	3	AGSC 4050	9
AGSC 3185	3	EDCI 4705	3
AGSC 3080	3	AGSC 3090	3
AGSC 4500	3		
	<u>12</u>		<u>15</u>

Guided Electives for Certification, Guided Electives for non-Agricultural Education Certification: Agricultural (30 semester hours); Education (30 semester hours); EDAD 4000; AGSC 3000, 3010, 3020, 3030, 3040; EDCI 3110, 3120, 3130, 3200, 3210, 3220, 3230; EDRD 4910, 3240, 3320, 3330, 3340, 3350, 3400; EDSE 3330, 3420, 3430, 3440, 3450, 4010, 4040; PSYC 3120, 4070, 4080, 4090, 4230, 4250, 4260; EDCU 420A, 4310, 4430; AGSC 4500

Bachelor of Science Degree in Agricultural Sciences Concentration in Animal Science Emphasis Suggested Four Year-Plan

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	ENGL 1020	3
ENGL 1010	3	BIOL 1110, 1111	4
CHEM 1110, 1111	4	AGSC 1200	3
MATH 1110	3	CHEM 1120, 1121	4
AGSC 1410	3	Humanities Elective	3
	<u>15</u>		<u>15</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
MATH 1140 or MATH 1830	3	HIST 2020	3
AGSC 2010 or 2020	3	Social/Behav. Elect.	3
COMM 2200	3	Humanities Elective	3
HIST 2010	3	Social/Behav. Elect.	3
AGSC 2040	3	CHEM 2010, 2011	4
	<u>15</u>		<u>16</u>

Guided Electives: 5 Credit Hours from the courses listed below (AGSC 2510, 3000, 3010, 3440, 3450, 3470, 3480, 3500, 3510, 3520, 3601, 4410, 4420, 4450, 4080)

Bachelor of Science Degree in Agricultural Sciences
Concentration in Food Bioscience and Technology
Suggested Four Year-Plan

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
AGSC 3120	3	AGSC 3400	3
AGSC 4710	1	AGSC 3420	3
Guided Elective	4	AGSC 3430	3
Humanities Elective	3	CHEM 3410, 3411	4
AGSC 3410	3	Guided Elective	3
	<u>14</u>		<u>16</u>

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
AGSC 4080	3	AGSC 4500	3
AGSC 4440	3	Guided Elective	3
AGSC 4430	3	Guided Elective	3
Guided Elective	3	Guided Elective	3
Guided Elective	3	AGSC 4720	1
	<u>15</u>		<u>13</u>

Guided Electives: 22 Credit Hours from the courses listed: AGSC 2510, 3000, 3010, 3440, 3450, 3470, 3480, 3500, 3510, 3520, 3601, 4410, 4420, 4450, BIOL 1120+1121

Bachelor of Science Degree in Agricultural Sciences Pre-Veterinary Medicine Emphasis
Suggested Four Year-Plan

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	ENGL 1020	3
ENGL 1010	3	BIOL 1110, 1111	4
CHEM 1110, 1111	4	AGSC 1200	3
MATH 1110	3	CHEM 1120, 1121	4
AGSC 1410	3	Humanities Elective	3
	<u>14</u>		<u>17</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
MATH 1140 or MATH 1830	3	HIST 2020	3
AGSC 2010 or 2020	3	AGSC Elective	3
BIOL 1120, 1121	4	Social/Behav. Elect.	3
COMM 2200	3	Humanities Elective	3
HIST 2010	3	CHEM 2010, 2011	4
	<u>16</u>		<u>16</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 2020, 2021	4	AGSC 3400	3
AGSC 4710	1	BIOL 2110, 2111 or BIOL 2400, 2401	4
AGSC 2040	3	PHYS 2020, 2021	4
PHYS 2010, 2011	4	CHEM 3410, 3411	4
AGSC 3410	3		
	<u>15</u>		<u>15</u>

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
Social/Behav. Elect.	3	AGSC 4500	3
AGSC 4440	3	AGSC 3430	3
AGSC 4430	3	AGSC 3420	3
AGSC 3120	3	Guided Elective	3
	<u>12</u>	Guided Elective	3
			<u>15</u>

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	ENGL 1020	3
ENGL 1010	3	AGSC 1200	3
COMM 2200	3	AGSC 2200	3
MATH 1110	3	Humanities Elective	3
AGSC 1410	3		
AGSC 2010	3		
	<u>16</u>		<u>12</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ENGL 2010-2028	3	CHEM 1120, 1121	4
CHEM 1110, 1111	4	SOCI 2010	3
AGSC 2040	3	BIOL 1110, 1111	4
Humanities Elective	3	Behavioral Elective	3
HIST 2010	3	HIST 2020	3
	<u>16</u>		<u>17</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 2110, 2111	4	CHEM 2120, 2121	4
AGSC 3500	3	AGSC 3510	3
BIOL 2400, 2401	4	AGSC 3520	3
AGSC 3530	3	AGSC 3120	4
AGSC 3690	3	AGSC 3020	3
	<u>17</u>		<u>17</u>

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
AGSC 4030	4	AGSC 4460	3
AGSC 4280	3	AGSC 4500	3
CHEM 3410, 3411	4	CHEM 3420	3
AGSC 4710	1	ASCG Electives	3
	<u>12</u>		<u>12</u>

Bachelor of Science Degree in Agricultural Sciences
Concentration in Applied Geospatial Information Systems
Suggested Four Year-Plan

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	ENGL 1020	3
ENGL 1010	3	AGSC 1200	3
MATH 1110	3	GEOG 1020	3
GEOG 1010	3	AGSC 2200	4
AGSC 1410	3	AGSC 2510	4
AGSC 2010	3		
	<u>16</u>		<u>17</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ENGL 2010	3	HIST 2020	3
CHEM 1010 or BIOL 1010	3	Humanities Elective	3
CHEM 1011 or BIOL 1011	1	CHEM 1020 or BIOL 1020	3
COMM 2200	3	CHEM 1021 or BIOL 1021	1
HIST 2010	3	Humanities Elective	3
AGSC 3200	4	Social/Behav. Elect.	3
	<u>17</u>		<u>16</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
Social/Behav. Elect.	3	AGSC 3580	3
AGSC 3350	3	AGSC 3590	3
AGSC 3550	3	AGSC 3600	3
AGSC 3560	3	AGSC 3340	3
AGSC 3570	3		
	<u>15</u>		<u>12</u>

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
AGSC 4230	4	AGSC 4530	3
AGSC 4500	3	AGSC 4540	3
AGSC 4510	3	AGSC 4550	3
AGSC 4520	3	AGSC 4560	3
AGSC 4710	1	AGSC 4720	1
	<u>14</u>		<u>13</u>

AGSC 3260	Plant Physiology	3
AGSC 3300	Plant Pathology	3
AGSC 3320	Propagation of Horticultural Plants	3
AGSC 3400	Animal and Plant Genetics	3
AGSC 3410	Anatomy and Physiology of Domestic Animals	3
AGSC 3430	Animal Health and Disease Prevention	3
AGSC 3530	Food Microbiology	3
AGSC 4070	Agricultural Special Problems	3
AGSC 4310	Plant Breeding	3
AGSC 4410	Dairy Production and Management	3
AGSC 4420	Poultry Disease Prevention and Sanitation	3
AGSC 4430	Animal Nutrition	3
AGSC 4440	Physiology of Reproduction	3
CHEM 4600	Spectroscopic Methods in Chemistry	3/4
CHEM 4700	Biochemical Analysis and Laboratory	3/4
CHEM 2100	Introduction to Analytical Chemistry and Laboratory	3/4

Bachelor of Science Degree in Agricultural Sciences
Concentration in Agricultural Biotechnology
Suggested Four Year-Plan

Bachelor of Science Degree in Agricultural Sciences
Concentration in Plant and Soil Science
Suggested Four Year-Plan

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ENGL 1010	3	ENGL 1020	3
CHEM 1110/1111	4	CHEM 1120/1121	4
MATH 1110	3	Social/Behavioral Science Elective	3
UNIV 1000	1	Humanities Elective	3
AGSC 1410	3	AGSC 1200	3
Humanities Elect.	3		
	<u>17</u>		<u>16</u>

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	ENGL 1020	3
ENGL 1010	3	AGSC 2510	4
AGSC 2010	3	AGSC 2410	3
MATH 1110	3	COMM 2200	3
Social/Behavioral Elective	3	AGSC 1200	3
	<u>13</u>		<u>16</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
COMM 2200	3	ENGL 2110-2230	3
AGSC 2010	3	Social/Behavioral Science Elective	3
HIST 2010	3	HIST 2020	3
AGSC 2040	3	Humanities Elective	3
BIOL 1110/1111	4	BIOL 2110/2111	4
	<u>16</u>		<u>16</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ENGL 2010-2018	3	Social /Behavioral Elective	3
CHEM 1110/BIOL 1110	3	CHEM 1120/BIOL 1120	3
CHEM 1111/BIOL 1111	1	CHEM 1121/BIOL 1121	1
Humanities Elective	3	AGSC 2200	4
HIST 2010	3	HIST 2020	3
		Humanities Elective	3
	<u>13</u>		<u>17</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
AGSC 3710	3	AGSC 3540	3
AGSC 3270	3	AGSC 3110	4
BIOL 2120/2121	4	CHEM 3410	3
AGSC 2600	4	BIOL 3410/3411 or BIOL 3400/3401	4
	<u>14</u>		<u>14</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 2110	3	AGSC 3250	3
AGSC 3200	4	AGSC 3300	3
AGSC 3210	3	AGSC 3350	3
AGSC 3240	3	Guided Electives	3
AGSC 3340	3	Guided Electives	3
	<u>16</u>		<u>15</u>

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
AGSC 4710	1	CHEM 4700 or CHEM 2100	3
BIOL 4110, 4111	4	AGSC 4500	3
AGSC 4280	3	BIOL 4112	4
AGSC 4270	3	AGSC 3110	3
CHEM 2010	3		
	<u>14</u>		<u>13</u>

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
AGSC 3260	4	AGSC 4230	4
AGSC 3320	3	AGSC 4310	3
AGSC 4220	4	AGSC 4500	3
AGSC 4710	1	Guided Electives	3
AGSC 3120	3	AGSC Elective	3
	<u>15</u>		<u>16</u>

Electives:	Course Num.	Course Title	Credits
	AGSC 2200	Fundamentals of Soil Science	3
	AGSC 3210	Principles of Crop Science	3

Guided Electives*: Plant and Soil Science
AGSC 3200, 3210, 3220**, 3230**, 3240, 3250, 3260, 3300, 3320, 3330, 3340, 3350, 3550, 3560, 3570, 3580, 3590, 3600, 4210**, 4220**, 4230**, 4240, 4250, 4260, 4310, 4510, 4520, 4530, 4540, 4550, 4560, CHEM 3410 and 3411

Guided Electives* 15 Credit Hours

*Guided Electives will be chosen from listed courses based upon the student's career interests.

**Students interested in soil science as a career will choose a minimum of 15 credit hours from the soils category of listed courses.

Course Descriptions Agricultural and Environmental Sciences (AGSC)

*AGSC 1200 Introduction to Plant Science (3). A one semester, introductory course in plant science that exposes students to the principles of crop science, horticulture, and conservation of the renewable natural resources. Two lectures and one laboratory period per week.

*AGSC 1410 Introduction to Animal Science (3). A course devoted to the adaptation of the different classes of farm livestock to varying farm conditions and to the relationship of each class to the other in different farm plans. A careful study of the correct types of livestock in relationship to economical production and market demands. Two lectures and one laboratory period per week.

*AGSC 2010 Introduction to Agribusiness I (3). The evolution of agriculture to agribusiness. Role, scope of agribusiness in the economy. Application of principles of economics to agriculture with focus on economic principles upon which rational managerial decisions must be made. Discussion of special topics as they affect small farmers, rural areas, environmental and natural resources, international trade and global economy.

AGSC 2020 Introduction of Agribusiness II (3). Principles of agribusiness management and management functions: planning, organizing, controlling, and directing. Agribusiness from characteristics out from structure. Marketing, forecasting, organization, basic capital budgeting, accounting information, budgeting, production, and inventory management, and human resource management.

AGSC 2040 Computer and Statistical Application in Agriculture (3). Computer concepts and basics of use of computer for decision-making. Emphasis on agricultural management concepts, management of data, and statistical analysis, use of popular software in agribusiness.

*AGSC 2200 Fundamentals of Soil Science (4). A study of the origin, structure, general nature of soil and the factors related to soil fertility, maintenance, and fertility practices. Three lectures and one laboratory period per week.

AGSC 2510 Fundamentals of Geospatial Information Systems (4). Introduction to GIS principles and technology. This course presents a foundation for creating, editing, querying, and presenting geospatial data. Laboratory exercises use a hands-on approach to learning GIS software and hardware. This course is multidisciplinary and is designed for students in any field of study. Prerequisite: AGSC 2040 or equivalent.

AGSC 3000 Agricultural Marketing (3). An understanding of the operations of food marketing (theory of marketing) and a familiarity with many of the descriptive and factual aspects of food marketing. Prerequisite: AGSC 2010 or instructor's approval.

AGSC 3010 Farm Management (3). Organization planning and operating farm business to make the most effective use of available resources and procedures for making economic decisions. Prerequisite: AGSC 2010 or instructor's approval.

AGSC 3020 Food Economics (3). An examination of the food prices and their effect on the consumers' and farmers' budgets. Food price determination and the marketing channels. International trade and development. Prerequisite: AGSC 2010 or instructor's approval.

AGSC 3030 Natural Resource Economics (3). A Study of the physical, economic and institutional factors affecting land and water use; population and resource requirements; principles of land utilization; social control of land, property, and land tenure. Prerequisite: AGSC 2010 or instructor's approval.

AGSC 3040 Agricultural Policy (3). A study of problems in agriculture, governmental policies, and programs assigned to deal with them.

AGSC 3050 Fundamentals of Agricultural Extension Education (3). The course is designed to introduce individuals to the intracurricular programs associated with formal, informal, and non-formal programs of agricultural education. School-based program components such as the classroom, the school lab, Supervised Agricultural Experience (SAE) programs, FFA, and school and community relationships will guide much of the discussion in this course. Non-formal education components such as 4-H and adult models of AEE (i.e. Young Farmers) will also be studied. Subject matter will also explore the philosophical foundations and historical development of school-based and non-formal Agricultural Education in the United States as well as emerging trends.

AGSC 3060 Intra-Curricular and Related Activities in Agricultural Education (3). The course is designed to prepare individuals for teaching responsibilities associated with curriculum and program planning in 1) school-based agricultural education (i.e. high school and/or middle school) and 2) non-formal agricultural education (extension/4-H). Topics to be covered include program organization and content identification, preparation of instructional objectives, guidelines for the selection and development of instructional materials, adult education programs, classroom management, as well as youth leadership development (FFA/4-H) and experiential learning (SAE).

AGSC 3070 Agricultural Power Equipment (3). Teaching procedures that foster creativity, engagement, critical thinking, leadership development, classroom/laboratory management, and technical competency in agriculture will be taught and modeled through a variety of instructional strategies. Course is taught fall semester of residency/student teaching year. 3 hours.

AGSC 3080 Methods of Teaching Agri/Env/STEM (3). Planning, implementing and evaluating educational programs of agricultural/environmental sciences and engineering (including high school Agriscience courses offered for science credit); course and lesson planning; laboratory facilities and equipment; and instructional methods and techniques for agriscience and ag engineering. Course is taught fall semester of residency/student teaching year for agricultural education students. 3 hours.

AGSC 3090 Introduction to Agricultural Engineering (3). Developing agricultural mechanics programs, application of methods, practices, and skills; study of shop layouts; equipment, organization, and laboratory exercises. This course will provide pre-service agriculture teachers with the necessary skills to teach, manage, and maintain middle and/or high school agricultural mechanics education laboratories. The majority of the experience will focus teaching the agricultural mechanics skills of wiring/electricity, small engines, and welding. Additionally, students will also be taught current and relevant skills related to technical and academic standards in the PST pathway. Supervised field experiences in junior and senior high schools required for teacher education students. Course is taught spring semester of residency/student teaching year for agricultural education students. 3 hours.

