

000046



Curriculum and Course Change System - General Education

Checklist**Major Name:** Packaging Science**Specific General Education Requirements**

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			..	X
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment:

Academic and professional ethics are incorporated throughout our curriculum. Students receive an introduction to both in PKGSC 101 (Packaging Orientation), the academic component is emphasized in each of the courses the student takes. The students' understanding of professional ethics grows as he or she moves to more advanced courses. The first lab course, PKGSC 202 (Pkg. Matls. & Manuf.), provides the opportunity to discuss plagiarism, introduce proper scientific citation practices and focus on the value of academic honesty. As the students move from individual efforts in the sophomore courses to collaborative teamwork in the junior and senior courses, they struggle first hand with the ethical issues inherent in team work—ensuring universal participation, resisting the temptation to use prior classes' work and deciding when to seek the instructor's assistance with a recalcitrant teammate. During their co-op assignment, students observe professionals at work in industry and begin to develop and refine their own set of professional ethics, following (or in some cases not following) the models they observe in industry. Some are thrown into serious ethical situations, e.g. observing or experiencing sexual or minority harassment. In PKGSC 368, Packaging and Society, ethical judgment is addressed in several different ways. First, a group of lectures on ethics is designed around typical situations students might face upon entering the profession and how they would handle the situations based on corporate policy and their own conscience. The material is presented in a case-study format and allows for group discussion. Secondly, the course requires

a topic to be selected based on a controversial topic that could become a law or regulation. The students are asked to research the topic from the point of view of trade organizations and regulatory agencies then base their opinion on their research. The assignment culminates in a mock public hearing where the audience (class) is allowed to debate the opinions expressed. This assignment gives the students an opportunity to view a topic from several "sides", make an informed opinion and present it in an organized manner where upon their opinion may be swayed or defended by class input. Lastly, the ethical need for laws and regulations are also discussed as part of the background for each regulation discussed. PKGSC 416 (Appl. Polymers in Pkg.) focuses on patents and issues related to professional honesty, violations and the importance of accurate, honest research records. PKGSC 440 (Distribution) exposes students to real world situations in the distribution environment, where the decisions made by the packaging engineer can impact the safety and health of others. In addition to the intensive team experience in our capstone course PKGSC 420 (Pkg, Design & Develop.) , a series of lectures focus on workplace issues such as honesty in marketing and marketing decision-making, safety and quality programs and administration and financial analysis and reporting. The portfolio experience will provide a needed opportunity for the student to reflect on four years of learning and exposure to ethical issues and the development of his own set of values. Packaging Science majors will complete and submit their Packaging Science ePortfolios as part of PKGSC 403 - Packaging Career Preparation, taken in the last semester of their senior year. The faculty will review these ePortfolio artifacts and their relation to the specific learning outcomes for critical thinking in an effort to determine future packaging science curriculum modifications and improvements.

Communication Integration Plan - Address competencies, implementation, and

assessment: The Packaging Science core curriculum requires a significant writing component in most of its courses. These have been selected and organized to teach and give the student practice in most of the technical writing formats he or she will encounter in his or her future career. In addition, students are required to develop skills in non-technical writing, particularly in developing their ePortfolios and their studies of ethical issues. The advanced writing cluster includes all of the 300 and 400 level courses in the core curriculum as follows: PKGSC 368 (Packaging and Society) – persuasive writing – research paper on a specific packaging regulation issue; PKGSC 401 (Packaging Machinery) – creative project paper – documentation of a packaging line design project; PKGSC 416 (Applications of Polymers in Packaging) – formal lab report – 8 team-written formal lab reports as used in plastics packaging; PKGSC 416 – analytical paper – formal documentation of a semester-long project to understand, analyze and defend a U.S. patent in plastics packaging; PKGSC 430 (Converting) – memorandum lab report – 10 team-written lab reports in the style used in a packaging converting manufacturing environment; PKGSC 440 – (Distribution) – formal research paper – formal research paper on a packaging distribution topic; PKGSC 440 – test plan – 2 test plans for distribution testing; PKGSC 440 – executive summary – justification of a distribution design to management; PKGSC 454 (Mechanical Properties of Packages lab) – formal lab reports – 8 individually written lab reports as used in the transport packaging industry; PKGSC 454 – informal lab reports – 3 informal lab reports; PKGSC 464 (Food Packaging) – formal lab report – 7 formal lab reports (one semester long project) as used in the food packaging industry; PKGSC 464 – field trip report – formal write-up of a plant visit; PKGSC 464 – analyzing and summarizing literature – 3 papers analyzing or summarizing reading assignments in food packaging; PKGSC 403 (Career Preparation) – resume, biography, business letters, financial plan, project/grant proposal, poster writing and design, career ePortfolio; PKGSC 420 (Package Design and Development) – formal report with executive summary – team-written report (~50 or more pages) on a semester long packaging system design project, including charts, pictures, designs, specifications, cost analysis; PKGSC 420 – professional poster

Students will be prepared for this intensive writing program starting in PKGSC 103 (ePortfolio) where they will learn and practice ePortfolio development, and develop skills in web site analysis, interviewing, creation, editing and insertion of charts, pictures and videos into documents and presentations, and practice non-technical writing through ten weekly assignments. Their preparation will continue in PKGSC 203 (Packaging Research Fundamentals) where they will be introduced to packaging research philosophy and methods, the literature of

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packaging, use of databases and on-line research, fundamentals of technical writing and the basic formats of technical documents used in the packaging industry. All of the above writing will be critiqued and assessed by the individual instructors. In addition, representative technical writing from all of the above courses, as well as courses outside Packaging Science will be assessed and critiqued in PKGSC 403 and assembled for the GenEd ePortfolio.

Packaging Science majors will complete and submit their Packaging Science ePortfolios as part of PKGSC 403 - Packaging Career Preparation, taken in the last semester of their senior year. The faculty will utilize the artifacts submitted in the ePortfolios to assess learning outcomes in communications. Faculty will use this artifact evaluation to direct future course and curriculum revisions for the Packaging Science curriculum."

Critical Thinking Integration Plan - Address competencies, implementation, and assessment:

The Teaching Goals of the Packaging Science Department state that we will "provide graduates with a combination of skills to pursue careers in designing, manufacturing, and utilization of packages by promoting innovative thinking and problem solving." Students are introduced to the important role of innovation in the packaging discipline in the freshman year. PKGSC 202 Packaging Materials and PKGSC 204 Container Systems use reasoning skills through the term project assigned for both classes. In PKGSC 202, students are asked to analyze an existing package and determine the need, function, identity, cost and manufacturing methods of the materials used to make the package. The students must perform the research by contacting industry sources in addition to web sites and published literature. Their research culminates in a written and oral report where they demonstrate that they have become the "expert" on their particular package. The project requires curiosity, ability to analyze a package through lab testing, asking questions and finding out how to get the answers. In PKGSC 204, the same project is carried further by redesigning the existing package. This project focuses more on how the package would be made and requires a great deal of creativity with regard to material selection and design (shape and graphics). Problem solving is also addressed in the PKGSC 206 Container Systems Lab where students are given experiments with variables which they must perform and analyze in a laboratory report. Students receive real world experience in problem solving and critical thinking during their required co-op experience. Students are often given their own project assignment to work on throughout the co-op under the supervision of an experienced professional. In PKGSC 401 (Packaging Machinery) students solve machinery power problems related to the maximization of packaging machine line speeds. In addition PKGSC 401 students design a packaging machinery line for a selected product and package. In PKGSC 440 (Packaging Distribution) students are given basic information on the product and distribution environment and required to determine the appropriate packaging materials based on these design parameters. In PKGSC 404 (Mech. Prop. Of Packages) students use basic principles of physics and mechanics to determine the behavior of individual and assemblies of packages using model systems Design of the model systems and extrapolation to real packaging systems challenges their critical thinking and analysis skills. In PKGSC 416 (Appl. Polymers in Pkg.), each of the seven laboratory exercises requires students to work in teams to explain the observed results in molecular terms. Most of these labs provide the students large bodies of data to incorporate in their analyses. Our capstone course, PKGSC 420 (Pkg. Design & Develop.) requires the students to work in teams to solve real-world design problems posed by industry. The stages of the projects from idea generation and evaluation to package design, construction and testing, through cost analysis require the students to bring together and use critically knowledge and problem solving skills from all the required courses in the undergraduate curriculum. Packaging Science majors will complete and submit their Packaging Science ePortfolios as part of PKGSC 403 - Packaging Career Preparation, taken in the last semester of their senior year. The faculty will utilize the artifacts submitted in the ePortfolios to assess critical thinking learning outcomes, as well as competencies specific to the discipline. The faculty will use the results of assessment to drive course and curriculum revision for the Packaging Science curriculum."

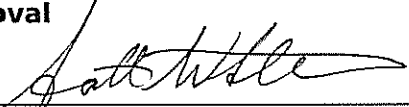

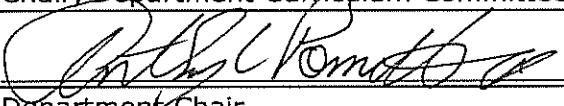
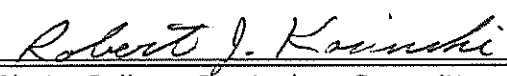

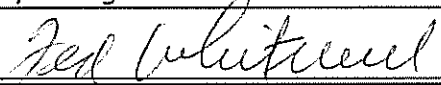

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Form Originator: , **Date Form Created:** 1/31/2011

Form Last Updated by: WWHTSD, William Whiteside **Date Form Last Updated:** 2/11/2011

Form Number: 3736

Approval

	2/11/11	 3/4/20
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum
	2/11/11	
Department Chair	Date	Chair, Graduate Curriculum Corr
	2/14/11	 5/18/11
Chair, College Curriculum Committee	Date	Provost
	2/14/11	 5/19/11
College Dean	Date	President

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Curriculum and Course Change System - General Education Checklist

Major Name: Agricultural Mechanization & Business

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			X AGM 472 or AGM 419	..
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Ethical judgment is integrated throughout the Agricultural Mechanization & Business curriculum. All students must take either AGM 472 or AGM 419. AGM 472 and 419 will be the primary courses where ethics competency is evaluated. In AGM 101, which is the freshman introductory course, the students are introduced to professionalism, ethical conduct and academic integrity. Case studies and role playing will be used to allow the students to develop their professional value system and to understand why ethics are important. AGM 472 and 419 serve as the capstone courses. In both AGM 472 and 419, students will prepare reports and presentations that will include ethics in the subject matter and also in the preparations of these reports and presentations. Case studies at an advanced level will be used to assess the student's comprehension of ethical judgment and professional responsibility.

There will be a 4-point rubric. Our goal is to have 75% of our graduates achieve scores of good or excellent on their capstone artifacts. If results do not meet this standard, the faculty will meet to consider revision of our curriculum.

Communication Integration Plan - Address competencies, implementation, and assessment: Agricultural Mechanization & Business is a broad-based curriculum with particular knowledge in applications of engineering technology and related business skills. The concept of a digital portfolio will be introduced in AGM 101 and finalized in AGM 472 and 419. All students must take either AGM 472 or AGM 419. Both written and oral communications are practiced in most courses in the form of reports or technical presentations. Several types of written correspondences such as letter, memo, and formal reports are covered in AGM 472 and AGM 419. Assessment of written and oral communication competencies will take place in the AGM capstone classes, AGM 472 and 419.

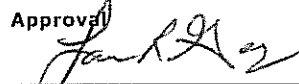
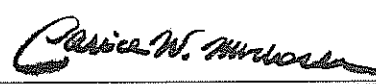
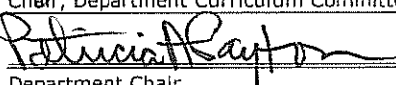
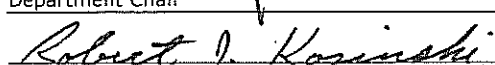

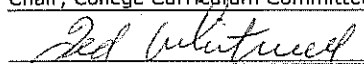

There will be a 4-point rubric. Our goal is to have 75% of our graduates achieve scores of good or excellent on their capstone artifacts. If results do not meet this standard, the faculty will meet to consider revision of our curriculum.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment: The Agricultural Mechanization & Business curriculum has problem solving and critical thinking as a foundation in the curriculum. With most areas of technology, there is seldom one correct answer. Many variables must be considered in each situation. A sample assignment used for the development of students' critical thinking competencies is the final project for AGM 206, which involves the sizing of machinery systems versus the timeliness of operations and associated costs. All students must take either AGM 472 or AGM 419. AGM 472 and 419 serve as the capstone courses to allow the student to demonstrate the knowledge learned in the curriculum. Assessment of critical thinking will be performed through the students' oral and written technical presentations conducted for their project in AGM 472 or 419.

There will be a 4-point rubric. Our goal is to have 75% of our graduates achieve scores of good or excellent on their capstone artifacts. If results do not meet this standard, the faculty will meet to consider revision of our curriculum.

Form Originator: KIRK2, Kendall Kirk Date Form Created: 10/11/2011

Form Last Updated by: KIRK2, Kendall Kirk Date Form Last Updated: 10/25/2011 Form Number: 4492

Approval 	10/26/11		12/2/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	10/26/11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	11/11/11		12/20/11
Chair, College Curriculum Committee	Date	Provost	Date
	11/11/11		12/2/11
College Dean	Date	President	Date



Curriculum and Course Change System - Print Major Form

000094

Change Major Name: Enr (Conservation Biology)

Degree: BS

Effective Catalog Year: 2012

.. Change Major Name to:

.. Change Degree to: (CHE approval required)

X Change Curriculum Requirements

(Submit or upload Curriculum map in catalog format. CHE approval required for > 18 hours of changes)

.. Change General Education Requirements

(Must also submit a General Education Checklist)

.. Add, Change or Delete Concentration(s)

(Submit or upload Curriculum map in catalog format. CHE approval required)

.. Add, Change or Delete Emphasis Area(s)

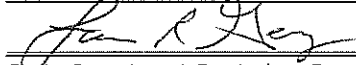
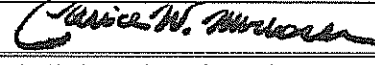
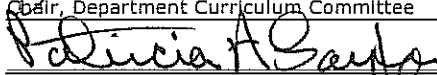
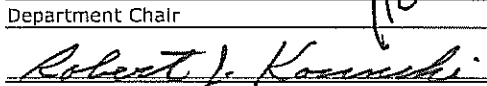

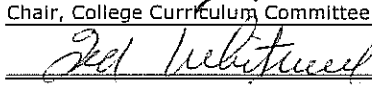
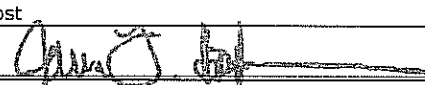
Explanation: In the past, students had to take AP EC 257; we are adding ECON 211 as an alternative option

Form Originator: ALANJ, Alan Johnson Date Form Created: 10/12/2011

Form Last Updated by: , Date Form Last Updated: 11/11/2011

Form Number: 4503

Approval

	11-11-11		12/2/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	11-11-11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	11/11/11		12/29/11
Chair, College Curriculum Committee	Date	Provost	Date
	11/11/11		12/21/11
College Dean	Date	President	Date

PROPOSED Environmental and Natural Resources
Bachelor of Science
CONSERVATION BIOLOGY CONCENTRATION

FRESHMAN YEAR

First Semester

3 ~ BIOL 103 General Biology I
1 ~ BIOL 105 General Biology Lab. I
4 ~ CH 101 (Chemistry requirement)
3 ~ MTHSC 102 Intro. to Mathematical Analysis
1 ~ ENR 101 Intro. to Environment & Nat. Res.
3 ~ Oral Communication Requirement¹

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Second Semester

3 ~ BIOL 104 General Biology II
1 ~ BIOL 106 General Biology Lab. II
4 ~ CH 102 (Chemistry requirement)
3 ~ EX ST 301 Introductory Statistics
3 ~ ENGL 103 Composition I
1 ~ FNR 102 FNR Freshman Portfolio