AGSC 3110 Principles and Methods of Biotechnology II (4). This course will be a continuation of AGSC 2600. It will be hands-on blending lectures and laboratory sessions which will include 1) detection of food borne pathogens, allergenic substances in foods and animal feeds, and antibody mediated assays; 2) transcriptional and genetic analyses to improve health and productivity of food animals, and rapid nucleic acid/immunoassay based techniques for the detection of pathogens in animal products; 3) plant-microbe interaction; and 4) instrumentation orientations for electron microscopy, flow Cytometry, X-Ray Diffractometry, and ICP-OES etc. Prerequisites: BIOL 101011011, BIOL 1110/1111, CHEM 1110/1111.

AGSC 3111 Introduction to Leadership: Practical Applications (Honors) (3). The course is designed to serve as an introduction to the development of leadership skills. It serves as an investigation of leadership theory when applied to specific contexts such as environmental science, agriculture, food, forestry, fuel, etc.. Students will develop their own definition of leadership as an inquiry investigation of personal strengths, communication concepts, critical thinking skills and dispositions, problem solving techniques, change management, and a philosophy of leadership. As an honors level course students will be challenged to prepare and delivery professional presentations and engage in the course content at a deeper level.

AGSC 3112 Introduction to Leadership: Practical Applications (3). The course is designed to serve as an introduction to the development of leadership skills. It serves as an investigation of leadership theory when applied to specific contexts such as environmental science, agriculture, food, forestry, fuel, etc.. Students will develop their own definition of leadership as an inquiry investigation of personal strengths, communication concepts, critical thinking skills and dispositions, problem solving techniques, change management, and a philosophy of leadership.

AGSC 3120 Introduction to Applied Statistics I (3). Basic concepts and principles of measurements, data collection, scientific investigation, and survey design. Topics include statistical measures of central tendency and dispersions, probabilities, normal and other distributions, tests of significance, regression and correlation, analysis of variance and index numbers. Prerequisite: Six hours of college math.

AGSC 3130 Sample Survey Theory and Techniques (3). A practical course in conducting, analyzing, and summarizing surveys; includes review of probability, distribution, and statistical measures; simple random sampling, stratified, systematic and cluster sampling, multi-frame, objective measurement, and enumerative surveys; sampling and non-sampling errors. Questionnaire design and enumeration techniques are included. Prerequisite: AGSC 3120.

AGSC 3185 Cooperative Education (3). A university-wide program that combines academic study with meaningful work experiences directly related to the student's academic major.

AGSC 3200 General Agricultural Botany (4). A course designed to provide a broad understanding of the fundamental facts and principles of botanical science. Three lectures and one laboratory period per week. Prerequisite: AGSC 1200.

AGSC 3210 Principles of Crop Science (3). A general study of the distribution culture, use, and climatic adaptation of the major agronomic crop plants. Two lectures and one laboratory period per week. Prerequisite: AGSC 1200.

AGSC 3220 Soil and Environmental Chemistry (3). A study of the chemical, mineralogical and colloidal properties of soils, with emphasis on mineral crystal structure and ion exchange phenomenon. Soil acidity, salt affected soils and their amelioration. Soil and water pollution and abatement principles and wet chemistry principles. Three lectures. Prerequisites: AGSC 2200, CHEM 1110 and 1120.

AGSC 3230 Soil Morphology and Classification (4). An introductory study of the principles of soil classification and land judging. Required of majors in Agronomy. Three lectures and one laboratory period per week. Prerequisites: AGSC 1200 and 2200.

AGSC 3240 Economic Entomology (3). A brief review of the structure, morphology, controls and the recognition of economic insects as related to agriculture. Two lectures and one laboratory period per week. Prerequisite: AGSC 1200.

AGSC 3250 Farm Weeds and Their Control (3). A course involving the identification, eradication, and economic value of the important weeds of fields and pastures. Elective for any department. Two lectures and one laboratory period per week. Prerequisite: AGSC 1200.

AGSC 3260 Plant Physiology (3). Application of plant physiological principles to seed plants with special emphasis on photosynthesis, respiration, absorption, transpiration and nutrition. Prerequisites: AGSC 1200 and 3200.

AGSC 3300 Plant Pathology (3). A study of the diseases of the most important agricultural plants in Tennessee and the south. Emphasis on the nature of the disease, recognition and control measures. Two lectures and one laboratory period per week. Prerequisite: AGSC 1200.

AGSC 3320 Propagation of Horticultural Plants (3). A study of the methods of propagation of horticultural plants including seedage, cuttage, and grafting of both economic and ornamental plants. Two lectures and one laboratory period per week. Prerequisite: AGSC 1200.

AGSC 3330 Floriculture (3). A course dealing with the principles underlying culture of greenhouse crops, commercial cut flowers, and house plants. Prerequisite: AGSC 1200.

AGSC 3340 Forestry (3). A study of forest conservation and management and the relation of forestry to agriculture, including the influence of the forest on climate, stream flow, and erosion. Two lectures and one laboratory period per week. Prerequisite: AGSC 1200.

AGSC 3350 Landscape Plants and Design (3). A study of the landscape composition dealing with the designing of small lots, city property, public grounds, and large estates. The use of ornamental plants such as trees, shrubs and flowers and their identification. Prerequisite: AGSC 1200.

AGSC 3400 Animal Breeding and Genetics (3). A study of the fundamental laws of heredity and their relation to livestock production. Identification and use of breed differences, breeding systems, gene frequencies, heritability and heterosis, pedigree information, and progeny testing for selection and mating of livestock are covered. Advances in livestock genetic evaluation techniques are also discussed.

AGSC 3410 Anatomy and Physiology of Domestic Animals (3). Review of the structure and function of body systems of domestic livestock. Relationships to animal management practices and animal health considerations emphasized. Two lectures and one laboratory period per week. Prerequisite: AGSC 1410.

AGSC 3420 Feeds and Ration Formulation (3). A study of the basic principles of feeding farm animals, feeding standards, balanced rations, composition and nutritive value of feeds. Two lectures and one laboratory period per week. Prerequisite: AGSC 1410.

AGSC 3430 Animal Health and Disease Prevention (3). A study of the causes, symptoms, and treatment of general diseases and parasites of livestock and poultry with special emphasis on prevention of health

problems. Two lectures and one laboratory period per week. Prerequisite: AGSC 1410.

AGSC 3440 Swine Production and Management (3). A study of the breeding, management, feeding and marketing of swine. Emphasis placed on both purebred and commercial production. Two lectures and one laboratory period per week. Prerequisite: AGSC 1410.

AGSC 3450 Beef Production and Management (3). This course includes a study of history, development, and distribution of breeds; management practices of the various production systems; control of diseases and parasites; and feeding practices for commercial and purebred breeding herds. Two lectures and one laboratory period per week. Prerequisite: AGSC 1410.

AGSC 3500 Principle of Food Science and Technology (3). Techniques of procurement, processing, packing, preservation and distribution of foods are covered in this class. Mechanization and automation of food handling processes. Nutrient components and organoleptic properties of foods. Regulation of the food industry. Two lectures and one laboratory period per week.

AGSC 3510 Processing Milk and Milk Products (3). A study of the procurement, processing and sale of milk and the bacteriological, chemical, and physical aspects of market milk processing. Two lectures and one laboratory period per week. Prerequisites: CHEM 1110 and 1120.

AGSC 3520 Processing Poultry Products (3). A detailed study of grades and classes of market poultry and eggs; methods of processing, storage, preservation and problems in plant operations. Two lectures and one laboratory period per week. Prerequisite: AGSC 2410.

AGSC 3530 Food Microbiology (3). A study of the microorganisms associated with food products. Subjects include: classes of microorganisms, factors that influence growth of spoilage organism, food hazards and quality assurance, effects of preservation techniques on food-borne organisms, microbiology of preservation techniques on food-borne organisms, and microbiology of fermented food products. Two lectures and two laboratory periods per week. Prerequisite: BIOL 2400.

AGSC 3540 Laboratory Instrumentation (3). Introduction to procedures and techniques commonly utilized in analysis of biological materials. Includes spectroscopy, gas and column chromatography, electrophoresis, etc.

AGSC 3550 Global Positioning Systems (3). Introduction to the principles, technology, and effective use of Global Positioning Systems. This course will present a foundation of navigation and positioning principles, hands-on experience with GPS instrumentation, collection and processing of data, and integration with geospatial information systems. This course is multidisciplinary and is designed for students in any field of study. Prerequisite: AGSC 2040 or equivalent.

AGSC 3560 Spatial Analysis (3). Fundamental concepts and analytical procedures used to abstract and simplify complex systems using geospatial information systems. This course emphasizes geometric, coincidence, and adjacency models as applied to surface analysis, linear analysis, raster analysis, topological overlay, and contiguity analysis. Spatial modeling will be used to describe, simulate, predict, and resolve real-world problems, issues, and systems. Prerequisite: AGSC 2510.

AGSC 3570 Geospatial Metadata (3). Data make up the most expensive component of a GIS and account for billions of dollars of expenditures annually. Metadata is data about data. It documents critical information about the data and the procedures used to create and maintain the data. This course explains metadata and its components, and teaches GIS users the how and why of documenting their data. Methodology and standards will follow the Federal Geographic Data Committee's Content Standard for Digital Geospatial Metadata and will conform to the National Spatial Data Infrastructure. Prerequisite: AGSC 2510.

AGSC 3580 Introduction to GIS for Natural Resources (3). An introductory geospatial information systems course on spatial data development and analysis in the science and management of natural resources. Topics covered include basic data structure, data sources, data collection, data quality, geodesy and map projections, spatial and tabular data analysis, digital elevation data and terrain analyses, cartographic modeling, and cartographic layout. Laboratory exercises provide practical experiences that complement theory covered in lectures. Prerequisite: AGSC 2510.

AGSC 3590 Spatial Landscape Design and Analysis (3). Modern landscape design is a blend of science, art, and technology. Utilizing the spatial tools provided by a GIS brings a new level of visualization and analysis of the landscape environment to the designer. This course introduces students to the principles and concepts of landscape design and analysis, and introduces the tools (CAD, GPS, and GIS) needed for successful landscape development and management. Prerequisites: AGSC 2510, AGSC 3550.

AGSC 3600 Image Analysis and Remote Sensing (3). Satellite imagery and aerial photography are vital tools for GIS developers, analysts, and users. Students will first be introduced to the concepts and methods of imaging, remote sensing, and image analysis. The main focus of this course will then be the manipulation and analysis of images within a GIS. Prerequisites: AGSC 2510.

AGSC 3601 Companion Animal Management (3). This is a general companion animal course. Students will learn breeding and selection, health maintenance, nutrition, therapy, animal bonding and other management practices related to dogs, cats, rabbits, horses, birds and fish. Prerequisite: AGSC 1410.

AGSC 3690 Principles of Food Engineering and Processing (3). This course focuses on engineering principles relevant to food processing operations. The introductory material covers units and dimensions used in process calculations as well as physical properties of food materials that are important in mass and energy balances. Mass and energy balances are reviewed for different types of food processing operations: batch and continuous, steady/ and unsteady/state systems. The second half of the course examines transport phenomena: fluid flow, heat and mass transfer. Through lectures, tutorials and problem/solving exercises, students will learn to analyze food processing systems and use basic engineering design equations. Students will also be introduced to advanced food processing technologies. The course is designed for undergraduate students in Agricultural and Environmental Sciences in (Concentration Food Bioscience and Technology). Prerequisite: AGSC 3500, MATH 1110 & CHEM 1110.

AGSC 4010 Rural Finance (3). An examination of the rural credit institutions and the role of credit in the development of economics, farmer and consumer organizations. Pre-requisite: AGSC 2010 or instructor's approval.

AGSC 4020 Introduction to Agribusiness Analysis (3). Application of theory to management problems encountered in agribusiness firms, application of quantitative tools to solve problems, economies of size, supply demand relationship, input-output analysis, benefit-cost analysis, and interregional competition. Prerequisite: AGSC 2010 or instructor's approval.

AGSC 4030 Practicum in Agribusiness (4). Approval of instructor. Supervised in-depth specialized practical experience in an agribusiness or working experience in a specialized public organization, agency; or solving problems in the organization and/or operation of agribusiness. Students select a practical problem and recommend solution(s) after analyzing the same. Designed to give students training in problem-solving in a real business environment. Prerequisite: AGSC 2010 or instructor's approval.

AGSC 4040 World Agriculture (3). A study of the role of agriculture in economic development. Survey of lesser developed countries with special emphasis on Africa.

AGSC 4070 Agricultural Special Problems (3). Supervised laboratory or field work research of a problem in agricultural sciences. Written project outline and reports of results required.

AGSC 4080 Experimental Design (3). A review of scientific investigation principles and statistical inference. Subjects include analysis of variance and co-variance, non-parametric and analysis, multiple comparison test and experimental designs. Designs cover all randomized block, balanced block, latin square, factorial, split plot, rectangular lattice and augmented. Greater emphasis placed on logic rather than on mathematics and computer.

AGSC 4090 Community Development (3). An analysis of the meaning, structure and function of community development with emphasis on the factors important in community change is carried out in this class.

AGSC 4100 Organization and Contemporary Issues Facing Agriculture Firms (3). An examination of the organization of agribusiness firms, types of business, advantage and disadvantages of each type, legal considerations, approaches to organizational structure, integration deciding where decisions should be made. Operating a business in a socially conscious environment, social, health, environmental, and global issues affecting agricultural firms and their impact on future of agribusiness. Prerequisite: AGSC 2010 or instructor's approval.

AGSC 4210 Soil Physics (3). A study of the physical properties of soils. Physical makeup, color, structure, thermal relationships, aeration, water movement phenomenon in soils and its relationship to soil nutrient movement/uptake. Three lectures. Prerequisites: AGSC 2200, MATH 1110 and 1120.

AGSC 4220 Advanced Soil Fertility (4). A study dealing with the determination of nutrient deficiencies in soils and plants in rapid methods, recommendations of corrective measures. Two lectures and one laboratory period per week. Prerequisites: AGSC 2200, CHEM 1110 and 1120.

AGSC 4230 Soil and Water Conservation and Management (4). A study of the principles of tillage, drainage, fertilization and rotation practices as they affect the productive capacity of field soils. Three lectures and one laboratory period per week. Prerequisites: AGSC 1200 and 2200.

AGSC 4240 Turf Management (3). This course will deal with establishing lawns, soil preparation, seeding, watering, fertilization, clipping, and general management. Corrective measures in established lawns. Care of golf course greens. Prerequisite: AGSC 1200.

AGSC 4250 Floral Design (3). A course dealing with essentials of flower arrangement. One lecture and two laboratory periods per week. Prerequisite: AGSC 1200.

AGSC 4260 Greenhouse Operation and Management (3). An elementary course of principles involving greenhouse site selection, types of structure, covering materials, heating and cooling systems and cultural practices for producing flowers and ornamental plants. Two lectures and one laboratory period per week. Prerequisite: AGSC 1200.

AGSC 4280 Food Safety and Quality Assurance (3). The course 4280 will cover the topics include regulation, safety, and wholesomeness of food products; microbiological, chemical, and physical risks associated with food; hazard analysis (HACCP) as related to food safety, processing and quality; sanitation and pest management principles; methods for analyzing the sensory qualities of food products; problem management associated with food quality assurance in food industries. Prerequisite: AGSC 3500.

AGSC 4310 Plant Breeding (3). Application of genetic principles to the improvement of economic crop plants; methods and procedures of plant breeding. Two lectures and one laboratory period per week. Prerequisite: AGSC 1200.

AGSC 4410 Dairy Production and Management (3). A study of general farm operation, adaptation of the herd to available facilities, factors affecting production, balancing rations for dairy cattle, disease control, principles of modern dairy cattle breeding, arrangement and development of dairy farm buildings. Two lectures and one laboratory period per week. Prerequisites: AGSC 1410 and 3420.

AGSC 4420 Poultry Disease Prevention and Sanitation (3). A course designed to give the major principles underlying sanitation and disease prevention as applied to a poultry farm. Two lectures and one laboratory period per week. Prerequisite: AGSC 2410.