15

SOPHOMORE YEAR

3 ~ AP EC 257 Nat. Resources, Environment & Economics
or ECON 211 Principles of Microeconomics
4 ~ BIOSC 320 Field Botany and
1 ~ Elective OR
2 ~ FOR 205 Dendrology and
3 ~ FOR 221 Forest Biology
4 ~ FNR 204 Soil Information Systems or
~ CSENV 202 Soils
3 ~ CH 223 Organic Chemistry

15

3 ~ GEN 300 Fundamental Genetics
3 ~ WFB 313 Conservation Biology
3 ~ Physical Environment Requirement²
3 ~ Taxonomy/Habitat Requirement³
3 ~ Arts and Humanities (Literature) Requirement

15

JUNIOR YEAR

3 ~ BIOSC 335 Evolutionary Biology
3 ~ Arts and Humanities (non-literature) Requirement¹
3 ~ Ecology Requirement⁴
3 ~ Natural Resource Economics Requirement⁶
3 ~ Taxonomy/Habitat Requirement³

15

3 ~ ENGL 314 Technical Writing
3 ~ ENR 302 Natural Resources Measurements
3 ~ Ecology Requirement⁴
3 ~ Physiology Requirement⁵
3 ~ Taxonomy/Habitat Requirement³

15

SENIOR YEAR

3 ~ Social Science Requirement¹
3 ~ FOR 434 GIS for Landscape Planning
3 ~ Conservation Policy/Law Requirement⁷
3 ~ Internship, Creative Inquiry or Directed Research⁸
3 ~ Taxonomy/Habitat Requirement³

15

3 ~ ENR 413 Restoration Ecology
3 ~ ENR 450 Conservation Issues
1 ~ FOR 498 Senior Portfolio or
1 ~ WFB 498 Senior Portfolio
6 ~ Taxonomy/Habitat Requirement³
2 ~ Elective

15

TOTAL SEMESTER HOURS

¹ See General Education Requirements. Three of these credits must also satisfy the Cross-Cultural Awareness Requirement. (Note: Social Science Requirement must be in an area other than economics or applied economics)

² GEOG 106, GEOL 101, or PHYS 240

³ AG M 301, BIOSC 302/306, 303/307, 304/308, 305/309, 320, 406/407, 410/411, 417, 442, 464, 468, 472, 477, 486, CSENV 404, ENT (BIOSC) 301, (BIOSC, W F B) 469, FOR 251, 406, GEOL 112, 114, 210, 403, MICRO 403, WFB 300, 418, 440, 462 or 476. At least four of the courses must be laboratories or courses with a required laboratory component.

⁴ BIOSC 441, 442, 443, 446, 470, or FNR 466

⁵ AVS 301, BIOSC 401/402, 458, 475, or (AVS) 480

⁶ AP EC 433, 475, C R D (AP EC) 357, or FOR 304

⁷ E N R 429, FOR 400, 416 or W F B 430

⁸ Internship (FNR 490), Creative Inquiry (FNR 470), Directed Research (WFB 463) or FNR 491 Senior Honors Thesis



Curriculum and Course Change System - General Education Checklist

000044

Major Name: Agricultural Education

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			..	X
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Ethical judgment is networked through the Agricultural Education Curriculum. The main reason for this is because the curriculum is in part a teacher certification curriculum. We must instill ethical judgment into our students until it becomes a part of their culture. Every Agricultural Education course syllabus has the University's ethical judgment statement clearly stated.

Each student in the following classes will also receive ethical judgment education that will culminate with artifacts collected and graded in AG ED 401 and 406.

AG ED 100 - Orientation and Field Experience allows students to explore the secondary classroom settings in a selected school. Our students are exposed to students with IEP's, those on free and reduced lunch programs, and IGP.

AG ED 102 - Agricultural Education Freshman Seminar. The students learn about different professional organizations and who can belong and the benefits and obligations associated with membership.

AG ED 200 - Agricultural Applications of Microcomputers teaches students how to use technology in the classroom to benefit classroom teaching. It also addresses ethical behavior regarding use of the internet.

AG ED 201 - Introduction to Agricultural Education. This course allows the student to gain knowledge of the Agricultural Education Organization - "Classroom, FFA, SAE, CDE, and Adult Education". This course explores the values of what agricultural education can offer students who chose to participate.

AG ED 401 - Methods of Teaching and AG ED 406, Directed Teaching introduces the students to Individualized Educational Plans (IEP), classroom management, student evaluation and the fair and ethical treatment of ALL students. One of the primary goals of our program is to have each Agricultural Education graduate to leave Clemson with the ability to base life decisions on fair, unbiased, and ethical judgments. This is evaluated in the student's mini-lesson presentation (401) and actual lessons taught (406) by an evaluation rubric.

If assessment results are inadequate, we will revise our curriculum to meet requested assessments.

Communication Integration Plan - Address competencies, implementation, and assessment: Implemented through AG ED 200, AG ED 201, AG ED 425, AG ED 401, and AG ED 406 or 407. All Agricultural Education faculty are developing their courses to use Blackboard (Bb), that will culminate with artifacts collected and graded in AG ED 401 and 406.

Educational technology (ET) and the delivery systems associate with technology will be forever changing. We will teach our students the skills needed to use and adapt to the changing world of educational technology. The foundation course for our Information Technology Integration Plan (ITIP) will be AG ED 200. In this course, the students will gain knowledge and apply knowledge gained through their work with PowerPoint, Professional Presentations, E-portfolio's, and web pages.

*AG ED 201 will require students to use and expand their knowledge in ET, through presentations and lessons, group work and service learning projects which focuses on middle and high school students.

*AG ED 303 will introduce the students to the systems approach of Agricultural Mechanization Technologies. The students will gain and apply knowledge learned on engine, electrical, materials, construction and metal technologies. They will develop the needed skills to teach the technology system approach.

*AG ED 425 - Teaching Agricultural Mechanics. Students will use knowledge gained through other agricultural mechanics courses to develop teaching projects for secondary education. They will be required to use the most updated technologies to develop these projects.

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*AG ED 401 - Instructional Methods in Agricultural Education. Students will incorporate knowledge gained in ET into the lesson presentation and teaching assignments. Students will continue work on e-portfolios and web pages. Students will be evaluated on their mini-teaching lesson through a rubric.

*AG ED 406 - Directed Teaching or AG ED 407, Internship. The student will use knowledge gained in their lesson presentation and teaching methods. The students will be required to use all ET technologies that are offered at their cooperating sites. The students will be assessed on their final seminars and e-portfolios: artifacts will be required such as their e-portfolio and final presentation and will be scored using a rubric.

*(Each of these courses will intergrate instruction that will enhance the students communication abilities through their projects, presentations/demonstrations and assigned work.)

If assessment results are inadequate, we will revise our curriculum to meet requested assessments.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment: Implemented through AG ED 204, AG ED 355, AG ED 401, AG ED 406, and AG ED 407.

Agricultural Education students are required to not only use reasoning, critical thinking and problem solving skills, but they must also be able to develop lesson plan and teach these skills to secondary education students. They will demonstrate their level of knowledge in these areas through the use of educational taxonomy of these domains. Therefore our curriculum must focus on these areas throughout their course of study. The students, who enter into the teaching profession, will be evaluated on their ability to not only teach but also to have their students gain an understanding in these areas. Our critical thinking plan will culminate during AG ED 406 and AG ED 407.

AG ED 204 - Applied Agriculture Calculation will involve reasoning, critical thinking, and problem solving based on technical situations and will use applied mathematical constructs in an agriculture context to require students to solve equations and make decisions based on their calculations.

AG ED 355 - Team & Organization Leadership will present students with the opportunity to develop leadership skills needed to work with organization and teams. This course will engage the students to work with groups to develop a solution to a social issue which will involve critical thinking and problem solving.

AG ED 401 - Instruction Methods in Agricultural Education involves the students developing and teaching lesson plans that require their intended audience to become engaged in critical thinking, problem solving and reasoning skills.

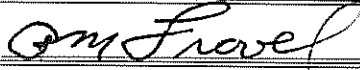
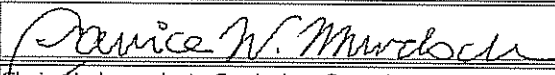
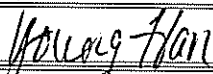



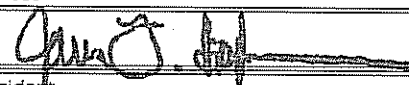
AG ED 406 or 407 will require students to demonstrate their ability to teach these skills in a "real life setting." These students will be evaluated according to a rubric used to evaluate their progress at three stages during their student teaching experience.

If assessment results are inadequate, we will revise our curriculum to meet requested assessments.

Form Originator: CSWFFRD, Charlotte Swafford **Date Form Created:** 2/7/2011

Form Last Updated by: , **Date Form Last Updated:** 2/10/2011 **Form Number:** 3759

Approval

	10Feb11		3/4/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	2-16-11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	2/10/11		5/18/11
Chair, College Curriculum Committee	Date	Provost	Date
	2/10/11		5/19/11
College Dean	Date	President	Date



Curriculum and Course Change System - General Education Checklist

000039

Major Name: BS in Microbiology (Biomedicine Concentration)

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			..	X
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment:

Scientific ethics (honesty in the recording and presentation of data, admitting experimental deficiencies that might have influenced the data, proper credit given to prior investigators) and more general academic ethics (like avoidance of plagiarism) are taught throughout our curriculum. At the beginning of our curriculum, a module on ethics is taught in MICRO 101 by a faculty member from Philosophy and Religion, who prepares a set of questions to evaluate student understanding. In addition, students in both MICRO 101 and BIOL 111 write an essay on a biological issue with an ethical component. This essay will be evaluated by an ethics rubric published in the course syllabus. Academic honesty issues are also discussed in MICRO 101. Ethical issues are discussed in several advanced classes. In Cell Biology Lab (BIOSC 462) and in the proposed consolidated microbiology labs, both of which will be taken by all of our majors, ethical issues related to the conduct of science (authorship, plagiarism, falsification of data and publication restrictions) are discussed. Student mastery of these issues is evaluated at the beginning and the end of the semester by English faculty using a series of essays graded with a consistent rubric, and the course will be revised if deficiencies are found. Students in our capstone course (Senior Seminar, MICRO 493) prepare an essay on an ethical issue related to biology. The essay will be evaluated according to an ethics rubric published in the course syllabus. If more than 25% of the MICRO 493 students fail to achieve an evaluation of "Excellent" or "Good" on the ethics evaluation in the capstone course, the faculty will strengthen the ethics instruction throughout the curriculum so that standards are met.

Communication Integration Plan - Address competencies, implementation, and assessment:

Clear communication is the basis of scientific discourse. One of the four Biological Sciences departmental competencies is "Students will prepare research reports, presentations, and other work products that adhere to professional standards of format and presentation." To meet this departmental priority, students in our curricula get instruction in scientific writing in BIOL 110/111, and also take Scientific Writing and Communication (ENGL 315), a course that we asked English to develop for Biological Sciences. We are also developing a special speech course with Communication Studies (currently under COMM 250) for scientific oral communication. Scientific writing is also an essential element of most laboratory courses taken by our majors. In both Cell Biology Lab (BIOSC 462) and the proposed consolidated microbiology lab course, students will create posters that will be evaluated by a team, including Biological Sciences and English faculty, using a consistent rubric. Students are asked to prepare an essay in our senior capstone course (MICRO 493). This essay will be evaluated according to a scientific communication rubric that will be published in the course syllabus. If 75% of the essays in

MICRO 493 do not meet the rubric's standards for "Excellent" or "Good" performance, we will consult with the faculty in ENGL 315 and COMM 250 courses and restructure communications instruction in our own courses.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment:

Two other departmental priorities of Biological Sciences are that the artifacts produced by MICRO students should "contain defensible claims that are based on analyzed data or the literature, " and should "critically analyze the limitations of data or the literature." Before any instruction in scientific thought occurs, students in BIOL 110 will be given the nationally-normed Critical Thinking Assessment Test (known as "CAT") as a pretest. Students are then introduced to scientific critical thinking in MICRO 101 and BIOL 110/111. Students get similar instruction in scientifically rigorous critical thinking in our intermediate level courses such as General Microbiology (MICRO 305). In Cell Biology laboratory (BIOSC 462), critical thinking and hypothesis formation will be taught and then evaluated by the CAT, now given as a posttest. Such testing is also planned for an advanced consolidated microbiology lab. Therefore, almost all our students will take both a CAT pretest and a posttest. If there is inadequate improvement in the scores by the time students get to the advanced labs, instruction is revised. Finally, in our senior capstone courses (MICRO 493), students discuss advanced topics in their field, and scientifically rigorous thinking is continually reinforced. Students will write an essay that will be evaluated by a critical thinking rubric published in the course syllabus. If more than 25% of the MICRO 493 students fail to achieve either "Good" or "Excellent" scores on the rubric used to evaluate critical thinking, instruction in this area going back to the freshman year will be reconsidered.

000050

Form Originator: RJKSN, Robert Kosinski **Date Form Created:** 1/26/2011

Form Last Updated by: RJKSN, Robert Kosinski **Date Form Last Updated:** 2/9/2011 **Form Number:** 3726

Approval

<i>Robert J. Kosinski</i>	2/9/11	<i>Janice W. Muroch</i>	3/4/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
<i>[Signature]</i>	2/9/11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
<i>Robert J. Kosinski</i>	2/10/11	<i>Louis R. Helms</i>	5/18/11
Chair, College Curriculum Committee	Date	Provost	Date
<i>Del Whitcup</i>	2/10/11	<i>James T. [Signature]</i>	5/19/11
College Dean	Date	President	Date


Curriculum and Course Change System - General Education Checklist
Major Name: BS in Microbiology

Specific General Education Requirements

000037

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			..	X
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment:

Scientific ethics (honesty in the recording and presentation of data, admitting experimental deficiencies that might have influenced the data, proper credit given to prior investigators) and more general academic ethics (like avoidance of plagiarism) are taught throughout our curriculum. At the beginning of our curriculum, a module on ethics is taught in MICRO 101 by a faculty member from Philosophy and Religion, who prepares a set of questions to evaluate student understanding. In addition, students in both MICRO 101 and BIOL 111 write an essay on a biological issue with an ethical component. This essay will be evaluated by an ethics rubric published in the course syllabus. Academic honesty issues are also discussed in MICRO 101. Ethical issues are discussed in several advanced classes. In the proposed consolidated microbiology labs, ethical issues related to the conduct of science (authorship, plagiarism, falsification of data and publication restrictions) are discussed. Student mastery of these issues is evaluated at the beginning and the end of the semester by English faculty using a series of essays graded with a consistent rubric, and the course will be revised if deficiencies are found. Students in our capstone course (Senior Seminar, MICRO 493) prepare an essay on an ethical issue related to biology. The essay will be evaluated according to an ethics rubric published in the course syllabus. If more than 25% of the MICRO 493 students fail to achieve an evaluation of "Excellent" or "Good" on the ethics evaluation in the capstone course, the faculty will strengthen the ethics instruction throughout the curriculum so that standards are met.