AGSC 4430 Animal Nutrition (3). A study of nutrients: their classification, properties, and functions; their digestion, absorption and cellular metabolism; and their requirements and deficiency symptoms. Prerequisites: AGSC 1410 and 3420 and one semester of organic chemistry.

AGSC 4440 Physiology of Reproduction (3). Fundamental principles of the physiology of reproduction with primary emphasis on farm animals, anatomy of the male and female reproductive tracts; hormones, estrus cycle; fertility and sterility, and manipulation of the reproductive process are covered in this class. Prerequisite: AGSC 1410.

AGSC 4450 Science of Meat (3). The study of the composition, physical, chemical, and nutritional properties of meat and meat products. Biochemical alterations of meat during aging, curing, processing and storage. Prerequisite: AGSC 1410.

AGSC 4460 Food Chemistry (3). The study of the function of food. Subjects include: food constituents-proteins, lipids, carbohydrates, mineral and trace elements, vitamins, enzymes; Effects of processing, storage and preparation. Two lectures and one laboratory period per week. Prerequisites: CHEM 1110 and 1120.

AGSC 4500 Senior Project (3). A course required of all seniors majoring in Agricultural Sciences. A course designed to expose students to basic research skills. Students are required to plan and carry out research in the area of their concentration. They are to design project, select method of investigation, review relevant literature, gather and analyze data, draw conclusions based on the results obtained from data.

AGSC 4510 Geospatial Applications in Pest Management (3). Pests, diseases, and weeds have plagued mankind since the beginning of agriculture. Even with modern equipment and methodology, the impact of pests, diseases, and weeds can be devastating. GIS and

spatial analysis offer an essential set of tools for use in pest management. This course introduces students to the concepts of pest management and then presents the geospatial tools needed to effectively and efficiently design, implement, and refine a successful pest management program. Prerequisites: AGSC 2510, AGSC 3550.

AGSC 4520 Spatial Analysis in Biosecurity and Risk Assessment (3). GIS and GPS have become integral parts of hazard and disaster management. Biohazards can arise in many different forms – everything from natural events to acts of terrorism. This course will teach students to identify, map, and analyze biohazards, to assess damage, to develop recovery and mitigation plans, and to accurately monitor and predict biohazard risks. Prerequisites: AGSC 2510, AGSC 3550, AGSC 3560.

AGSC 4530 Spatial Database Design and Management (3). The accuracy and usability of data determine the analysis, output, and cost of any geospatial information system. This course presents the principles and techniques of geodatabase design, editing, and management needed to obtain required functionality from a GIS. Prerequisite: AGSC 2510.

AGSC 4540 Geospatial Information Systems Application and Design (3). Concepts and procedures used to successfully assess needs, evaluate requirements, design, and implement geospatial information systems. Emphasis will be placed on the data and technology needed to produce desired information products, and on cost-benefit analysis and project proposal development. Prerequisite: AGSC 2510.

AGSC 4550 Temporal Analysis of Spatial Information (3). The analysis of events over time can reveal trends that are not detectable in a single 'snapshot' of data. The spread of pests and diseases during a specified period, for example, can allow GIS users to make accurate predictions about future spread and to recommend measures to limit or stop spread. This course will introduce students to the concepts and tools needed to analyze spatial data over time. Upon successful completion of the course, students will have the knowledge and skills needed for temporal analysis of historical data and predictive modeling. Prerequisites: AGSC 2510, AGSC 3560.

AGSC 4560 Practicum in GIS (3). The GIS practicum is designed to expose students to real-world GIS problems that might be encountered in the workplace. Student is assigned specific projects in which their knowledge and skills in GIS will be used to solve a problem. Prerequisites: AGSC 2510, AGSC 3560.

AGSC 4710-4720 Seminar (1-1). A course devoted to discussions of current literature and problems in agricultural sciences. Required of seniors majoring in the department. One hour credit each semester. One lecture.

Department of Biological Sciences

Terrance L. Johnson, Ph.D., Department Chair
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Faculty: M. Asson-Batres, C. Caudle, A. Ejiogor, H. Fentress, P. Ganter, C. Gardner-Jones, L. Harlston, D. Hui, A. Isa, M. Ivy, G. Komives, E. Martin, B. McAdory, E. Myles, Q. Quick, J. Robinson, V. Tiriveedhi, B. Washington, X. Wang, A. Young-Seigler

General Statement: The curriculum of the Department of Biological Sciences is designed to fulfill the pre-professional requirements of degrees leading to careers in medical, dental,

environmental, marine, and biological sciences. Training in biology prepares students for careers in teaching, government, and private industry. State and federal agencies in agriculture, health, human services, environmental protection, and similar areas seek out students with good backgrounds in biology. New areas of biotechnology and genetic engineering have been added to opportunities in more traditional fields of research in marine biology, limnology, pharmacy, medicine, pathology, forestry, and horticulture. The degree programs in biology can provide a liberal education directed toward an appreciation of the complexity, diversity and beauty of nature.

The Department also offers the M.S. degree in Biology and the Ph.D. degree in Biological Science. For information about these programs, see the Graduate Catalog.

General Education Core:

Communications (9 hours)

ENGL 1010, 1020	Freshman English I, II (minimum grade of C in each)	6
COMM 2200	Public Speaking	3

Humanities and/or Fine Arts (9 hours)

ENGL 2110-2230	Sophomore Literature Course I	3
ENGL 2110-2230	Sophomore Literature Course II	3
Humanities	One course from approved list.	3

Social and Behavioral Science (6 hours)

Elective	One course from approved list.	3
Elective	One course from approved list.	3

History (6 hours)

HIST 2010	American History I	3
HIST 2020	American History II	3

Natural Science (8 hours)

BIOL 1110/1111	General Biology I	4
BIOL 1120/1121	General Biology II	4

Mathematics (3 hours)

One course from approved list.		3
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Orientation (1 hour)

UNIV 1000	Service to Learning	1
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Total General Education Hours with Orientation: 42-Hours

Major Core: 32 - Hours

Mathematics (3 hours)

MATH 1730 or 1720	Pre-Calculus Mathematics II or Pre-Calculus Mathematics Alternative or	3
MATH 1915	Calculus and Analytical Geometry (required for Cellular and Molecular Biology students)	3

Note: Students may need to pass MATH 1710 or lower math if they are unprepared for MATH 1720 or 1915.

Chemistry (16 hours)

CHEM 1110	1111 General Chemistry I with lab	4
CHEM 1120	1121 General Chemistry II with lab	4
CHEM 2010	2011 Organic Chemistry I with lab	4
CHEM 2020	2021 Organic Chemistry II with lab	4

Physics (8 hours)

PHYS 2010	2011 College Physics I with lab	4
PHYS 2020	2021 College Physics II with lab	4

Biology (8 hours)

BIOL 2110	2111 Cell Biology with lab	4
BIOL 2120	2121 Principles of Genetics with lab	4

Total Major Core: 32

Bachelor of Science Degree in Biology
General Biology Emphasis
Suggested Four-Year Plan – Total 122-Hours

For Admission into the upper division of programs of the Biology major, students must complete all of the requirements listed above under General Education Core and the Major Core. In addition they must earned a cumulative grade point average of at least 2.0 on college-level coursework.

Upper-division Curricula

The undergraduate curricula for majors results in the Bachelor of Science degree. Students may select one of three curricula under the guidance of a major advisor. The programs are: 1) General Biology, which is recommended for pre-professional students; 2) Cellular and Molecular Biology, which is recommended for students who wish to pursue graduate training and/or careers in these fields; and 3) Teacher Certification in Biological Sciences, which leads to endorsement in biology and general science for teaching grades 7 – 12. No grade of less than “C” in any Biology course will be accepted as credit toward meeting Departmental requirements.

The Teacher Education Program is designed for students pursuing a teaching career in secondary education with a major in Biology. The program goals are directed toward the application of biology to the development of competencies in reading, writing, speaking, listening, mathematics, reasoning, studying, and computer competency. The overall curriculum provides for the improvement of knowledge and skills in English, the arts, mathematics, natural sciences, and social studies. A total of 124 semester hours is required in the teacher preparation program including student teaching and the accompanying seminar. Enhanced student teaching requires an eight-week placement in secondary school and a seven-week placement in middle school. A foreign language is not a requirement for the teacher education curriculum.

Students seeking teacher certification in Biology must be officially admitted to the certification program by applying through the College of Education, usually in the sophomore year. Admission to this program requires a cumulative grade point average of 2.75 and a passing score on the Pre-Professional Skills Test (PPST) or the Computer-Based Academic Skills Assessment Test (CBT). Students who have previously earned a 21 on the ACT, 22 on the Enhanced ACT, or a combined 990 on the verbal and mathematics portions of the SAT are exempt from the PPST and the CBT. To be eligible for upper-level certification courses, a student must be officially admitted to the Teacher Education Program. For a complete list of admission and retention requirements in the Program, see the College of Education section, Teacher education Admission and Requirements.

A major in Biology with emphasis in General Biology or Cellular and Molecular Biology requires 122 semester hours, of which 33 must be in biological course work. Seniors who have demonstrated high achievements in their major courses are encouraged to take Biology 4190, an honors research course. This course offers an opportunity to gain experience in research under the direction of the Departmental faculty.

An undergraduate minor in the Department consists of a minimum of 24 semester hours, 16 of which should be taken in sequence in Biology 1110-1111; 1120-1121; 2110-2111 (Cell Biology), and 2120-2121 (Genetics). General Chemistry 1110 and 1120, with laboratories, are required as a supporting related course and must precede BIOL 2110. The remaining eight hours of the minor must be on the 3000 or 4000 level and may be elected in the minor area desired by the student.

Accreditation: The teacher certification program in Biology is approved by the Tennessee Department of Education. In addition, the teacher education program is accredited by the National Council on the Accreditation of Teacher Education (NCATE).

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
BIOL 1110, 1111	4	BIOL 1120, 1121	4
CHEM 1110, 1111	4	CHEM 1120, 1121	4
ENGL 1010	3	ENGL 1020	3
Social Science (Elective)	3	*MATH 1720 or Higher	3
UNIV 1000	1	Social Science (Elective)	3
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*Students will have to take MATH 1710 or lower if they are unprepared for these courses.

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
BIOL 2110, 2111	4	BIOL 2120, 2121	4
CHEM 2010, 2011	4	CHEM 2020, 2021	4
ENGL 2110	3	ENGL 2120	3
HIST 2010	3	HIST 2020	3
COMM 2200	3	Humanities	3
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JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
Physiology Elective (BIOL 3210/3211, 3400/3401, 4300 /4301)	4	BIOL 4120, 4121 CHEM 3410, 3411	4
BIOL Elective 3000/4000	4	PHYS 2020, 2021	4
PHYS 2010, 2011	4	Electives, 3000/4000	3
BIOL 3110 or AGSC 3120 or 3130	3		
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SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
BIOL 4170	1	BIOL 4180	1
BIOL Electives 3000/4000	4	BIOL Electives 3000/4000	8
Electives 3000/4000 Level	9	Electives 3000/4000 Level	3
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	14		12

Bachelor of Science Degree in Biology
Cellular and Molecular Biology Emphasis
Suggested Four-Year Plan – Total 122-Hours

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
BIOL 1110, 1111	4	BIOL 1120, 1121	4
CHEM 1110, 1111	4	CHEM 1120, 1121	4
ENGL 1010	3	ENGL 1020	3
Social Science (Elective)	3	MATH 1910*	3
ASOR 1001	1	Social Science (Elective)	3
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*Students will have to take MATH 1710 and 1720 if they are unprepared for 1915.

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
BIOL 2110, 2111	4	BIOL 2120, 2121	4
CHEM 2010, 2011	4	CHEM 2020, 2021	4
Sophomore Lit.	3	Humanities	3
HIST 2010	3	HIST 2020	3
COMM 2200	3	Humanities	3
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	17		17

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
Physiology Elective (BIOL 3200/3201, 3210/3211,3400/3401, or 4300/4301)	4	BIOL 4120, 4121	4
CHEM 3410, 3411	4	CHEM 3420, 3421	4
PHYS 2010, 2011	4	PHYS 2020, 2320/21	4
BIOL 3110 or ABSC 3120	3	Electives, 3000/4000	3
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	15		15

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
BIOL 4170	1	BIOL 4180	1
BIOL Electives 3000/4000	4	BIOL Electives 3000/4000	8
Electives 3000/4000	9	Electives 3000/4000	3
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	14		12

Bachelor of Science Degree in Biology
With Teacher Certification Licensure for Grades 7-12
Suggested Four-Year Plan – Total 124-Hours

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
BIOL 1110, 1111	4	BIOL 1120, 1121	4
CHEM 1110, 1111	4	CHEM 1120, 1121	4
ENGL 1010	3	ENGL 1020	3
Humanities Elective	3	*MATH 1720 OR Higher	3
HPSS 1510	3		
UNIV 1000	1		
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*Students will have to take MATH 1040 or lower if they are unprepared for 1720.

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
BIOL 2110, 2111	4	BIOL 2120, 2121	4
CHEM 2010, 2011	4	CHEM 2020, 2021	4
ENGL 2110	3	COMM 2200	3
HIST 2010	3	HIST 2020	3
PSYC 2420	3	EDCI 2010	3
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	17		17

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
Physiology Elect. (BIOL 3200/3201, 3210/3211, 3400/ 3401, or 4300/4301)	4	BIOL 4120, 4121	4
ART 1010	3	BIOL 3010, 3011	3
PHYS 2010, 2011	4	SOCI 2010	3
PSYC 3120	4	PHYS 2020, 2021	4
	3	EDCI 3870	3
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	14		17

SENIOR YEAR			
FALL SEMESTER.	HR.	SPRING SEMESTER	HR.
BIOL 3710	3	BIOL 4724	9
BIOL 4170 OR 4180	1	EDC I 4705	3
EDCI 3110 (Formerly EDCI 419)	3		
EDCI 4190	2		
EDRD 4910	3		
EDSE 3330	3		
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	15		12

Course Descriptions
Biology (BIOL)

For all classes that have laboratory components, students must register for the laboratory in the same semester that they register for the lecture class.

BIOL 1010, 1011 and 1020, 1021 Introductory Biology I, II and Laboratory (4, 4) (Formerly BIO 1010, 1011 and 1020, 1021). An interdisciplinary course for non-science majors involving the principles of mathematics, chemistry, physics and biology. The objective of the course is to integrate the areas as they are related to living organisms. Three hours lecture and two hours laboratory per week.

BIOL 1012, 1013 and 1022, 1023 Honors Introductory Biology I, II and Laboratory (4, 4) (Formerly BIO 1012, 1013 and 1022, 1023). Honors version of BIOL 1010, 1011, 1020, 1021. Courses limited to students in University Honors Program.

BIOL 1110, 1111 and 1120, 1121 General Biology I, II and Laboratory (4, 4) (Formerly BIO 1110, 1111 and 1120, 1121). A general biology course for science majors that covers structure, function, and life characteristics of organisms. The objective of the course is to provide students a survey of living organisms and the processes required for life.

BIOL 1112, 1113 and 1122, 1123 Honors General Biology I, II and Laboratory (4, 4) (Formerly BIO 1032, 1033 and 1042, 1043). Honors version of BIOL 1110, 1111, 1120, 1121. Course limited to students in University Honors Program.

BIOL 2110, 2111 Cell Biology and Laboratory (4) (Formerly BIO 211, 211L). Structure and function of cells and their components. Prerequisites: BIOL 1110, 1111, 1120, 1121.

BIOL 2120, 2121 Principles of Genetics and Laboratory (4) (Formerly BIO 212, 212L) An introduction to genetics, including classical and modern approaches, the laws of heredity, the role of heredity in developmental physiology, and the relation between heredity and evolution. Prerequisites: BIOL 1110, 1111, 1120, 1121.

BIOL 2210, 2211 and 2220, 2221 Human Anatomy and Physiology and Laboratory (4, 4) (Formerly BIO 221, 221L and 222, 222L). The fundamentals of the structure, function, and organization of the organ systems of man. These courses should be taken in sequence.