Communication Integration Plan - Address competencies, implementation, and assessment:

Clear communication is the basis of scientific discourse. One of the four Biological Sciences departmental competencies is "Students will prepare research reports, presentations, and other work products that adhere to professional standards of format and presentation." To meet this departmental priority, students in our curricula get instruction in scientific writing in BIOL 110/111, and also take Scientific Writing and Communication (ENGL 315), a course that we asked English to develop for Biological Sciences. We are also developing a special speech course with Communication Studies (currently under COMM 250) for scientific oral communication. Scientific writing is also an essential element of most laboratory courses taken by our majors. In the proposed consolidated microbiology lab course, students will create posters that will be evaluated by a team, including Biological Sciences and English faculty, using a consistent rubric. Students are asked to prepare an essay in our senior capstone course (MICRO 493). This essay will be evaluated according to a scientific communication rubric that will be published in the course syllabus. If 75% of the essays in MICRO 493 do not meet the rubric's standards for "Excellent" or "Good" performance, we will consult with the faculty in ENGL 315

and COMM 250 courses and restructure communications instruction in our own courses.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment:

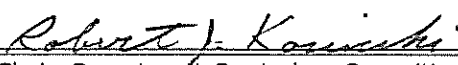
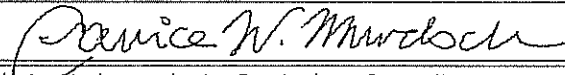
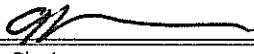
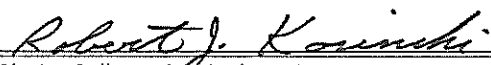



Two other departmental priorities of Biological Sciences are that the artifacts produced by MICRO students should "contain defensible claims that are based on analyzed data or the literature," and should "critically analyze the limitations of data or the literature." Before any instruction in scientific thought occurs, students in BIOL 110 will be given the nationally-normed Critical Thinking Assessment Test (known as "CAT") as a pretest. Students are then introduced to scientific critical thinking in MICRO 101 and BIOL 110/111. Students get similar instruction in scientifically rigorous critical thinking in our intermediate level courses such as General Microbiology (MICRO 305). In the proposed Microbiology combination lab course, critical thinking and hypothesis formation will be taught and then evaluated by the CAT, now given as a posttest. Therefore, almost all our students will take both a CAT pretest and a posttest. If there is inadequate improvement in the scores by the time students get to the advanced labs, instruction is revised. Finally, in our senior capstone courses (MICRO 493), students discuss advanced topics in their field, and scientifically rigorous thinking is continually reinforced. Students will write an essay that will be evaluated by a critical thinking rubric published in the course syllabus. If more than 25% of the MICRO 493 students fail to achieve either "Good" or "Excellent" scores on the rubric used to evaluate critical thinking, instruction in this area going back to the freshman year will be reconsidered.

000038

Form Originator: RJKSN, Robert Kosinski **Date Form Created:** 1/26/2011

Form Last Updated by: RJKSN, Robert Kosinski **Date Form Last Updated:** 2/9/2011 **Form Number:** 3724

Approval

	2/9/11		3/4/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	2/9/11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	2/10/11		5/18/11
Chair, College Curriculum Committee	Date	Provost	Date
	2/10/11		5/19/11
College Dean	Date	President	Date



Curriculum and Course Change System - General Education Checklist

000035

Major Name: BA in Biological Sciences

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			..	X
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment:

Scientific ethics (honesty in the recording and presentation of data, admitting experimental deficiencies that might have influenced the data, proper credit given to prior Investigators) and more general academic ethics (like avoidance of plagiarism) are taught throughout our curriculum. At the beginning of our curriculum, a module on ethics is taught in BIOSC 101 by a faculty member from Philosophy and Religion, who prepares a set of questions to evaluate student understanding. In addition, students in both BIOSC 101 and BIOL 111 write an essay on a biological issue with an ethical component. This essay will be evaluated by an ethics rubric published in the course syllabus. Academic honesty issues are also discussed in BIOSC 101. Ethical issues are discussed in several advanced classes. In Cell Biology Lab (BIOSC 462), ethical issues related to the conduct of science (authorship, plagiarism, falsification of data and publication restrictions) are discussed. Student mastery of these issues is evaluated at the beginning and the end of the semester by English faculty using a series of essays graded with a consistent rubric, and the course will be revised if deficiencies are found. Students in our capstone course (Senior Seminar, BIOSC 493) prepare an essay on an ethical issue related to biology. The essay will be evaluated according to an ethics rubric published in the course syllabus. If more than 25% of the BIOSC 493 students fail to achieve an evaluation of "Excellent" or "Good" on the ethics evaluation in the capstone course, the faculty will strengthen the ethics instruction throughout the curriculum so that standards are met.

Communication Integration Plan - Address competencies, implementation, and assessment:

Clear communication is the basis of scientific discourse. One of the four Biological Sciences departmental competencies is "Students will prepare research reports, presentations, and other work products that adhere to professional standards of format and presentation." To meet this departmental priority, students in our curricula get instruction in scientific writing in BIOL 110/111, and also take Scientific Writing and Communication (ENGL 315), a course that we asked English to develop for Biological Sciences. We are also developing a special speech course with Communication Studies (currently under COMM 250) for scientific oral communication. Scientific writing is also an essential element of most laboratory courses taken by our majors. In Cell Biology Laboratory (BIOSC 462), students will create posters that will be evaluated by a team, including Biological Sciences and English faculty, using a consistent communication rubric. Students are asked to prepare an essay in our senior capstone course (BIOSC 493). This essay will be evaluated according to a scientific communication rubric that will be published in the course syllabus. If 75% of the essays in BIOSC 493 do not meet the rubric's standards for "Excellent" or "Good" performance, we will consult with the faculty in ENGL 315

and COMM 250 courses and restructure communications instruction in our own courses.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment:

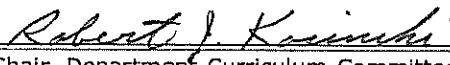
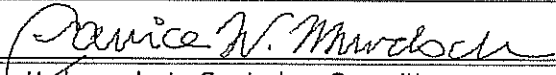
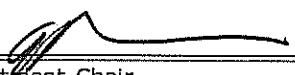
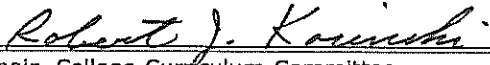
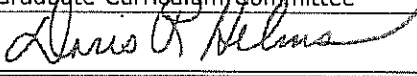


Two other departmental priorities of Biological Sciences are that the artifacts produced by BIOSC students should "contain defensible claims that are based on analyzed data or the literature," and should "critically analyze the limitations of data or the literature." Before any instruction in scientific thought occurs, students in BIOL 110 will be given the nationally-normed Critical Thinking Assessment Test (known as "CAT") as a pretest. Students are then introduced to scientific critical thinking in BIOSC 101 and BIOL 110/111. Students get similar instruction in scientifically rigorous critical thinking in our intermediate level courses such as General Microbiology (MICRO 305) and Evolutionary Biology (BIOSC 335). In Cell Biology lab, critical thinking and hypothesis formation will be taught and then evaluated by the CAT, now given as a posttest. Therefore, almost all our students will take both a CAT pretest and a posttest. If there is inadequate improvement in the scores by the time students get to the advanced labs, instruction is revised. Finally, in our senior capstone course (BIOSC 493), students discuss advanced topics in their field, and scientifically rigorous thinking is continually reinforced. As mentioned above, students will write an essay that will be evaluated by a critical thinking rubric published in the course syllabus. If more than 25% of the BIOSC 493 students fail to achieve either "Good" or "Excellent" scores on the rubric used to evaluate critical thinking, instruction in this area going back to the freshman year will be reconsidered.

000036

Form Originator: RJKSN, Robert Kosinski **Date Form Created:** 1/26/2011

Form Last Updated by: RJKSN, Robert Kosinski **Date Form Last Updated:** 2/9/2011 **Form Number:** 3723

Approval

	2/9/11		3/4/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	2/9/11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	2/10/11		5/18/11
Chair, College Curriculum Committee	Date	Provost	Date
	2/10/11		5/19/11
College Dean	Date	President	Date



CLEMSON

UNIVERSITY

Curriculum and Course Change System - General Education Checklist

Major Name: Genetics

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
English Composition		Specify restrictions - e.g. PHIL courses only		
Oral Communication*	ENGL 103	X
Academic & Professional Development			..	X
Mathematics	X
Natural Science with Lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Both academic and professional ethics are distributed throughout our program. The academic component is strong throughout, and the professional component gets more emphasis as the students advance. In the introductory GEN 103 Careers in Biochemistry and Genetics, the students spend a class period discussing typical ethical problems that occur in genetics and the next week must complete a portfolio document exploring an ethical issue. In BIOL 110/111 Principles of Biology I and II students work in collaborative laboratory groups, and get a strong orientation to the definition of plagiarism and the value of academic honesty. GEN 302 Molecular and General Genetics continues this emphasis on academic honesty, and students also examine the ethical implication of issues such as determining a patient's predisposition to disease, privacy rights, sex selection, eugenics, and cloning. In GEN 410 Fundamentals of Genetics I and GEN 411 Fundamentals of Genetics I Laboratory, the students discuss materials and data ownership such as the use of Materials Transfer Agreements (MTAs) and research safety protocols (IBC protocols), human subjects and human genetic data sharing rules (IRB requirements), ethical and research protocols for genetically modified crops using specific examples, and the ethical use of statistical evidence in genetics for probability theories applied in courtrooms, gene therapies, and drug efficacy trials. Additionally, technical concerns such as experimental design and the importance of fostering open and honest communication with others in the laboratory and research community through sharing accurate and updated experimental

documentation are also discussed. In GEN 493 Senior Seminar students begin to practice ethics in the professional arena by presenting two published research articles and writing a summary of each of those published papers while following all the scientific conventions on attribution. In this course, we include extensive discussions on plagiarism, authorship, and scientific professional ethics in the context of laboratory research and published research articles.

Our first assessment of this competency takes place in GEN 103 through completion of a portfolio document exploring an ethical issue. The second main assessment occurs in GEN 493. The rubric used for grading PowerPoint presentations and written summaries includes sections related to proper attribution of ideas, figures, etc in the PowerPoint presentations and proper citation and avoidance of plagiarism in the written summaries. Students are given feedback on these assignments and are allowed to submit revisions to correct such errors and to further ingrain the importance of these professional ethics. The course contents and the ethical judgment part of the curriculum will be reviewed regularly and revised accordingly based on the outcomes of these assessments.

Communication Integration Plan - Address competencies, implementation, and assessment: Students take ENGL 103 Accelerated Composition and either COMM 150 Introduction to Human Communication or 250 Public Speaking during their freshman year.

Competencies in both oral and written communication are further developed in most of the upper-level laboratory courses. In BIOCH 302 Molecular Biochemistry Laboratory, CH 228 Organic Chemistry Laboratory, GEN 411 Fundamentals of Genetics I Laboratory, and GEN 421 Fundamentals of Genetics II Laboratory, students participate in group discussions and write lab reports. In GEN 410 Fundamentals of Genetics I, students participate in group discussions and a semester project. Communication is particularly stressed in GEN 493 Senior Seminar. In this course, students are required to give two oral presentations and two written summaries based on published research articles. Students are instructed on scientific writing and oral presentations, including creation of effective PowerPoint presentations.

Our assessment of this competency takes place in BIOCH 302, GEN 411, and GEN 421 through grading of written lab reports using a rubric detailing aspects of proper scientific writing and presentation of scientific data. In GEN 493, the presentations are graded with respect to the general knowledge/presentation of the article, effective use of slides, proper attribution, and overall poise/speaking skills. Written summaries are graded with respect to flow (introduction, results, discussion), proper attribution, and sentence/paragraph construction and proofreading. The course contents and the communication part of the curriculum will be reviewed regularly and revised accordingly based on the outcomes of these assessments.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment: Reasoning, critical thinking, and problem solving are at the core of the scientific enterprise and are primary areas of emphasis throughout our curriculum. Students are introduced to general critical thinking in GEN 103 Careers in Biochemistry and Genetics, in which they must evaluate ethical problems and societal issues that occur in genetics. However, the rest of our courses stress technical reasoning. For example, students in BIOL 110/111 Principles of Biology I and II must answer approximately 1,500 "study guide" questions, a third of which involve these skills. Given an explanation of a phenomenon, typically they must interpret experimental data, predict the results of a novel experiment, graph relationships, etc. These skills are expanded in GEN 302 Molecular and General Genetics, in which students spend about a third of the semester solving complex mating problems using the laws of probability. Then, as they explore molecular mechanisms, they must solve problems in chemistry, mathematics, physics, and biochemistry. In BIOCH 301 Molecular Biochemistry, students must draw conclusions from experimental results, especially unexpected results. All exams in BIOCH 301 contain problems of this type. Every laboratory in BIOCH 302 Molecular and General Genetics Laboratory involves reasoning and problem solving. GEN 410 Fundamentals of Genetics I, 411 Fundamentals of Genetics I Laboratory, 420 Fundamentals of Genetics II, and 421 Fundamentals of Genetics II Laboratory continue this emphasis on problem solving and also the emphasis on bringing together knowledge from the student's entire mathematics and science background. GEN 440 Bioinformatics familiarizes students with nucleic acid and protein databases and the bioinformatics tools available for utilization of these large data sets, and requires group and individual projects that pose relevant questions to be answered through querying the databases and computational analysis of the output. Finally, in GEN 493 Senior Seminar students use their genetics knowledge to comprehend data, evaluate its reliability and relevance, and synthesize it into a unified presentation, based either on a published research article or on their own original two-semester genetics project. GEN 493 presentations are given before the class and

the faculty instructor. The faculty member meets with the student after each presentation to provide feedback on the positive and negative aspects of the presentation and areas for improvement.
 Assessment of this competency occurs in several courses. In GEN 411 and 421, lab reports are graded on a rubric that includes assessment of the student's analysis and presentation of the data collected. In GEN 493, presentations are graded for this competency with respect to the student's overall understanding of the article presented, how the student detailed the most critical results from the article, and the student's integration of the article into an overall larger discussion of the relevance of the research and future avenues. The course contents and the critical thinking part of the curriculum will be reviewed regularly and revised accordingly based on these assessments.

Form Originator: HLIANG, Haiying Liang **Date Form Created:** 1/28/2011

Form Last Updated by: HLIANG, Haiying Liang **Date Form Last Updated:** 2/8/2011 **Form Number:** 3728

Approval

Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
<i>[Signature]</i>	2/9/2011	<i>[Signature]</i>	3/4/2011
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
<i>[Signature]</i>	2/10/11	<i>[Signature]</i>	5/18/11
Chair, College Curriculum Committee	Date	Provost	Date
<i>[Signature]</i>	2/10/11	<i>[Signature]</i>	5/19/11
College Dean	Date	President	Date
		<i>[Signature]</i>	

CLEMSON

UNIVERSITY

Curriculum and Course Change System - General Education Checklist

Major Name: Biochemistry

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
English Composition		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate ENGL 103	
Oral Communication*	X
Academic & Professional Development			..	X
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Both academic and professional ethics are distributed throughout our program. The academic component is strong throughout, and the professional component gets more emphasis as the students advance. In the introductory BIOCH 103 Careers in Biochemistry and Genetics course, the students spend a class period discussing typical ethical problems that occur in biochemistry and the next week must complete a portfolio document exploring an ethical issue. In BIOL 110/111 Principles of Biology I and II students work in collaborative laboratory groups, and get a strong orientation to the definition of plagiarism and the value of academic honesty. In BIOCH 301 Molecular Biochemistry and BIOCH 431 Physical Approach to Biochemistry, this emphasis on academic honesty continues, and students examine some professional ethical problems from the history of the science, such as the role of Rosalind Franklin in the discovery of the structure of DNA. In BIOCH 432 Biochemistry of Metabolism and BIOCH 436 Molecular Biology, the students discuss the ethics of using the powerful tools they are learning in medicine, agriculture, and related areas. PHIL 326 Philosophy and Values allows students to discuss the ethical and social obligations of scientists and the role of values (including social and political values) in science. In BIOCH 493 Senior Seminar students begin to practice ethics in the professional arena by presenting two published research articles and writing a summary of each of those published papers while following all the scientific conventions on attribution. In this course, we include extensive discussions on plagiarism, authorship, and scientific professional

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ethics in the context of laboratory research and published research articles.

Our first assessment of this competency takes place in BIOCH 103 through completion of a portfolio document exploring an ethical issue. The second main assessment occurs in BIOCH 493. The rubric used for grading PowerPoint presentations and written summaries includes sections related to proper attribution of ideas, figures, etc in the PowerPoint presentations and proper citation and avoidance of plagiarism in the written summaries. Students are given feedback on these assignments and are allowed to submit revisions to correct such errors and to further ingrain the importance of these professional ethics. The course contents and the ethical judgment part of the curriculum will be reviewed regularly and revised accordingly based on the outcomes of these assessments.