BIOL 2400, 2401 Principles of Microbiology (4). Identification, culture, sterilization, and disinfectant procedures employed in studying certain microorganisms. Open to majors in Family and Consumer Sciences, HPER, and Nursing.

BIOL 3010, 3011 Earth and Space Science and Laboratory (3) (Formerly BIO 301, 301L). An integrated study of earth and space sciences, including a study of the shape, structure, composition, motions, and atmosphere of the earth. Topics include an examination of the effect of weathering and erosion on the lithosphere and concerns for our environment. Consideration will be given to space exploration, including stars, space, and time. Two lecture periods and one two-hour laboratory per week.

BIOL 3110 Biometrics (3) (Formerly BIO 311). An introduction to the methods of statistics that are of particular interest to biologists for experimental design and interpretation. Prerequisites: MATH 1720, BIOL 2110, 2111, 2120, 2121, or their equivalents.

BIOL 3200, 3201 Comparative Physiology (4) (Formerly BIO 320, 320L). Introduces the concepts of physiology, including topics from cellular and animal physiology. Prerequisites: Successful completion of BIOL 2120, 2121; CHEM 211-211L and/or concurrent enrollment in CHEM 212-212L and PHY 212-212L.

BIOL 3210, 3211 Mammalian Physiology and Laboratory (4) (Formerly BIO 321, 321L). Consideration of the dynamic interactions and integrations of mammalian organ systems. Special emphasis is placed upon recent advances in methodology and new concepts in physiology and contributing sciences. Prerequisites: BIOL 1110, 1111, 1120, 1121 and CHEM 1110, 1111, 1120, 1121, or equivalents.

BIOL 3240, 3241 Comparative Anatomy and Laboratory (4) (Formerly 324, 324L). The comparative anatomy and evolution of the organ system of chordate animals. Prerequisites: BIOL 1110, 1111, 1120, 1121.

BIOL 3300, 3301 Plant Morphology and Laboratory (4) (Formerly BIO 330, 330L). Consideration of the structure, embryology, and phylogeny of higher vascular plants. Prerequisites: BIOL 1110, 1111, 1120, 1121, BIOL 2120, 2121, 4110, 4111.

BIOL 3320, 3321 General Botany and Laboratory (4) (Formerly BIO 332, 332L). The anatomy, physiology, and taxonomy of plants. Prerequisites: BIOL 2110, 2111, 2120, 2121.

BIOL 3400, 3401 Introduction to Microbial Physiology and Laboratory (4) (Formerly BIO 340, 340L). Salient features in the physiology of microorganisms. Selected examples of the metabolism of carbohydrates, lipids, and nitrogen-containing compounds are considered as a basis for further understanding of biologic phenomena. Prerequisites: BIOL 3410, 3411 or CHEM 211, 211L concurrently.

BIOL 3410, 3411 Principles of General Bacteriology and Laboratory (4) (Formerly BIO 341, 341L). The isolation, identification, culture, nutrition, sterilization, and chemotherapeutic procedures employed in studying bacteria. Prerequisites: BIOL 2110, 2111, 2120, 2121; CHEM 1110, 1111, 1120, 1121.

BIOL 3710 Methods of Teaching Biology (3) (Formerly BIO 371). A course designed to explore methods and techniques for teaching biology in the secondary school. It offers opportunities for locating sources of biological materials, supplies, and equipment for the biology laboratory and gives guidance in the selection of books, journals, and other printed materials that support academic programs in secondary school biology. A field component of at least 24 hours of varied clinical experiences, classroom observation, active participation, and other related activities in clinical and/or in school settings is required. Required of all Biology majors seeking secondary certification in Biology. Prerequisite: official admission to the Teacher Education Program.

BIOL 4100 Special Topics (3) (Formerly BIO 410). Student-and faculty-generated course. Scope of subject matter is determined by students and instructor. Prerequisites: 12 hours upper-level Biology or permission of instructor. (Elective)

BIOL 4110, 4111 Molecular Genetics and Laboratory (4) (Formerly BIO 411, 411L). An introduction to molecular genetics in microorganisms, plants, and animals. Emphasis is placed on biotechnical advances and the methods and techniques used in these systems. Prerequisites: BIO 2110, 2111, 2120, 2121.

BIOL 4112, 4113 Bioinformatics (4) upon successful completion of this course, student will be able to (1) retrieve specific DNA and protein sequence, (2) identify experimental sequences through GenBank database similarity search, (3) extract functional information for DNA and protein sequences from public database, (4) perform multiple sequences alignment and phylogenetic analysis, (5) describe to a reasonable accuracy the theoretical bases for these operations, (6) write scripts to perform computational functions.

BIOL 4120, 4121 Principles of Ecology and Laboratory (4) (Formerly BIO 412, 412L). Fundamental ecological principles with special reference to levels of organization, population and community properties, structural adaptation, functional adjustments, and other factors affecting the distribution of organisms. Prerequisite: BIOL 1110, 1111, 1120, 1121, 2120, 2121, 4110, 4111.

BIOL 4130, 4140 Contemporary Problems in Ecology I, II (3, 3) (Formerly BIO 413, 414). A study of some of the contemporary problems constituting the environmental crisis, the hazards comprising such problems, and the complexity affecting their resolutions. (Elective)

BIOL 4150, 4151 Microtechnique and Laboratory (4) (Formerly BIO 415, 415L). Methods of microscopic study of tissues. Prerequisites: BIOL 1110, 1111, 1120, 1121, 2120, 2121 and CHEM 1110, 1111, 1120, 1121.

BIOL 4160 Evolution (3) (Formerly BIO 416). A study of current evolutionary theory, including systematics, with an examination of macroevolutionary patterns and microevolutionary processes. Prerequisites: BIOL 1110, 1111, 1120, 1121.

BIOL 4170 and 4180 Senior Seminar (1, 1) (Formerly BIO 417, 418). Current problems in biology. A minimum of one semester required of all seniors in the Department. Meets one hour per week.

BIOL 4190 Junior Honors Research (3) (Formerly BIO 419). Open to juniors and seniors of outstanding attainment who have demonstrated high achievements in their major field. It offers opportunity to do individual research under the direction of a member of the Department faculty. (Elective)

BIOL 4200, 4201 Invertebrate Zoology and Laboratory (4) (Formerly BIO 420, 420L). Study of the morphology, physiology, taxonomy, and life histories of the invertebrates. Emphasis is placed on the systemic developments of invertebrate types. Prerequisites: BIOL 1110, 1111, 1120, 1121, 2120, 2121. (Elective)

BIOL 4210, 4211 Embryology and Laboratory (4) (Formerly BIO 421, 421L). A general consideration of gametogenesis, fertilization, cleavage in animals and the early development of echinoderms, protochordates, and selected vertebrates, with emphasis on early development of the chick. Prerequisite: BIOL 3240 and 3241 are strongly recommended.

BIOL 4220, 4221 Endocrinology and Laboratory (4) (Formerly BIO 422, 422L). The function of vertebrate hormones, with emphasis on those concerned in the physiology of reproduction. Topics include techniques used in small animal surgery in endocrine research. Prerequisite: BIOL 4210, 4211. (Elective)

BIOL 4230, 4231 Histology and Laboratory (4) (Formerly BIO 423, 423L). Study of animal tissues. Prerequisites: BIOL 1110, 1111, 1120, 1121, 2120, 2121, 4110, and 4111. (Elective)

BIOL 4240, 4241 Introduction to Parasitology and Laboratory (4) (Formerly BIO 424, 424L). Animal parasites and their methods of entering the body of man and mammals. The several types of host-parasite relationships are surveyed, with emphasis on the effects of parasites on or within the hosts, immunogenic responses by the host to parasitism, and a history of the discipline. Prerequisites: BIOL 1110, 1111, 1120, 1121, 2120, 2121. (Elective)

BIOL 4260, 4261 Field Zoology and Laboratory (4) (Formerly BIO 426, 426L). Study of selected groups of animals. Methods of collecting, classifying, and preserving will be emphasized. Prerequisites: BIOL 1110, 1111, 1120, 1121, 2120, 2121. (Elective)

BIOL 4270, 4271 and 4280, 4281 Physiology and Pathophysiology I, II and Laboratory (4, 4) (Formerly BIO 427, 427L and 428, 428L). A closely integrated series of lectures and laboratory demonstrations which emphasize human physiology and pathophysiology. Physiology of the nervous system, blood circulation, respiration, and special senses is considered, as is the basic and applied physiology of the digestive, excretory, and endocrine systems. Mechanisms of integrating various systems are emphasized. Must be taken in sequence. Prerequisites: BIOL 1110, 1111, 1120, 1121 or BIOL 2210, 2211, 2220 and 2221 and CHEM 211, 211L.

BIOL 4272, 4273 Physiology and Pathophysiology and Laboratory (4) (Formerly BIO 427A, 427K). An accelerated one-semester series of lectures and laboratory demonstrations which emphasize human physiology and pathophysiology. Immune response, gastrointestinal, cardiovascular, electrolytic, respiratory, renal, neurological, endocrinal, reproductive, and musculoskeletal disorders are considered. Both courses are required of Nursing majors. Prerequisites: BIOL 1110, 1111, 1120, 1121 or BIOL 2210, 2211, 2220 and 2221 and CHEM 1110, 1111.

BIOL 4300, 4301 Introduction to Plant Physiology and Laboratory (4) (Formerly BIO 430, 430L). Consideration of the functions of digestion, nutrition, growth, photosynthesis, respiration, translocation, photoperiodism, plant hormones, transpiration, and water relations as occurring in typical green plants. Prerequisites: BIOL 3320, 3321 and CHEM 1110, 1111, 1120, 1121.

BIOL 4320, 4321 Field Botany and Laboratory (4) (Formerly BIO 432, 432L). A course designed to acquaint the student with basic principles of plant classification and identification, the use of manuals with reference made to the families, genera, and species of the local flora. Prerequisite: BIOL 3320, 3321. (Elective)

BIOL 4400, 4401 Pathogenic Microorganisms and Laboratory (4) (Formerly BIO 440, 440L). Survey of the important features of host-parasite interaction. Characteristics of the organisms, host hypersensitivity, and natural and acquired immunity are considered as contributing factors toward this interaction. Modern preventive methods are emphasized. Prerequisite: BIOL 3410, 3411.

BIOL 4410, 4411 Immunology and Serology and Laboratory (4) (Formerly BIO 441, 441L). Theories of immunity and training in serological methods and procedures for immunization. Prerequisites: BIOL 3410, 3411. (Elective)

BIOL 4420, 4421 Virology and Laboratory (4) (Formerly BIO 442, 442L). Survey of bacterial, plant, and animal viruses with emphasis on their infectious cycles. Prerequisite: BIOL 3410, 3411. (Elective)

BIOL 4724 Student Teaching (9) (Formerly BIO 427S). A semester-long experience of supervised practice teaching, appropriately divided between middle school and high school. Required of all students seeking certification in the teaching of biology. Prerequisite: successful completion of all certification courses except EDCI 470A, which is taken concurrently.

MARC Program

The following courses are offered through the MARC (Minority Access to Research Careers) Honors Program. Enrollment is restricted to MARC participants, or by permission of the Director.

BIOL 3920 Scientific Communication (4) (Formerly BIO 392). Course designed to improve written, oral, and quantitative skills necessary to enhance career development in the sciences.

BIOL 4900, 4901 Cell Physiology and Laboratory (4) (Formerly BIO 490, 490L). Introduction to the interrelationships of biological, physical, and chemical aspects of the cell. Prerequisites: BIOL 1110, 1111, 1120, 1121, CHEM 1110, 1111, 1120, 1121.

BIOL 4911 Modern Scientific Methods (3) (Formerly BIO 491). Use and applications of modern laboratory equipment and techniques. Prerequisite: BIOL 4900, 4901.

BIOL 4920 Honors Undergraduate Research (4) (Formerly BIO 492). Intramural and extramural biomedical research experiences.

BIOL 4930 Current Biomedical Topics (0) (Formerly BIO 493). Training in critical analysis and oral presentations of current journal publications in selected biomedical fields. Ethical issues including plagiarism, falsification, fabrication, and misconduct in research are discussed. All MARC Trainees must register in this course each semester.

BIOL 4940, 4950 MARC Seminar Series (1-1&2) (Formerly 494, 495). Exposure to current presentations by eminent scientists in biomedical research.

Department of Chemistry

Mohammad R. Karim, Ph.D., Department Chair
201 Chemistry Building
(615) 963-5321

Faculty: M. Al-Masum, Y. Beni, W. Boadi, T. Duello, S. Guha, M. Karim, J. Moore, C. Okoro, N. Phambu, T. Siddiquee, K. Vercruysse, M. Whalen, M. Zheng

General Statement: The purpose of the Department of Chemistry is the advancement, interpretation, dissemination, and preservation of chemical concepts and knowledge. Chemistry itself is the science of the nature, composition, and property of material substances, as well as their transformations and interactions. It is thus basic to natural phenomena and modern technology alike. Chemistry is traditionally divided into five major parts: organic chemistry, inorganic chemistry, analytical chemistry, biochemistry, and physical chemistry.

The principal objectives of the Department of Chemistry are (1) to instruct students in the basic principles and techniques of the various branches of chemistry, (2) to educate students and the general public in the importance of chemistry to the quality of the environment and everyday living, and (3) to engage in research and publication of new scientific information.

The Chemistry Department offers undergraduate programs earning B.S. degrees and a graduate program earning an M.S. degree. Four different undergraduate curricula are available to students according to their individual interests. For details of the M.S. in Chemistry, see the Graduate Catalog.

No grade of less than a "C" in any Chemistry course will be accepted as credit toward meeting Departmental requirements and towards graduation.

Accreditation: The teacher certification program in Chemistry is approved by the Tennessee Department of Education. In addition, the teacher certification program of the University is accredited by the National Council on the Accreditation of Teacher Education (NCATE). Curriculum 1-Professional Chemistry Curriculum is approved by the American Chemical Society.

Departmental Requirements for Bachelor of Science Chemistry: 35-59 Semester Hours

Requirements for a Minor: 24 or More Semester Hours with a Minimum 8 Hours of Upper-Division Courses

An undergraduate minor in chemistry must take a minimum of 24 hours of chemistry courses, 16 of which to be taken in sequence. These are CHEM 1110, 1111 (General Chemistry I and Lab), CHEM 1120, 1121 (General Chemistry II and Lab), CHEM 2010, 2011 (Organic Chemistry I and Lab), and CHEM 2020, 2021 (Organic Chemistry II and Lab). Honors sections of these courses will also satisfy the requirement. The remaining 8 hours of the minor must be on the 3000 or 4000 level in consultation with the advisor.

General Education Core

Communications (9 hours)

ENGL 1010, 1020	Freshman English I, II (minimum grade of C in each)	6
COMM 2200	Public Speaking	3

Humanities and/or Fine Arts (9 hours)

ENGL 2012-2320	Sophomore Literature Course	3
Elective	One course from approved list.	3
Elective	One course from approved list.	3

Social and Behavioral Science (6 hours)

Elective	One course from approved list.	3
Elective	One course from approved list.	3

History (6 hours)

HIST 2010	American History I	3
HIST 2020	American History II	3

Natural Science (8 hours)

CHEM 1110, 1111	General Chemistry I	4
CHEM 1120, 1121	General Chemistry II	4

MATH 1910 (4-hours)

(Students will need lower level math if they are unprepared for 1910.)

Orientation (1 hour)

UNIV 1000	Orientation for Science Majors	1
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Total General Education Hours with Orientation - 43-Hours

Upper-division Admission

For admission into the upper-division programs of the Chemistry major, students must complete all of the requirements listed above under General Education Core. In addition, they must have earned a cumulative grade point average of at least 2.0 on college-level coursework, and completed the Senior Exit Examination. In addition, they must have earned a grade of C or better in CHEM 1110 or 1112, 1111 or 1113, 1120 or 1122, 1121 or 1123, 2100, 2101, 2010 or 2012, 2011 or 2013, 2020 or 2022, and 2021, or 2023. Honors sections of chemistry courses will also fulfill the degree requirements. Chemistry Majors are recommended to take honors courses.