Communication Integration Plan - Address competencies, implementation, and assessment: Students take ENGL 103 Accelerated Composition and either COMM 150 Introduction to Human Communication or 250 Public Speaking during their freshman year.

Competencies in both oral and written communication are further developed in most of the upper-level laboratory courses. In GEN 303 Molecular and General Genetics Laboratory, CH 228 Organic Chemistry Lab, BIOCH 433 General Biochemistry Laboratory I, and BIOCH 434 General Biochemistry Laboratory II, students participate in group discussions and write lab reports. Communication is particularly stressed in BIOCH 493 Senior Seminar. In this course, students are required to do two oral presentations and submit two written summaries based on published research articles. Students are instructed on scientific writing and oral presentations, including creation of effective PowerPoint presentations.

Our assessment of this competency takes place in GEN 303, BIOCH 433, and BIOCH 434 through grading of written lab reports using a rubric detailing aspects of proper scientific writing and presentation of scientific data. In BIOCH 493, the presentations are graded with respect to the general knowledge/presentation of the article, effective use of slides, proper attribution, and overall poise/speaking skills. Written summaries are graded with respect to flow (introduction, results, and discussion), proper attribution, and sentence/paragraph construction and proofreading. The course contents and the communication part of the curriculum will be reviewed regularly and revised accordingly based on the outcomes of these assessments.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment: Reasoning, critical thinking, and problem solving are at the core of the scientific enterprise and are primary areas of emphasis throughout our curriculum. Students are introduced to general critical thinking in BIOCH 103 Careers in Biochemistry and Genetics, in which they must evaluate ethical problems and societal issues that occur in biochemistry. However, the rest of our courses stress technical reasoning. For example, students in BIOL 110/111 Principles of Biology I and II must answer approximately 1,500 "study guide" questions, a third of which involve these skills. Given an explanation of a phenomenon, typically they must interpret experimental data, predict the results of a novel experiment, graph relationships, etc. These skills are expanded in BIOCH 301 Molecular Biochemistry, in which students must draw conclusions from experimental results, especially unexpected results. All exams in BIOCH 301 contain problems of this type. In GEN 302 Molecular and General Genetics, students spend about a third of the semester solving complex mating problems using the laws of probability. Then, as they explore molecular mechanisms, they must solve problems in chemistry, mathematics, physics, and biochemistry. BIOCH 431 Physical Approach to Biochemistry questions students constantly in an effort to improve their analytical skill, and requires a large project in which they must analyze several experiments in order to produce a restriction map. Students in BIOCH 432 Biochemistry of Metabolism and 436 Molecular Biology study classic experiments and discuss how previous investigators sorted through competing hypotheses, collected data, analyzed it, and devised even more powerful, predictive hypotheses. The students then practice by solving problems taken from medicine, agriculture, and related areas. GEN 440 Bioinformatics familiarizes students with nucleic acid and protein databases and the bioinformatics tools available for utilization of these large data sets, and requires group and individual projects that pose relevant questions to be answered through querying the databases and computational analysis of the output. Finally, in BIOCH 493 Senior Seminar students use their biochemistry knowledge to critically analyze data from published research articles and synthesize it into a unified presentation that includes background information on the research area and results from other articles. BIOCH 493 presentations are given before the class and the faculty instructor. The faculty member meets with the student after each presentation to provide feedback on the positive and negative aspects of the presentation and areas for improvement.

Assessment of this competency occurs in several courses. In BIOCH 433 and 434, lab reports are graded on a rubric that includes
 Assessment of the student's analysis and presentation of the data collected. In BIOCH 493, presentations are graded for this competency
 With respect to the student's overall understanding of the article presented, how the student detailed the most critical results from the
 article, and the student's integration of the article into an overall larger discussion of the relevance of the research and future avenues.
 The course contents and the critical thinking part of the curriculum will be reviewed regularly and revised accordingly based on these
 assessments.

Form Originator: HLIANG, Haiying Liang **Date Form Created:** 1/28/2011
Form Last Updated by: HLIANG, Haiying Liang **Date Form Last Updated:** 2/8/2011 **Form Number:** 3729

Approval

Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
<i>[Signature]</i>	2/9/11	<i>[Signature]</i>	3/9/2011
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
<i>[Signature]</i>	2/9/11	<i>[Signature]</i>	5/18/11
Chair, College Curriculum Committee	Date	Provost	Date
<i>[Signature]</i>	3/10/11	<i>[Signature]</i>	5/19/11
College Dean	Date	President	Date
		<i>[Signature]</i>	



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Curriculum and Course Change System - General Education Checklist

Major Name: Food Science

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			X FD SC 102, NUTR 418 Dietetics; FD SC 102, NUTR 419 Nutrition; FD SC 102, FD SC 417 Food Sci & Tech	..
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X FD SC 214	..

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox: The department faculty within the food science and technology concentration and the nutrition and dietetic concentration within the food science program decides the most appropriate ways to integrate learning experiences in each of the ethical judgment, communication, and critical thinking areas. These integration plans are distributed throughout the curricula.

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Different aspects of ethics are taught in different courses with ethics competencies assessed by a reflection paper in FD SC 418 and NUTR 425 and graded by a published rubric. Specific content areas related to ethical judgment including: current issues in food science, food laws and regulations, professionalism skills, quality assurance, pathogenic and spoilage microorganisms in foods, beneficial microorganisms in food systems, influence of the food system on the growth and survival of microorganisms, control of microorganisms, packaging materials and methods, cleaning and sanitation, as well as water and waste management. Learning objectives are referenced in the FD SC 101, FD SC 102, MICRO 407, FD SC 404, FD SC 214, FD SC 430, FD SC 306, and all sections of FD SC 450 Creative Inquiry courses.

Additional competencies apply to the Nutrition and Dietetic Concentration: The American Dietetic Association and the Commission on Dietetic Registration have a code of ethics which is specifically taught in the FD SC 418 and NUTR 425 courses that students take in their senior year. In addition, ethical principles are integrated into required courses on food service, medical nutrition therapy, and community nutrition. Case studies presenting ethical issues are used in food service and community nutrition. These courses enhance ethical judgment capacity within two specific competency areas: the integration of scientific information and research into practice and in beliefs, values, attitudes and behaviors for the professional dietitian level of practice.

It is anticipated that the students behave in an ethical manner and apply these principles within targeted dietetic skills areas including: FD SC 214 (organic foods); FD SC 306 (ADA accommodations); NUTR 425 (end of life and professional responsibility); NUTR 426 (obesity, food access); FD SC 404 (fair trade). These specific dietetic and nutrition artifacts are assessed through reflections papers with rubric for grading written reflections.

In general, the objectives for the student ethical judgment graded artifact plan are assessed via programmatic rubrics (reflections, case study, group project reports, and lab reports). If the results are inadequate, the curriculum will be revised.

Communication Integration Plan - Address competencies, implementation, and assessment: Objectives for communication skills (oral and written communications, listening, interviewing etc.) practice is an integral part of all aspects of the fields addressed by the Food Science program throughout the curriculum. By completion of Food Science program, the student should demonstrate the use of oral and written communication skills as different aspects are incorporated throughout the curriculum as reflected in the file of artifacts of assessment grades described here. This includes such skills as writing technical reports, letters and memos; communicating technical information to a nontechnical audience; and making formal and informal presentations. Students are introduced to development of professional presentations in FD SC 102, 214, and 215 and this information is reinforced in NUTR 426 as well as FD SC 407, and team work in the creation and formal written report/business plans are produced in the FD SC 306, 307, and FD SC 410 courses. Competencies are assessed as noted for oral presentations, written assignments and lab reports and graded by published rubrics. Application of evidence-based analysis to understand current dietary recommendations as an individual and/or team project is included in NUTR 451; creating a short news story on a current "hot topic" in Food Science and Nutrition with a team presentation in FD SC 214; in FD SC 410 student teams develop a new food product using steps (conduct a focus group; develops sensory ballots; conduct and evaluate sensory panel; modify product; perform a market analysis and submit product with an executive report to a national food ingredient company competition; in FD SC 418 students execute an independent search of the published literature to determine engineering parameters. If the results of the graded assessments described above are inadequate the result will be revision of the curriculum.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment: Throughout the curriculum, students are involved in critical thinking/problem solving skills practice and development. Specifically, the program highlights critical thinking/problem solving skills (i.e. creativity, common sense, resourcefulness, scientific reasoning, and analytical thinking). The courses that reinforce this skill set include: FD SC 306, FD SC 430, NUTR 451, and FD SC 404. As a summative assessment all sections of FD SC