Curriculum 1 - ACS Approved Professional Chemistry Curriculum: 59- Hours

This program requires 120 hours for graduation and is designed for students pursuing professional chemists' career opportunities in industry or government laboratories, and for those students desiring to pursue advanced studies in graduate school.

A minimum of 59 semester hours in Chemistry is required, 39 of which must be in 3000- or 4000-level courses. The required courses are 1110, 1111, 1120, 1121, 2100, 2101, 2010, 2011, 2020, 2021, 3210, 3211, 3220, 3221, 3410, 3420, 4100, 4200, 4201, 4210, 4320, 4321, 4505, 4506, 4910, and 4920, plus two additional courses to be chosen from CHEM 4005-9, 4600, 4500, 4800 and 4830. CHEM 4600 is strongly recommended. MATH 2110 is also highly recommended during the sophomore year. This curriculum is based upon

recommendations by the American Chemical Society. Honors sections of chemistry courses will also fulfill the degree requirements. Chemistry Majors are recommended to take honors courses.

Curriculum 2 - Biochemistry Concentration: 50-Hours

This program requires 120 hours for graduation and is designed for students pursuing a professional career in medicine, dentistry, pharmacy, or veterinary medicine. Students following this curriculum may receive a minor in Biology, if students take an additional 8 hrs. of 3000 or 4000 level biology courses.

A minimum of 50 semester hours in Chemistry is required, 30 of which must be in 3000- and 4000-level courses. The required courses are: 1110, 1111, 1120, 1121, 2100, 2101, 2010, 2011, 2020, 2021, 3000, 3210, 3211, 3220, 3410, 3411, 3420, 3421, 4100, 4505, 4506, 4700, 4701, 4910, and 4920. Honors sections of chemistry courses will also fulfill the degree requirements. Chemistry Majors are recommended to take honors courses.

Curriculum 3 - Chemistry Concentration: 35-Hours

This program of study requires 120 hours for graduation and is designed to train students for career objectives other than professional chemist, graduate school, professional school, or teacher certification. This program gives students more flexibility with regard to individualized course selection which prepares students for careers as laboratory technicians, research technicians, or positions in chemical sales, process control, chemical editing-writing, and patent law. The minor in this concentration is selected by the student according to his or her career goals and is monitored carefully by an advisor.

This degree requires 35 hours of Chemistry with 15 hours of 3000- and 4000-level courses, and is designed for students whose career objectives are in fields where chemistry has indirect applications. The required courses are: 1110, 1111, 1120, 1121, 2100, 2101, 2010, 2011, 2020, 2021, 3000, 3210, 3211, 3220, 3221, 4100, 4910, and 4920.

Curriculum 4 - Major in Chemistry with Teacher: 34-Hours Certification, Licensure for Grades 7-12

All candidates for certification in secondary education must complete a minimum of 123 semester hours, which includes a general education core (42 hours), a professional education core (36 hours, including a 9-hour course in enhanced student teaching), and a major concentration of content and knowledge courses (32 hours). The required courses in Chemistry are 1110, 1111, 1120, 1121, 2100, 2101, 2010, 2011, 2020, 2021, 3000, 3210, 3211, 3410, 3710, 4724 and 4910. Successful completion of this program provides one with a license to teach Chemistry in grades 7-12 in Tennessee public schools.

Students seeking the Bachelor of Science Degree with licensure must make written application for admission to the Teacher Education Program in the College of Education, usually during the sophomore year. They must have a 2.75 cumulative quality point average at time of application and must pass the Pre-Professional Skills Test (PPST) or the Computer-Based Academic Skills Test (CBT). Students who have previously earned a 21 on the ACT, 22 on the Enhanced ACT, or a combined 990 on the verbal and mathematical portions of the SAT are exempt from the PPST and the CBT. Enhanced student teaching requires placement of eight weeks at the secondary level and seven weeks at the middle school level. For a complete list of requirements for admission to and retention in the Teacher Education Program, see the College of Education section.

Bachelor of Science Degree in Chemistry Curriculum 1 - Professional Chemistry Suggested Four-Year Plan

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 1112, 1113**	4	CHEM 1122, 1123**	4
ENGL 1010	3	ENGL 1020	3

MATH 1910*	4	MATH 1920	4
Humanities	3	SOC/BEH SCI	3
UNIV 1000	1	COMM 2200	3
SOC/BEH SCI	3		
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SOP*Students will have to begin with lower-level MATH if they are unprepared for this course.

**Honors courses are strongly suggested

SOPHOMORE YEAR

FALL SEMESTER	HR	SPRING SEMESTER	HR
CHEM 2100, 2101	4	CHEM 2022, 2023**	4
CHEM 2012, 2013**	4	Humanities	3
ENGL 2012-2320	3	HIST 2020	3
HIST 2010	3	PHYS 2120, 2121	4
PHYS 2110/2111	4		
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	18		14

JUNIOR YEAR

FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 3210, 3211	4	CHEM 3220, 3221	4
CHEM 4200, 4201	4	CHEM 4100	2
MATH/Science	3	CHEM 4210	3
Elective 3000-4000 Level			
Elective, Any Level	2	MATH/Science	3
		Elective 3000-4000 Level	
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	13		12

SENIOR YEAR

FALL SEMESTER	HR	SPRING SEMESTER	HR.
CHEM 3410	3	CHEM 3420	3
CHEM 4505	2	CHEM 4320, 4321	4
CHEM 4910	1	CHEM 4506	2
Elective 3000-4000 Level	6	CHEM 4920	1
		CHEM Elective	6
		3000-4000 Level	
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	12		16

Bachelor of Science Degree in Chemistry Curriculum 2 - Professional Biochemistry Concentration Suggested Four-Year Plan

FRESHMAN YEAR

FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 1112, 1113**	4	CHEM 1122, 1123**	4
ENGL 1010	3	ENGL 1020	3
BIOL 1110, 1111	4	BIOL 1120, 1121	4
MATH 1910*		COMM 2200	3
UNIV 1000	1		
	<hr/>		<hr/>
	12		14

*Students will have to begin with lower-level MATH if they are unprepared for this course.

SOPHOMORE YEAR

FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 2100, 2101	4	CHEM 2022, 2023**	4
CHEM 2012, 2013**	4	Humanities	3
SOC/BEH SCI	3	HIST 2020	3
ENGL 2012-2320	3	Humanities	3
HIST 2010	3	SOC/BEH SCI	3
	<hr/>		<hr/>
	17		16

JUNIOR YEAR

FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 3210, 3211	4	CHEM 3220	3
CHEM 3410, 3411	4	CHEM 3420, 3421	4
PHYS 2010, 2011	4	PHYS 2020, 2021	4
		CHEM 4100	2
	<hr/>		<hr/>
	12		13

FALL SEMESTER	SENIOR YEAR		HR.
	HR.	SPRING SEMESTER	
CHEM 3000	3	CHEM 4506	2
CHEM 4505	2	CHEM 4920	1
CHEM 4700, 4701	4	BIOL Elective, 3000-4000	4
CHEM 4910	1	Electives, 3000-4000 Level	8
BIOL Elective, 3000-4000	4		
Elective, 3000/4000 Level	3		
	<u>17</u>		<u>15</u>

Bachelor of Science Degree in Chemistry
Curriculum 3 - Chemistry Concentration
Suggested Four-Year Plan

FALL SEMESTER	FRESHMAN YEAR		HR.
	HR.	SPRING SEMESTER	
CHEM 1110, 1111	4	CHEM 1120, 1121	4
ENGL 1010	3	ENGL 1020	3
HIST 2010	3	HIST 2020	3
MATH 1910*	4	SOC/BEH SCI	3
UNIV 1000	1	Humanities	3
	<u>15</u>		<u>16</u>

*Students will have to begin with lower-level MATH if they are unprepared for this course.

FALL SEMESTER	SOPHOMORE YEAR		HR.
	HR.	SPRING SEMESTER	
CHEM 2100, 2101	4	CHEM 2020, 2021	4
CHEM 2010, 2011	4	SOC/BEH SCI	3
COMM 2200	3	Humanities	3
ENGL 2012-2320	3	BIOL 1120, 1121	4
BIOL 1110, 1111	4	Elective, Any Level	1
	<u>18</u>		<u>15</u>

FALL SEMESTER	JUNIOR YEAR		HR.
	HR.	SPRING SEMESTER	
CHEM 3210, 3211	4	CHEM 3220, 3221	4
PHYS 2010, 2011	4	PHYS 2020, 2021	4
Electives 3000/4000 Level	6	CHEM 4100	2
		Electives, 3000/4000 Level	6
	<u>14</u>		<u>16</u>

FALL SEMESTER	SENIOR YEAR		HR.
	HR.	SPRING SEMESTER	
CHEM 3000	3	CHEM 4920	1
CHEM 4910	1	Electives 3000/4000 Level	12
Electives 3000/4000 Level	9		
	<u>13</u>		<u>13</u>

Bachelor of Science Degree in Chemistry
Curriculum 4 - Major in Chemistry with Teacher Certification,
Licensure for Grades 7-12
Suggested Four-Year Plan

FALL SEMESTER	FRESHMAN YEAR		HR.
	HR.	SPRING SEMESTER	
CHEM 1110, 1111	4	CHEM 1120, 1121	4
ENGL 1010	3	ENGL 1020	3
MATH 1910*	4	COMM 2200	3
HIST 2010	3	HIST 2020	3
UNIV 1000	1	Humanities	3
Humanities	3		
	<u>3</u>		<u>3</u>

18

16

*Students will have to begin with lower-level MATH if they are unprepared for this course.

SOPHOMORE YEAR

FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 2100, 2101	4	CHEM 2020, 2021	4
CHEM 2010, 2011	4	SOCI 2010	3
ENGL 2012-2320	3	EDCI 2010	3
PHYS 2010, 2011	4	PHYS 2020, 2021	4
PSYC 2420	3	SOC/BEH SCI	3
	<u>18</u>		<u>17</u>

JUNIOR YEAR

FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 3210, 3211	4	CHEM 3410	3
BIOL 1110, 1111	4	BIOL 1120, 1121	4
CHEM 3000	3	EDCI 3870	3
EDSE 3330	3	ASTR 1100	4
	<u>14</u>		<u>14</u>

SENIOR YEAR

FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 3710	3	CHEM 4724	9
CHEM 4910	1	EDCI 4705	3
EDCI 4620	3		
EDCI 4910	3		
BIOL 3010, 3011	4		
	<u>14</u>		<u>12</u>

Course Descriptions
Chemistry (CHEM)

CHEM 1000 (3) and 1001 (1) Basic Chemistry and Laboratory (Formerly CHEM 100 and 100L). A study of the fundamentals of chemistry. Topics include the metric system, atomic theory, inorganic nomenclature, chemical stoichiometry, properties of gases, liquids and solutions, and acid/base chemistry. Laboratory component emphasizes basic qualitative and quantitative measurements and data interpretation. Three lectures and one three-hour laboratory per week. Offered in fall and spring.

CHEM 1030 (3) and 1031 (1) General Chemistry for Non-Science Majors I and Laboratory (Formerly CHEM 1030 and 1031). A course for non-science majors that focuses on the application of chemistry to society. Topics such as air and water pollution, ozone depletion, global warming, energy, acid rain, and other current environmental issues will be surveyed and implications for personal and societal decisions explored. Laboratory component focuses on the principles learned in lecture. Three lectures and one three-hour laboratory per week. Offered in fall and spring.

CHEM 1040 (3) and 1041 (1) General Chemistry for Non-Science Majors II and Laboratory. A continuation of CHEM 1030, 1031. Prerequisites: CHEM 1030, 1031. Three lectures and one three-hour laboratory per week. Offered in fall and spring.

CHEM 1100 (3) and 1101 (1) Fundamentals of Organic and Biological Chemistry (Formerly CHEM 101 and 101L). A study of the fundamentals of organic chemistry, biochemistry and environmental chemistry. Topics include the nature of organic compounds, and the chemistry and metabolism of biochemical macromolecules and current environmental issues. Laboratory emphasizes principles learned in lecture. Three lectures and one three-hour laboratory per week. Prerequisites: high school chemistry or CHEM 1000/1001 and two years of high school algebra or MATH 1010. Offered in fall and spring.

CHEM 1110 (3) and 1111 (1) General Chemistry I and Laboratory (Formerly CHEM 1010 and 1011). A comprehensive study of chemical principles designed for students pursuing a career in chemistry or other scientific areas. Topics include the metric system and scientific notation, compounds of matter, nomenclature, composition and reaction stoichiometry, types of chemical reactions, thermochemistry, atomic structure, theories of bonding, gases and the kinetic molecular theory, liquids, solids, and thermodynamics. Laboratory complements lecture topics and emphasizes qualitative and quantitative measurements and data interpretation. Prerequisites: high school chemistry or CHEM 1000, 1001, and two years high school algebra or MATH 1110. Three lectures and one three-hour laboratory per week. Offered in fall, spring, and summer.

CHEM 1112 (3) and 1113 (1) Honors General Chemistry I and Laboratory (Formerly CHEM 1012 and 121K). For Chemistry majors and University Honors Program students only. Topics covered are similar to CHEM 1110, 1111, but the depth of understanding expected is greater. Prerequisites: high school chemistry or CHEM 1000, 1001, and two years high school algebra or MATH 1110. Three lectures and one three-hour laboratory per week. Offered only in fall.

CHEM 1120 (3) and 1121 (1) General Chemistry II and Laboratory (Formerly CHEM 1020 and 1021). A continuation of CHEM 1110, 1111. Topics include solutions, acid/base reactions, chemical thermodynamics, chemical kinetics, gaseous equilibria, acid/base and solubility chemical equilibria, electrochemistry, nuclear chemistry, and descriptive organic and inorganic chemistry. Laboratory complements lecture topics and emphasizes qualitative and quantitative measurements, and data interpretation and manipulation. Prerequisites: CHEM 1110, 1111. Three lectures and one three-hour laboratory per week. Offered in fall, spring, and summer.

CHEM 1122 (3) and 1123 (1) Honors General Chemistry II and Laboratory (Formerly CHEM 1022 and 122K). A continuation of CHEM 1112, 1113. Topics covered are similar to CHEM 1120, 1121, but the depth of understanding expected is greater. Prerequisites: CHEM 1112, 1113. Three lectures and one three-hour laboratory per week. Offered only in spring.

CHEM 2010 (3) and 2011 (1) Organic Chemistry I and Laboratory (Formerly CHEM 211 and 211L). A systematic study of the physical and chemical properties of hydrocarbons and their derivatives. Topics include chemical bonding, structural formula and physical properties, nomenclature, stereochemistry, synthesis and reactions of alkanes, alkenes, alkynes, alkyl halides, and alcohols. Reaction mechanism is emphasized. Laboratory component focuses on reaction set-ups, recrystallization, melting point, distillation, extraction, chromatography, and reactions. Prerequisites: CHEM 1120, 1121, or CHEM 1122, 1123. Three lectures and one three-hour laboratory per week. Formerly CHEM 211, 211L. CHEM 2010, 2011 is required of all Chemistry majors. Offered in fall, spring, and summer.

CHEM 2012 (3) and 2013 (1) Honors Organic Chemistry I and Laboratory (Formerly CHEM 211H and 211K). For Chemistry majors and University Honors Program students only. Topics are similar to CHEM 2010, 2011, but covered in greater detail. Prerequisites: CHEM 1122, 1123. Three lectures and one three-hour laboratory per week. Offered only in fall.

CHEM 2020 (3) and 2021 (1) Organic Chemistry II and Laboratory (Formerly CHEM 212 and 212L). A continuation of CHEM 2010, 2011. Emphasis is on the synthesis, reactions, and spectroscopic identification of aromatic compounds, carbonyl compounds (includes aldehydes, ketones, carboxylic acids and their derivatives), and amines. Reaction mechanism is strongly emphasized. Laboratory component exposes students to multi-step synthesis, and spectroscopic and chromatographic characterization of reaction products. Prerequisites: CHEM 2010, 2011. Three lectures and one three-hour laboratory per week. Formerly CHEM 212, 212L. CHEM 2020, 2021 is required of all Chemistry majors. Offered in fall, spring, and summer.

CHEM 2022 (3) and 2023 (1) Honors Organic Chemistry II and Laboratory (Formerly CHEM 212H and 212K). A continuation of 2012, 2013. Topics covered are similar to CHEM 2020, 2021, but covered in greater detail. Prerequisites: CHEM 2012, 2013. Three lectures and one three-hour laboratory per week. Offered only in spring.

CHEM 2100 (3) and 2101 (1) Introduction to Analytical Chemistry and Laboratory (Formerly CHEM 210 and 210L). Quantitative methods of chemical analysis. Topics include data manipulation, error analysis and statistical methods; chemical equilibria; acid/base, complexometric and precipitation titrimetry; spectrometric methods; chemical separations and chromatography; analytical glassware, equipment, and instrumentation; and use of computer spreadsheet programs. Laboratory component directly parallels lecture topics. Prerequisites: CHEM 1120, 1121, or CHEM 1122, 1123. Three lectures and one three-hour laboratory per week. Formerly CHEM 210, 210L. Required of all Chemistry majors. Offered in fall and spring.

CHEM 2500 (3) Introduction to Pharmacology (Formerly CHEM 250). An introductory study of mechanisms, dosages, and side effects of pharmacological classes of medication. Three lectures per week. Offered only in fall.

CHEM 3000 (3) Introduction to Inorganic Chemistry (Formerly CHEM 300). An introduction to descriptive inorganic chemistry. Emphasis is on periodicity in structure and reactivity. Topics include bonding, boron chemistry, catalysis, coordination compounds and reaction mechanisms, electronic spectroscopy, and bio-inorganic chemistry. Prerequisites: CHEM 1120, 1121. Offered only in the fall.

CHEM 3185, 3186, 3187 (3, 3, 3) Cooperative Education I, II, III (Formerly CHEM 318A, B, C). Supervised and approved program of learning experiences undertaken by students in governmental, business, or industrial setting. Formal proposals, project objectives, or learning plans are reviewed and approved by faculty. Student activities and progress are monitored, evaluated, and graded by a full-time faculty member. Prerequisite: permission of Department Chair. Offered in fall, spring, and summer.

CHEM 3200 (3) and 3201 (1) Physiological Biochemistry and Laboratory (Formerly CHEM 320 and 320L). The fundamentals of human physiological chemistry. Required of majors in foods and nutrition. Prerequisites: CHEM 3600, 3601. Not available for students having credit for CHEM 4700. Three lectures and one three-hour laboratory per week. Offered only in spring.

CHEM 3210 (3) and 3211 (1) Physical Chemistry I and Laboratory (Formerly CHEM 321 and 321L). Topics covered include the laws of thermodynamics and their application to physical processes and chemical systems, ideal and real gases, single and multi-component phase equilibrium, solutions of non-electrolytes and electrolytes, and electrochemistry. Laboratory component emphasizes the material covered in lecture. Prerequisites: MATH 1910 CHEM 2100, 2101, and either CHEM 2020, 2021 or CHEM 2022, 2023. Three lectures and one three-hour laboratory per week. Offered only in fall.

CHEM 3220 (3) and 3221 (1) Physical Chemistry II and Laboratory (Formerly CHEM 322 and 322L). A continuation of CHEM 3210, 3211. Topics include kinetic molecular theory, transport processes, reaction kinetics, quantum mechanics, atomic structure, molecular electronic structure, spectroscopy, and photochemistry. Prerequisites: CHEM 3210, 3211. Three lectures and one three-hour laboratory per week. Offered only in spring.

CHEM 3410 (3) and 3411 (1) General Biochemistry I and Laboratory (Formerly CHEM 341 and 341L). A study of the chemical and physical properties and biological functions of proteins, carbohydrates, lipids, and nucleic acids. Topics include cell membranes, enzyme kinetics and mechanisms, replication, transcription, and translation. Prerequisites: CHEM 2010, 2011. Laboratory component emphasizes ionization of acids and bases, pH and buffers, important biochemical techniques, and the chemistry of the major classes of biological compounds. Three lectures and one three-hour laboratory per week. Offered in fall, spring, and summer.

CHEM 3420 (3) and 3421 (1) General Biochemistry II and Laboratory (Formerly CHEM 342 and 342L). A continuation of CHEM 3410, 3411. Study of the major catabolic and anabolic pathways, including their chemical reactions, energetics, and regulation. Additional topics include hormones, vitamins, and biochemical function of various organs. Prerequisites: CHEM 3410, 3411. Laboratory emphasizes biochemical and molecular techniques associated with the study of metabolism. Three lectures and one three-hour laboratory per week. Offered in fall, spring, and summer.

CHEM 3500 (3) Atmospheric Chemistry. A study of the chemical processes determining the composition of the Earth's atmosphere including photochemistry, kinetics, thermodynamics, and biogeochemical cycling. This knowledge is applied to the study of aerosols and their impacts on climate and visibility, stratospheric ozone and ozone depletion, oxidation chemistry, ozone air pollution and acid rain, and Arctic and Atmospheric chemistry. Prerequisites: CHEM 2020, 3210. Recommended: CHEM 2100. Offered on demand.

CHEM 3600 (3) and 3601 (1) Organic Chemistry and Organic Survey Laboratory (Formerly CHEM 360 and 360L). Study of important classes of organic compounds. Emphasis is placed upon the study of hydrocarbons and their principal derivatives: carbohydrates, proteins, fats, oils, vitamins, and dyes. Designed for majors in Agriculture, Home Economics, and Allied Health. Prerequisites: CHEM 1120, 1121. Not available for students having credit for CHEM 2010, 2020. Three lectures and one three-hour laboratory per week. Offered only in fall.

CHEM 3710 (3) Methods of Teaching High School Chemistry (Formerly CHEM 371). A course in the methods of teaching chemistry in the secondary school. Clinical and field-based experiences which call for active participation by students are part of the course requirements. Required of all Chemistry majors in the Teacher Education Program. Prerequisite: official admission to the Teacher Education Program. Offered on demand.

CHEM 4005 (3) Special Topics in Analytical Chemistry. Selective topics in Analytical Chemistry which are current and relevant to the discipline. Prerequisite: permission of the instructor. Three lectures per week. Offered on demand.

CHEM 4006 (3) Special Topics in Biochemistry. Selective topics in Biochemistry which are current and relevant to the discipline. Prerequisite: permission of the instructor. Three lectures per week. Offered on demand.

CHEM 4007 (3) Special Topics in Inorganic Chemistry. Selective topics in Inorganic Chemistry which are current and relevant to the discipline. Prerequisite: Permission of the instructor. Three lectures per week. Offered on demand.

CHEM 4008 (3). Special Topics in Organic Chemistry. Selective topics in Organic Chemistry which are current and relevant to the discipline. Prerequisite: permission of the instructor. Three lectures per week. Offered on demand.

CHEM 4009 (3). Special Topics in Physical Chemistry. Selective topics in Physical Chemistry which are current and relevant to the discipline. Prerequisite: permission of the instructor. Three lectures per week. Offered on demand.

CHEM 4100 (2) Scientific Communications (Formerly CHEM 410). A focus on writing, oral, and library skills involving scientific information. Writing skills include the preparation of laboratory notebooks, term papers, and research papers. Oral skills concentrate on presentations of scientific results. Library skills include on-line and library literature search for chemical information. Prerequisites: CHEM 2100, 2101, or 2020, 2021. Two one-hour lectures per week. Offered only in spring.

CHEM 4200 (3) and 4201 (1) Inorganic Chemistry I and Laboratory (Formerly CHEM 420 and 420L). Topics include atomic and molecular structure, quantum mechanics, atomic and group theory, solid state chemistry, acid/base and oxidation/reduction chemistry, and the chemistry of metal complexes. Laboratory provides experience in the synthesis and characterization of inorganic compounds. Prerequisites: CHEM 2020, 2021. Three lectures and one three-hour laboratory per week. Offered only in fall.

CHEM 4210 (3) Inorganic Chemistry II (Formerly CHEM 421). A continuation of CHEM 4200. Course provides a systematic survey of the descriptive chemistry of the elements, building on the theories presented in CHEM 4200. Prerequisites: CHEM 4200, 4201. Offered only in spring.

CHEM 4320 (3) and 4321 (1) Instrumental Analysis and Laboratory (Formerly CHEM 432 and 432L). Principles and applications of analytical instrumentation, including electromagnetic, spectrometric, and chromatographic principles. Prerequisites: CHEM 2100, 2101, 3220, 3221. Three lectures and one three-hour laboratory per week. Offered only in spring.

CHEM 4400 (3) Organic Reaction Mechanisms (Formerly CHEM 440). A selective treatment of theoretical and mechanistic aspects of organic chemistry. Course includes an introduction to molecular orbital theory and its application to bonding. Aromatic, pericyclic elimination, and addition reactions are thoroughly treated. Emphasis is on reaction mechanism. Prerequisites: CHEM 2020, 2021, 3220, 3221. Three lectures per week. Offered only in fall.

CHEM 4420 (3) Medicinal Chemistry. Medicinal chemistry is a chemistry-based discipline that uses the fundamental concepts of organic chemistry to solve health-related problems. In addition, it involves aspects of biological, medical, and pharmaceutical sciences. It is concerned with the invention, discovery, design, identification and preparation of biologically active compounds, the study of their metabolism, the interpretation of their mode of action, and the development of structure-activity relationship (SAR). Drug development, production, and approval by the Food and Drug Administration are also covered. Pre-requisites: CHEM 2010 and 2020. Offered in Spring.

CHEM 4500 (3) Cancer Biochemistry and Biology. An in-depth study of the biochemical and biological basis of cancer. Topics include biochemistry/biology of: cellular oncogenes; growth factor receptors; tumor suppressors; angiogenesis; invasion and metastasis; and cancer treatment. Prerequisites: CHEM 3410 or Permission of the instructor. Three hours of lecture per week. Offered only in Spring.

CHEM 4505, 4506 (2, 2) Senior Project I, II (Formerly CHEM 450A, 450B). A special laboratory investigation carried out under the direction of the instructor. Emphasis is on scientific research and report writing. Must be taken in sequence. Students are expected to spend at least ten hours per week on their research project(s). Prerequisites: CHEM 3220, 3221 or 3320, 3321. Prerequisites: CHEM 4910, 4920. CHEM 4505 offered only in fall, 4506 only in spring.

CHEM 4600 (3) Spectroscopic Methods in Chemistry (Formerly CHEM 460). Various spectroscopic methods in chemistry, concentrating on the practical aspect of using spectroscopic techniques to solve structural problems. Techniques include ultraviolet spectroscopy, infrared spectroscopy, nuclear magnetic resonance (NMR) spectroscopy, including Two Dimensional (2-D) NMR in solving problems, and mass spectrometry (MS). Prerequisites: CHEM 2020, 2021, 3220, 3221. Three lectures per week. Offered only in fall.

CHEM 4610, 4620 (3, 3) and 4621 (1) Introduction to Polymer Chemistry I, II and Laboratory (Formerly CHEM 461, 462 and 462L). Organic chemical reactions leading to high polymers, physical properties and physical behavior of polymers, polymer processing, and end uses. Prerequisites: CHEM 2020, 2021, or permission of instructor. Three lectures and one three-hour laboratory per week. CHEM 4610 offered only in fall, 4620 and 4621 only in spring.

CHEM 4700 (3) and 4701 (1) Biochemical Analysis and Laboratory (Formerly CHEM 470 and 470L). Designed to familiarize the student with the principles and practices involved in the analysis of biological and biochemical materials. Topics include separation systems, molecular spectroscopy, radioactivity, ionic strength, and analysis of macromolecules. Laboratory component emphasizes the topics covered in the lectures. Prerequisites: CHEM 2100, 2101, 3320, 3321, 3420, 3421. Three lectures and one three-hour laboratory per week. Offered only in fall.

CHEM 4720 (9) Student Teaching in Chemistry (Formerly CHEM 472S). A semester-long experience of supervised practice teaching appropriately divided between middle and secondary schools. Required of all students seeking certification in teaching Chemistry. Prerequisite: successful completion of all certification courses except EDCI 4705, which is taken concurrently. Offered on demand.

CHEM 4800 (3) Advanced Pharmacology. An in-depth discussion of the principles of pharmacology and how it applies to the evaluation and development of drugs. Topics covered include pharmacokinetics, absorption, metabolism, distribution, transport mechanisms and clinical aspects. Prerequisite: CHEM 3410. Offered only in the Fall.

CHEM 4830 (3) Advanced Physical Chemistry (Formerly CHEM 483). A systematic survey of classical transport processes, kinetic molecular theory, statistical mechanics, and absolute reaction rate theory. Prerequisites: CHEM 3220, 3221. Offered only in spring.

CHEM 4910, 4920 (1, 1) Seminar (Formerly CHEM 491, 492). Required of all senior Chemistry majors. Must be taken in sequence. Prerequisites: CHEM 3220, 3221 or 3320, 3321. CHEM 4910 offered only in fall, 4920 only in the spring.

Department of Family and Consumer Sciences

Chiquita A. Briley, Ph.D., Interim Department Chair
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General Statement: The purpose of the undergraduate program in the Department of Family and Consumer Sciences is to provide both a liberal and specialized education in which the interests and well-being of individuals, family members, and consumers are significant. The program includes study of nutrition, food, health, clothing, textiles, management of resources, design, care and guidance of children, human growth and development throughout the life span, interpersonal relationships, and family relationships, with emphasis on breadth of knowledge and its application to the solution of contemporary human problems.

The unifying focus is on an integrative approach to relationships among individuals, families, and communities and the environments in which they function. The program seeks to (a) empower individuals, (b) strengthen families, and (c) enable communities.

Specifically the mission of the Department of Family and Consumer Sciences is to prepare individuals for leadership roles in professional family and consumer sciences careers who can use an integrated approach to relationship to improve the quality of life for individuals, families, and communities through; (a) education, prevention and development; (b) discovery of new knowledge and extension of this knowledge to an increasingly global community; and (c) service to the community.

The goals of the undergraduate programs in the Department of Family and Consumer Sciences are to prepare individuals for (1) graduate and professional programs, (2) communicating family and consumer sciences concepts in formal and non-formal settings, (3) professional careers as entrepreneurs in business, the international arena, the public and government sectors and other agencies serving children and families, and (4) improved personal development including family life. In addition, the goal is to prepare empowered individuals who (5) can think critically, (6) empower others to live a more satisfying life, and (7) are committed to service.

Student Learning Outcomes

The graduates will:

1. Have specialized knowledge and skills in the concentration/major areas to address work roles in their professional careers in education, government, industry and society;
2. Have the capability to write research reports including identifying implications of research;
3. Analyze and interpret data for implication in work and personal life;
4. Use critical thinking skills to utilize diverse approaches for determining alternative solutions for issues;
5. Communicate information to diverse groups at all levels of expertise;
6. Recognize, respect, and value individual and societal diversity;
7. Reflect on one's own practices, articulate a philosophy and rationale for decisions, and continually self-assess as a basis for program planning and modification and continuing professional development;
8. Establish and maintain positive, collaborative relationships with colleagues, other professionals, and families and work effectively as a member of a professional team;
9. Practices ethical professional practice;
10. Have the knowledge and skills to become advocates for public policy as related to individuals, families and communities;
11. Use technology effectively in their work and family life;
12. Pursue lifelong learning;
13. Have an understanding of their responsibilities to their communities and the global society;
14. Demonstrate understanding of the synergistic, integrative nature of the family and consumer sciences profession with its focus on the interrelationships among individuals, families, consumers, and communities as taught in human systems theory and life course development and students apply this understanding the study of their areas of specialization.

Accreditation

The Department of Family and Consumer Sciences is accredited by the American Association of Family and Consumer Sciences (AAFCS). The Didactic Program in Dietetics (DPD) is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND), Academy of Nutrition and Dietetics (AND), 120 South Riverside Plaza, Suite 2000, Chicago, IL 60606-6995, (312)899-0040, ext. 5400.

Departmental Admission/Retention Requirements

All Family and Consumer Sciences majors must have a "C" or better in all courses in their area of concentration in order to graduate.

Admission/Retention Requirements for the Didactic Program in Dietetics (DPD)

The DPD at TSU provides the necessary coursework to meet the academic requirements of the Accreditation Council for Education in Nutrition and Dietetics (ACEND), Academy of Nutrition and Dietetics.

Admission Requirements: Prospective students must meet admission requirements and must apply for admission to this program. These requirements include:

1. Cumulative GPA = 2.75 or better
2. Achievement of at least junior status at the university (i.e. 60+ hours). These hours must include the courses listed in items 3 and 4.
3. Grade of B or better in the following courses:
NUFS 1110 – Food Preparation and Meal Management
NUFS 2110 – Elementary Nutrition
4. Grade of C or better in each of the following courses:
BIOL 2210 and 2211 – Anatomy and Physiology I/Lab
CHEM 1110 and 1111– General Chemistry I and lab
CHEM 1120 and 1121 – General Chemistry II and lab
5. Completion of application packet, which includes:
 - a. DPD admission application
 - b. Current transcripts from TSU and/or any other relevant Universities or colleges attended
 - c. Completion of interview with dietetics faculty

Upon admission, all students are required to complete the coursework outlined on the curriculum map. When the majority of the coursework has been completed, and the student has maintained a minimum of a 2.75 GPA, the student is eligible to apply for a post-baccalaureate supervised practice experience, i.e. a dietetic internship or ISPP.

Before entering an internship, students must receive a Verification Statement Form from the DPD Director. Criteria to receive the form include:

- Completion of all required courses. Student must have a C or better in courses that are designated as meeting KRD's.
- Minimum 2.75 GPA
- Passage (75% or greater) on the comprehensive DPD examination

Teacher Education Admission and Retention Requirements:

Degree candidates seeking teaching certification in Early Childhood Education and Family and Consumer Sciences Education must meet requirements designed for the Teacher Education Program as below.

Each student who desires to be a candidate for admission to the Teacher Education Program will make application to the Director of Student Services and Teacher Education in the second semester of the sophomore year. The student must have earned a cumulative 2.75 GPA, and acceptable scores on PRAXIS I or the Computer Based Test (CBT).

Further clarification of the Teacher Education Program can be found in the College of Education section of this catalog; "Admission, Retention, and Student Teaching Requirements for the Teacher Education Program." Students are required to complete 9 semester hours of student teaching which includes a dual placement. The Teacher Education Program was changed according to the Reach2Teach Program that was implemented Fall 2013.

Admission/Retention Requirements for Dietetics Concentration Programs in the Department

Students may elect majors or concentrations in the following:

Early Childhood Education (PreK-3 certification)
Family and Consumer Sciences with concentration in one of the following:

- Child Development and Family Relations

- Design
- Fashion Merchandising
- Family and Consumer Sciences Education
- Foods and Nutrition and Dietetics

Upper level students enrolled in any program can elect to complete the courses for the Family Financial Planning Program. The Department offers a Family Financial Planning Program that is designed to prepare professionals in personal financial planning who will have the knowledge and skills necessary to qualify to take Certified Financial Planner Board of Standards, Inc. (CFP Board) exam. Completing the six courses in Family Financial Planning courses at Tennessee State University, receiving a bachelor's degree, passing the CFP exam and gaining the appropriate work experience will lead to the granting of the CFP(r) certification which is a recognized standard of excellence for personal financial planning.

Due to the explosion of a rapidly changing and increasingly complex financial marketplace, families are searching and requesting assistance from financial professionals in managing their income, assets, debts, and much more. Financial service providers have noted this phenomenon and have extended their services to provide comprehensive financial assistance. Financial planners are employed in the marketplace with companies that specialize in retirement, equity trading, insurance, and real estate. In addition, personal financial planners may work as a personal financial counselor in a company or may be self-employed.

Bachelor of Science Degree in Early Childhood Education
With Teacher Certification Pre K-3
Suggested Four Year Program

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	ART 1010	3
ENGL 1010	3	ENGL 1020	3
ECFS 1010	3	MATH 1110	3
GEOG 1010 or 1020	3	FACS 1010	1
BIOL 1010, 1011	4	ASTR 1020,1021	4
	<u>14</u>		<u>14</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ENGL 2010 or 2110-2320	3	MATH 1420	3
HIST 2010/2012	3	HIST 2030	3
ECFS 2010	3	COMM 2200	3
EDCI 2010	3	MUSC 1010	3
POLI 2010	3	ECFS 3320	3
MATH 1410	3		
	<u>18</u>		<u>15</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ENGL 3730	3	EDRD 3500*	3
EDSE 3330	3	ECFS 4600	3
ECFS 3610	3	ECFS 3520	3
NUFS 3330	3	EDCI 3220	3
ECFS 4000	3	ECFS 4630	3
	<u>15</u>		<u>15</u>

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ECFS 4650	3	ECFS 4720	3
EDCI 4600*	3	EDCI 4706	9
EDCI 4500*	3		
EDCI 4550	3		
EDCI 4620	6		
	<u>18</u>		<u>12</u>

*Prerequisite admission to Teacher Education

Bachelor of Science Degree in Family and Consumer Sciences Concentration in Child Development and Family Relations - Suggested Four Year Program

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	ART 1010	3
ENGL 1010	3	ENGL 1020	3
ECFS 1010	3	MATH 1110	3
FACS 1010	1	GEOG 1010 or 1020	3
BIOL 1010,1011, or Gen. Ed. Natural Science	4	BIOL 1020, 1021, or Gen. Ed. Natural Science	4
MUSC 1010	3		
	<u>15</u>		<u>16</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ENGL 2010-2024	3	COMM 2200	3
HIST 2010	3	HIST 2020	3
ECFS 2010	3	EDCI 2010	3
DIGN 2010 or FASH 1120	3	ECFS 3320	3
SOCI 2010	3	ECFS 3020	3
	<u>15</u>		<u>15</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ECFS 3610	3	ENGL 3730	3
EDSE 3330	3	ECFS 3520	3
FERM 3210 or FERM 4330	3	ECFS 3530	3
NUFS 3330	3	ECFS 4630	3
PSYC 3120 or 2180	3	ECFS 4600	3
	<u>15</u>		<u>15</u>

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ECFS 4650	3	ECFS 4660	9
ECFS 4000	3	SOWK 4700	3
Electives(3000-4000 level)	2		
FACS 4500	3		
ECFS 4620	3		
ECFS 4520	3		
	<u>17</u>		<u>12</u>

Bachelor of Science Degree in Family and Consumer Sciences Concentration in Design
Suggested Four Year Program

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	ART 1010	3
ENGL 1010	3	ENGL 1020	3
FASH 1110	3	MATH 1110	3
DIGN 2010	3	CHEM 1020, 1021 or Gen. Ed. Natural Sci.	4
CHEM 1010,1011 or Gen. Ed. Natural Sci.	4		
FACS 1010	1	THTR 1020	3
	<u>15</u>		<u>16</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ENGL 2010-2024	3	FASH 2110 or AREN 4300	3
HIST 2010	3	Social Science Elect.	3
FASH 2030 or AREN 2310	3	HIST 2020	3
DIGN 3000	3	COMM 2200	3
NUFS 2110 or NUFS 2010	3	ECON 2010	3
	<u>15</u>		<u>15</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
FACS 3730	3	DIGN 3010	3
DIGN 3100	3	DIGN 4110	3
FASH 4130, 3220 or THTR 4000, 4020	3	DIGN 4350*	6
		ECFS 4630	3
DIGN 3500 or 3400	3		
DIGN 3230	3		
	<u>15</u>		<u>15</u>

*Summer Only

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
DIGN 4120	3	DIGN 4000	3
DIGN 2200	3	DIGN 4210	3
FACS 4500	3	DIGN 4200	3
Elective	3	Electives (3000 or 4000 level)	6
FERM 4330	3		
	<u>15</u>		<u>15</u>

Bachelor of Science Degree in Family and Consumer Sciences Concentration in Fashion Merchandising Suggested Four Year Program

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	NUFS 2110	3
ENGL 1010	3	ENGL 1020	3
FASH 1110	3	FASH 1120	3
MATH 1110	3	FACS 1010	1
ART 1010	3	Humanities Elective	3
Gen. Ed. Natural Science	4	Gen. Ed. Natural Science	4
	<u>17</u>		<u>17</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ECON 2010	3	FASH 2110	3
DIGN 2010	3	ECON 2020	3
ACCT 2010	3	HIST 2020	3
HIST 2010	3	COMM 2200	3
FASH 2030	3	ENGL 2010-2024	3
	<u>15</u>		<u>15</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
DIGN 3100	3	ECFS 4630	3
DIGN 3000	3	MKTG 3010	3
FASH 3000	3	FERM 4330 or 3210	3
DIGN 3230	3	FASH 4150*	6
FACS 3730	3		
	<u>15</u>		<u>15</u>

*Summer Only

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
FASH 4030	3	Elective (3000-4000 level)	5
MKTG 3200	3	MKTG 4250	3
FASH 4000	3	FASH 4140	3
FACS 4500	3	FASH 4440	3
	<u>12</u>		<u>14</u>

*Summer Only

Bachelor of Science Degree in Family and Consumer Sciences Concentration in Foods and Nutrition - Dietetics Verification -Suggested Four Year Program

FRESHMAN YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
UNIV 1000	1	ENGL 1020	3
ENGL 1010	3	CHEM 1120, 1121	4

MATH 1110	3	Humanities Electives	3
CHEM 1110*, 1111	4	FACS 1010	1
		ECON 2010	3
	<u>11</u>		<u>14</u>

SOPHOMORE YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
ENGL 2010-2018	3	BIOL 2220, 2221, or Electives*	4
BIOL 2210, 2211	4		
COMM 2200	3	CHEM 2010, 2011	4
HIST 2010	3	HIST 2020	3
NUTR 1110	4	NUFS 2110	3
	<u>17</u>		<u>14</u>

JUNIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
CHEM 3410, 3411	4	BIOL 2400, 2401	4
PSYC 2010	3	MGMT 3010	3
NUFS 3120	3	NUFS 3110	3
NUFS 3130	3	NUFS 3350	3
NUSF 3830	3	NUFS 4110	3
	<u>16</u>		<u>16</u>

SENIOR YEAR			
FALL SEMESTER	HR.	SPRING SEMESTER	HR.
FERM 4330	3	FACS 4500	3
NUTR 4520	4	NUFS 4520	3
NUFS 4120	3	NUTR 4540***	4
FACS 3500	2	FACS 4600	3
ELECTIVE	3	ECFS 4630	3
	<u>15</u>		<u>16</u>

*Must have 19 on ACT to take this semester

**Summer

***Required courses for Dietetics Verification

Course Descriptions Design (DIGN)

DIGN 2010 Environmental Design (3). A course in which students develop techniques for becoming aware of design in the near environment. Students learn to solve creative problems, varied materials and techniques in design and color with emphasis on the element and principles of art as applied to the home and individuals. They also examine two and three dimensional forms in design. Lab-lecture. Fall Semester

DIGN 2200 Sustainability Living (3). An overview of lifestyle choices and how they impact our environment. This course introduces the concepts and practices of sustainable living and design. Lectures will cover current technology, products, consumer practices, and design practices that affect our environment as well as how choices made by individuals and organizations can reduce environmental impact. Lecture

DIGN 3000 Fashion Illustration (3). A course in which students learn how to sketch human figures and use fashion illustration as a form of communication. Emphasis on color, proportion, fabric detail, development of individual techniques and development of individual techniques and experimentation with a variety of media. Lab-lecture. Prerequisite: DIGN 2010. Fall Semester: Odd Years

DIGN 3010 Costume/Fashion Design (3). A course in which students learn how to make rendering and layouts and make costume and fashion analysis for the individual and theatre. They learn fashion fundamentals such as application of the fashion tools, fashion makers, responsibilities of designers, creative use of research, inspirational museums and library sources. Studio problems with emphasis on live color and texture for the individual and costumes are emphasized. Lab-lecture. Prerequisite: DIGN 2010, FASH 2030. Spring Semester

DIGN 3100 Interior, Fashion & Textile CAD (3). An introduction to the use of computers in interior, fashion, and textile design. Various computer programs are used for developing interior drawings, fashion designs, and textile design. Fall Semester

DIGN 3230 Space Planning (3). An introductory course in the interior design profession in which students apply the design elements and principles to interior design. Studio problems in designing living spaces for family living. Lab-lecture. Prerequisite: DIGN 2010. Fall Semester

DIGN 3400 Presentation Techniques (3). In this course students will gain knowledge and experience in portfolio development and presentation skills. Emphasis is placed on writing and vocalizing design concepts and the design process, developing presentation drawings, renderings and boards. Prerequisite: DIGN 2010. Fall Semester

DIGN 3500 Studio Design Laboratory (3). A course designed for students who wish to experiment with art studio problems, related art problems, design inspiration and media with guidance of instructor. Prerequisite: DIGN 2010. Fall Semester

DIGN 4000 History of Interiors (3). A course which includes a study of the historical and contemporary interiors, traditional and modern, classic Asian, European and current influences, and contemporary. Spring Semester
Design 4110 Non-residential Design (3). A studio course in which students utilize the design process in the analysis and planning of non-residential interior environments such as healthcare, restaurant, preschool, and retail facilities. The course includes a study of current codes relating to health, safety, and handicapped accessibility in non-residential design. Prerequisite: DIGN 2010 and 3230 or consent of instructor.

DIGN 4120 Furniture Design and Decorative Finishes (3). A course in which students design and execute art crafts using inexpensive materials and tools. The content of the course includes: relationship of design to function, materials, tools and techniques; understanding educational, economic, social, recreational and therapeutic art craft work. Emphasis is placed on making creative objects of original design. Lab-lecture. Fall Semester: Even Years

DIGN 4200 Experimental Textile, Apparel and Design (3). A course which covers creative and technical aspects of designing textiles, apparel, accessories, and home fashions. Original designs with exercises in various media, direct, indirect and accidental methods will be used to stimulate ideas and involve the students in the process of exploring and awakening intellectual and creative potentials. Lab-lecture. Prerequisite: DIGN 2010 or consent of instructor. Spring Semester

DIGN 4210 Interior Architecture (3). A course whose major topics for this course are: problems in designing for living; integration of structural concepts; design in relation to site, house and interior environment; selection and coordination of furniture, fabrics, materials, accessories in interior space laboratory. Lab-lecture. Prerequisites: DIGN 2010 & 3230. Spring Semester

DIGN 4350 Internship/Seminar/Options (6). A course in which students gain experience in established firms, institutions, showrooms, etc. Students are introduced to many practical applications of design theory directed toward various aspects of the fashion, interior, visual and fabric structure and decoration industry as well as specialized teaching. Each option is to be executed under the supervision of the concentration coordinator. Senior standing in curriculum required. Summer Semester.

Early Childhood, Child Development, and Family Relationships (ECFS)

ECFS 1010 Introduction to Early Childhood & Child Development (3). A study of staff roles in a variety of pre-school programs for children in

Middle Tennessee. The first half of the semester will be spent in observation, the second in a practicum as an aide functioning in a variety of roles. Fall Semester

ECFS 2010 Principles and Concepts of Child Development (3). A study of the basic principles and concepts of growth and development which serve as a foundation in understanding children from birth to age 8. Observation and laboratory experiences are required.

ECFS 3020 Middle Childhood and Adolescence (3). A course in which students study human development from later pre-school through adolescence (5-18) years. Prerequisite: ECFS 2010 Spring Semester

ECFS 3320 Expressive Arts for Young Children (3). A course in which students interpret and are involved with (1) art learning activities, (2) self-directed activities, and (3) integrated activities with emphasis on the role of creative play. Prerequisites: ECFS 2010 or ECFS 3510. Spring Semester

ECFS 3520 Observation, Participation and Assessment in Early Childhood Settings (3). Observation and participation in early childhood settings. A course required of students concentrating in Child Development and Family Relationships. This course will address appropriate observation methods and assessment tools for use in early childhood settings. Laboratory experiences required. Prerequisites: ECFS 2010 or ECFS 3510. Spring Semester

ECFS 3530 Infant Clinic (3). A course designed to address the human development process from birth to 2 years of age and the relative influences of the environment on socialization. Emphasis is placed on the various theories and curricula being followed in quality day-care programs for infants. Observation/participation in infant programs required. Prerequisite ECFS 2010.

ECFS 3610 Early Childhood Curriculum I (3). A course in which students design curricula in Early Childhood Education, including learning how to write general goals and behavioral objectives for lesson plans, and discussing forces that affect curriculum. Prerequisites: observation in a variety of early childhood settings, ECFS 2010 or ECFS 3510. Fall Semester

ECFS 4000 Behavior Management and Guidance (3). This course examines positive guidance strategies for children from birth to eight years. Students will explore theoretical foundations related to child development and the implementation of various models to foster self-control, organize the classroom environment and curriculum for pro-social skills, methods for addressing persistent and challenging behaviors. Emphasis will be on behavior management and on guidance strategies for preschool and early elementary children. The course will also explore a wide variety of issues in relation to parenting, child-rearing practices, and child-family relations. Required field experience. Prerequisite ECFS 2010.

ECFS 4520 Early Childhood Administration and Leadership (3). A course designed to familiarize students with the operational procedures of day care programs. Emphasis is placed on providing students with practicum experience relating to administering and supervising personnel, managing budgets, and developing computer programs. Observation/participation in Early Learning Center required. Fall Semester

ECFS 4600 Preschool and Kindergarten Methods and Materials (3). A study of methods, materials and modern trends of teaching in the nursery school and kindergarten. Organization, equipment, and housing in child care centers and public kindergartens are studied based on the developmental levels of children. Observation/participation experiences in early childhood programs required. Prerequisite: ECFS 3320 and ECFS 3610 Spring Semester

ECFS 4620 Current Topics and Issues in Early Childhood Education (3). A course in which students study programs, trends and issues in child development and early education.

ECFS 4630 Family Relationships (3). A study of modern family life, giving special emphasis to the needs and activities of individuals as they relate to the development of the family throughout the life cycle. Spring Semester

ECFS 4650 Parenting/Practical Steps to Childrearing (3). A course in which students outline and examine contemporary problems of childrearing and focus on systematic and scientific methods of parenting. Subject areas to be examined are child abuse, socialization practices among various cultures, myths and misconceptions about effectiveness of punishment, the rights of children, principles of behavioral modification and parents of children with special needs. Fall Semester Prerequisite ECFS 2010.

ECFS 4660 Internship or Fieldwork in Child Development (9). A course in which students are provided an opportunity to student teach in the campus Early Learning Center. Taken with approval of the coordinator of Child Development and Family Relationships.

ECFS 4720 Observation and Student Teaching in Pre-K and K-3 (9). Supervised teaching experiences in both Pre-K and K-3 settings on a full-time basis for a semester. Seminars are integral parts of the student teaching experience. Prerequisite: This course is open only to students who have met the student teaching prerequisites. Spring Semester

Family and Consumer Sciences Education (FACS)

FACS 1010 Family and Consumer Sciences as a Profession (1). A course designed to help students identify their goals and individual needs and explore possible family and consumer sciences career areas. Students gain knowledge of the history and philosophy of family and consumer sciences as well as public policy and issues and trends. One lecture.

FACS 3730 Entrepreneurship in Family and Consumer Sciences (3). A course that focuses on the application of knowledge to teaching entrepreneurship skills in family and consumer sciences programs and/or developing plans to become an entrepreneur using family and consumer sciences skills.

FACS 4500 Senior Project Writing (3). A course in which students develop skills related to techniques of professional writing, literature searching, and abstracting scientific material. Students will incorporate area-special concepts into an original project with an accompanying written component. Senior standing in curriculum required.

FACS 4600 Field Experiences in Food Service or Nutrition (2-6). A supervised work experience in the food service industry or in nutrition programs. Course includes class seminar. Senior standing in curriculum required. Summer Session

Fashion Merchandising (FASH)

FASH 1110 Textiles (3). A consumer-oriented study of textiles, emphasizing fibers, yarns, fabric construction, finishes and socio-economic background of the textiles and apparel industry in relation to end use. Lecture-laboratory. Fall Semester

FASH 1120 Cultural Interpretation of Dress (3). A study of the dynamic nature of the fashion phenomenon within the global society. Theories regarding psychological, social, cultural and economic forces of acquiring new styles will be explored. Learn about fashionable apparel worn in various cultures. Spring Semester

FASH 2030 History of Costume (3). The history of costume from ancient times to the present and the influence of social and economic conditions upon costume are covered in this course. Fall Semester

FASH 2110 Principles of Apparel Construction (3). Students learn the fundamental techniques of sewing various apparels. Students apply these sewing skills in the construction of apparels. Lecture-laboratory. Spring Semester

FASH 3000 Apparel Quality Analysis (3). A study of various techniques of evaluating silhouettes, structural and decorative details of apparel. The degree of excellence displayed in construction will be examined. Prerequisites: FASH 2110 and DIGN 3010. Fall Semester

FASH 3120 Applied Dress Design (3). The students learn the application of elements and principles of design as they relate to clothing. Emphasis is placed upon problem solving and the functional, structural and decorative aspects of apparel design. Prerequisites: FASH 2110 and DIGN 3010. Spring Semester: Even Years

FASH 3210 Tailoring (3). A course in which students learn advanced construction methods. Students construct a tailored garment. Emphasis is also placed on selection and care of garments. Prerequisite: examination in construction skills and/or FASH 2110. Fall Semester: Odd Years

FASH 3220 Flat Pattern Adaptation (3). A study of the principles and techniques of flat pattern design and application of these principles to commercial pattern alteration. The development of original designs is emphasized. Prerequisite: FASH 2110. Spring: Odd Years

FASH 4000 Display Merchandising (3). Presentation of merchandise, coordination elements and principles of design, properties and the art of arranging soft goods through a visual medium. Concepts and tools of selling merchandise in numerous retail settings for increasing sales are covered. Fall Semester

FASH 4030 Clothing Economics (3). A study of the problems in various aspects of buying fashions. Emphasis is on the planning involved in marketing of merchandise and computer applications in retailing. Spring Semester

FASH 4130 Dress Design and Draping (3). A course in dress design with emphasis on originality and draping. Opportunity is given to students to investigate sources of design and to practice various methods of designing. Prerequisite: FASH 2110 & DIGN 2010. One lecture and two laboratory periods. Fall: Even Years

FASH 4140 Fashion Merchandising Seminar (3). A study of the techniques and strategies used to correctly gauge current and future market demands, purchase products from a manufacturer and then convince shoppers to buy the products. Spring Semester

FASH 4150 Internship (6). A temporary period of supervised work experience which provides the student an opportunity to apply theoretical knowledge to a work situation. Internship is designed to give students supervised work experience in an area of fashion merchandising. Prerequisites: (1) junior level or above in Family and

Consumer Sciences, (2) a job in clothing and/or textiles retailing or merchandising, and (3) instructor's written approval. Summer Sessions

FASH 4440 Fashion Promotions and Events (3). Students learn to incorporate numerous elements of selling into a theatrical presentation using live models. Stages of planning fashion promotions by establishing the type of show, site, theme, budget, publicity, advertising and various press materials for producing a fashion show are implemented into an annual presentation. Students produce a major fashion show. Spring Semester

Family Economics and Resource Management (FERM)

FERM 3210 Family Resource Management (3). A course which includes a study of the family as an ecosystem and how that ecosystem is influenced by and influences other larger systems. Attention is given to the problems faced by individuals and families in managing resources. The management process is viewed within an environmental context. Offered online Spring Semester

FERM 3500, Fundamentals of Family Financial Planning (3). This course introduces students to various financial planning topics that face families such as the financial planning process, client/planner interactions, time value of money applications, personal financial statements, cash flow and debt management, asset acquisition, and education planning. Risk management, investment planning, retirement planning, plan integration and ethics are also discussed. This course is one of the six courses designed to prepare students for the Certified Financial Planning Certificate. Permission of instructor required. Offered online only.

FERM 3600, Insurance Planning for Families (3). This course introduces students to risk management and insurance decisions in personal financial planning. Topics include insurance for life, health, disability, property and liability risks, as well as annuities, group insurance, and long term care. This course is one of the six courses designed to prepare students for the Certified Financial Planning Certificate. Permission of instructor required. Offered online only.

FERM 3700, Investment Planning For Families (3). This course provides the student with an understanding of the various types of securities traded in financial markets, investment theory and practice, portfolio construction and management, and investment strategies and tactics to meet a family's investment goals. This course is one of the six courses designed to prepare students for the Certified Financial Planning Certificate. Permission of instructor required. Offered online only.

FERM 4100, Income Tax for Families (3). The course provides an overview of current tax law, income tax principles, taxation terminology. The course focuses on tax planning considerations, computations, and tax planning strategies including tax pitfalls that impact financial planning for families. This course is one of the six courses designed to prepare students for the Certified Financial Planning Certificate. Permission of instructor required. Offered online only.

FERM 4200, Retirement Planning for Families (3). The intent of the retirement planning course is to provide individuals with knowledge of both public and private retirement plans. The public plans include Social Security, Medicare, and Medicaid. The private plans include defined benefit and defined contribution plans and their regulatory provisions. The specifics of the various plans are analyzed as well as non-qualified deferred compensation plans. Finally, issues that individuals face in retirement, such as life-styles choices and medical issues are discussed. This course is one of the six courses designed to prepare students for the Certified Financial Planning Certificate. Permission of instructor required. Offered online only.

FERM 4300, Estate Planning for Families (3). The course focuses on the efficient conservation and transfer of wealth, consistent with the family's goals. It is a study of the legal, tax, financial and non-financial aspects of this process, covering topics such as trusts, wills, probate, advanced directives, charitable giving, wealth transfers and related taxes. This course is one of the six courses designed to prepare students for the Certified Financial Planning Certificate. Permission of instructor required. Offered online only.

FERM 4330 Consumer Education (3). A course which includes a study of consumer activities in the marketplace and the financial world. Emphasis is given to the most important areas in which individuals and families function as consumers. Offered each Fall Semester.

FERM 4800, Family Financial Planning Capstone Class (3). This capstone course is designed for students to demonstrate the skills to develop integrated financial plans for clients and communicate their

planning recommendations to those clients. Select topics included are ethics and professional responsibilities, laws, regulations, client communication, decision making, writing a financial plan, and implementing and monitoring the plan. Students are expected to utilize skills obtained in other courses and work experiences in the completion of a comprehensive personal finance case, other mini-case studies, and calculation templates. Prerequisites: FERM 3500, 3600, 3700, 4100, 4200, and 4300. Offered online only.

Foods and Nutrition (NUFS)

NUFS 1110 Food Principles and Meal Management (4). A study of foods from harvest to service. A consideration of economics, grade standards, sanitation, preparation and nutritional quality is included. The topics include the planning, preparation and service of nutritious attractive meals at various cost levels for different occasions with emphasis on the conservation of time, energy and money. Two lectures and two laboratory periods. Fall Semester. Prerequisite: Family and Consumer Sciences major or consent of instructor.

NUFS 2010 Basic Nutrition Principles (3). A course in which students study nutrition and its relationship to health. Emphasis is placed on functions, sources and deficiency symptoms for the various nutrients. Regulations surrounding food and related products are presented. Nutritional requirements throughout the life cycle are introduced. Fall Semester

NUFS 2110 Elementary Nutrition (3). A general course in nutrition with emphasis on scientific principles, metabolism and requirements for nutrients. Special topics of interest to health care professionals are discussed.

NUFS 3110 Food Science (3). A course which includes a study of the scientific principles of food preparation. Emphasis is placed on deviations from the norm and causes. Lecture and laboratory. Prerequisites: CHEM 1010 and NUFS 1110. Spring Semester, odd years.

NUFS 3120 Nutrition in the Global Community (3). In this course students apply basic nutrition principles to life situations. Course includes the study of current issues in nutrition, community resources, and world nutrition problems. Field experiences. Prerequisite: NUFS 2010 or 2110.

NUFS 3130 Foodservice Equipment and Cost Control (3). A course that assists the student with the tools necessary to plan a foodservice facility and to control the costs in such a facility. Purchase specifications, budgeting, forecasting, fiscal planning and cost analysis are covered in this class. Field experiences. Prerequisite NUFS 1110.

NUFS 3330 Maternal and Child Nutrition (3). A course which includes a study of nutrition as it relates to children from prenatal life through adolescence. Application of knowledge and nutrition education are emphasized. Experiences with Early Learning Center are included. Fall Semester

NUFS 3350 Life Span Nutrition (3). Physiologic and biochemical principles and results of current research are used to build a foundation for exploration of nutrition across the stages of growth and development, maturation and aging. These serve as a basis for consideration of the social, economic, physiologic, and life style factors that influence nutrition status, food choices, and specific life stage concerns. Particular attention is paid to using the principles of nutrition in planning and implementing recommendations for dietary change. The course is designed for undergraduate students in dietetics and health-related programs. Prerequisites: NUFS 2110; BIOL 2210 and 2220. Fall Semester.

NUFS 3830 Nutrition, Assessment, Behavior Change, and Counseling (3). Changing dietary habits is extremely difficult as evidenced by the high rates of obesity and diet-related diseases. This course provides future nutrition professionals nutrition assessment and counseling skills. Emphasis is placed on how behavior change theories, concepts, and models are used to promote diet and health. Prerequisites: NUFS 2110 Fall Semester

NUFS 4110 Advanced Nutrition (3). A study of chemical and physiological factors in digestion, absorption, and metabolism of nutrients. Reports of recent research and their relation to problems of human nutrition are studied. Prerequisite: NUFS 2010 or 2110 and CHEM 1110-1120 Spring Semester NUFS 4120 Quantity Food Procurement and Production (3). A course that includes a study of methods of purchasing and storing foods in quantity, organization of labor, standards of work materials, and meal planning, and

preparation in large quantities. Some experience is gained in the University Cafeteria or other food facilities. Prerequisite: NUFS 1110. Spring Semester

NUFS 4120 Quantity Food Procurement and Production (3). A course that includes a study of methods of purchasing and storing foods in quantity, organization of labor, standards of work, materials and meal planning, and preparation in large quantities. Some experience is gained in the University Cafeteria or other food facilities. Prerequisites: NUFS 1110 and NUFS 3130.

NUFS 4520 Foodservice Systems Management (3). A course that includes a study of institutional food service systems, professional ethics and qualifications for managers, employment procedures, personnel schedules, financial records, and computer applications. Field experience required. Prerequisite: NUFS 4120 or permission of coordinator.

NUFS 4530 Medical Nutrition Therapy (4). A study of the modifications of the normal diet in the treatment of disease, food and drug interactions, and the role of the dietitian in health care. Prerequisites: NUFS 4110, BIOL 2220, CHEM 3410. Field experiences and laboratory required.

NUFS 4540 Medical Nutrition Therapy II (3). A continuous study of the modifications of the normal diet in the treatment of disease, food and drug interactions and the role of the dietitian in health care. Prerequisites: NUFS 4530

NUFS 4620 Special Problems in Foods and Nutrition (3). An individual directed study and investigation involving techniques used in nutrition research and food service management. Prerequisite: permission of coordinator.

The College of Business

Millicent Lownes-Jackson, Ph.D., Professor, Dean
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General Statement

The College of Business at Tennessee State University is strongly grounded with a stellar reputation afforded by accreditation at both the undergraduate and graduate levels by the major international accrediting agency for business schools-AACSB International – The Association to Advance Collegiate Schools of Business. The College is poised to successfully fulfill its mission with new academic programs, new corporate alliances, new international partners, and a newly renovated academic facility on the Avon Williams Campus which includes a state-of-the art financial trading center.

Vision

The College of Business strives to achieve national and international prominence in educating current and future business professionals for the global economy.

Mission

Our mission is to educate current and future business professionals through innovative teaching and research focused on contemporary business concepts for the global economy, complemented with a commitment to service and lifelong learning.

Guiding Principles and Core Values

1. Accountability
2. Continuous Improvement
3. Diversity
4. Ethical Conduct
5. Excellence
6. Global Perspective
7. Mutual Respect
8. Scholarship