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450 Creative Inquiry grade critical thinking with the published rubric. If results of the graded assessment is inadequate the curriculum will be revised. These activities focus on preparing students in being able to define of a problem, identify potential causes and possible solutions, and make thoughtful recommendations. Throughout the program experiences, students apply skills to new situations, hone organizational skills, as well as practice the handling of multiple tasks and pressures. In addition within the program a number of science laboratory courses and classes with extensive out of class teamwork, students also take EXST 301 which is based upon problem solving. In FD SC 102, students will be able to identify an appropriate hypothesis and variables for a scientific study and propose a newly designed follow-up study. All of their 300 and 400 level FDSC and NUTR classes test their ability to reason and think critically and to solve the types of problems they will be expected to address in their careers, for example, in FD SC 409, students are taught problem solving and the creative thought process.

Form Originator: MCONDRA, Margaret Condrasky **Date Form Created:** 1/18/2011
Form Last Updated by: MCONDRA, Margaret Condrasky **Date Form Last Updated:** 2/7/2011 **Form Number:** 3704

Approval

<i>Margaret Condrasky</i>	2/7/11	<i>Pravica W. Muroloch</i>	3/4/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
<i>Orlando Penubaz</i>	2/8/11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
<i>Robert J. Kocinski</i>	2/10/11	<i>David R. Nelson</i>	5/18/11
Chair, College Curriculum Committee	Date	Provost	Date
<i>Paul Whitman</i>	2/10/11	<i>James O. Holt</i>	5/19/11
College Dean	Date	President	Date

003017


Curriculum and Course Change System - General Education Checklist
Major Name: Wildlife and Fisheries Biology

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			X ENR 101, FNR 102	..
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. In Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Consideration of ethical issues is integrated throughout the curriculum, including many of the upper division WFB classes, particularly those that satisfy the 6 required credits in Policy and Law courses. In the freshman year, assessment will focus on ENR 101 (Introduction to Environmental and Natural Resources), which is required of all students. Later assessment will focus on selected Policy and Law courses: ENR 429 (Environmental Law and Policy), ENR 450 (Conservation Issues), or WFB 430 (Wildlife Conservation Policy).

ENR 101 introduces the student to ethics in the University setting. Using material from the Rutledge Center on Ethics and other sources, students will receive instruction on issues of academic integrity, including cheating and plagiarism. FNR 102 introduces students to standards of professional ethics, as reflected in the Wildlife Society's code of ethics. This code states:

- a wildlife biologist's prime responsibility is to the public interest, the wildlife resource and the environment
- don't perform professional services for anybody whose sole or primary intent is to damage the wildlife resource
- don't agree to perform tasks for which you aren't qualified
- don't reveal confidential information about your employer's business
- wildlife biologists shall at all times uphold the dignity and integrity of the wildlife profession. They shall endeavor to avoid even the suspicion of dishonesty, fraud, deceit, misrepresentation, or unprofessional demeanor.

In ENR 101 students will be given homework or an in-class assessment related to the ethical topics covered in class. In ENR 429, ENR 450 and WFB 430, students will be evaluated (by essay questions or term papers) for their understanding of standards of professional ethics. In all cases, assessments will be scored according to a standard 4-point rubric. Assessment results will be reviewed by WFB faculty, and if fewer than 75% score as "Excellent" or "Good", revisions will be made to improve the ethics components of the curriculum.

Communication Integration Plan - Address competencies, implementation, and assessment: Clear communication ability is crucial in the science and management of wildlife and fisheries resources. Students are required to take courses to improve their oral and written communication skills, and opportunities to express those skills are woven throughout the curriculum. Specifically, students must take a class meeting the University Oral Communication requirement (such as COMM 150 Introduction to Human Communication, or COMM 250 Public Speaking), and they must take ENGL 103 (Accelerated Composition) and ENGL 314 (Technical Writing). Assessment of oral communication proficiency will take place in FNR 499 (Natural Resources Seminar), where students are required to make an oral presentation using PowerPoint. Assessment of written proficiency will take place selected courses which fulfill the Policy and Law requirement for the major: ENR 429 (Environmental Law and Policy), ENR 450 (Conservation Issues), or WFB 430 (Wildlife Conservation Policy). Writing assignments from these classes will be assessed for clarity and effectiveness of communication. Both oral and written assessments will be scored using a standard 4-point rubric, and the results will be reviewed by WFB faculty. If fewer than 75% attain a score of "Excellent" or "Good", curriculum changes will be made as needed to strengthen the communication components.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment: We rely on basic general education requirements to provide a foundation of oral and written communication skills, basic science and math knowledge, and an introduction to the social sciences and humanities. Within our curriculum, there is a building process whereby students are taught the fundamentals of wildlife and fisheries biology (ecology, taxonomy, etc.) and the basics of how to manage them (both theory and practice). We rely heavily on outdoor lab experiences to give students experience with everyday wildlife or fisheries management problems. By the time students are juniors, they are proficient in the basics of measurement and identification, and begin integrating their knowledge base into problem-solving activities.

WFB majors must take EXST 301 (Introductory Statistics), which is based upon problem-solving, as well as a number of science courses, which emphasize critical thinking in classroom and laboratory settings. All 400-level WFB courses test their ability to reason and think critically to solve problems in wildlife and fisheries management.

Assessment will focus selected classes that fulfill the major's Policy and Law requirement: ENR 429 (Environmental Law and Policy), ENR 450 (Conservation Issues) or WFB 430 (Wildlife Conservation Policy). Students will prepare term papers which demonstrate technical writing skills and ability to think critically by evaluating opposing viewpoints on current natural resources issues. Topics might include regulatory decisions under the Endangered Species Act, natural and prescribed fire in habitat management, regulation of game species of fish and wildlife, impacts of invasive species, or dimensions of human-wildlife conflict. Critical thinking demonstrated in these term papers

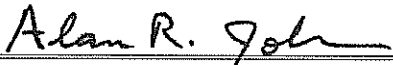
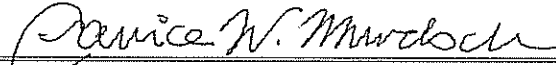
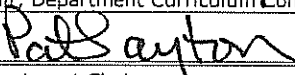
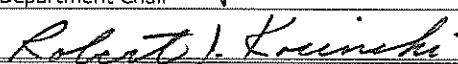
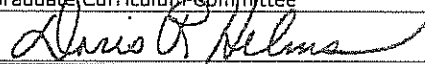


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will be scored using a standard 4-point rubric. The assessment results will be reviewed by WFB faculty, and if fewer than 75% attain an "Excellent" or "Good" score, curriculum changes will be made as needed to enhance the critical thinking and problem solving components.

Form Originator: ALANJ, Alan Johnson Date Form Created: 3/8/2011

Form Last Updated by: , Date Form Last Updated: 3/9/2011 Form Number: 3919

Approval

	3/9/11		4/1/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	3/10/11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	3/10/11		5/18/11
Chair, College Curriculum Committee	Date	Provost	Date
	3/10/11		5/19/11
College Dean	Date	President	Date

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Curriculum and Course Change System - General Education Checklist

Major Name: Environmental and Natural Resources

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			X ENR 101, FNR 102	..
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Consideration of ethical issues is integrated throughout the curriculum, including many of the upper division ENR and other classes taken by our majors. Assessment will focus on ENR 101 (Introduction to Environmental and Natural Resources), FNR 102 (Freshman Portfolio) and ENR 450 (Conservation Issues).

ENR 101 introduces the student to ethics in the University setting. Using material from the Rutledge Center on Ethics and other sources, students will receive instruction on issues of academic integrity, including cheating and plagiarism. FNR 102 introduces students to standards of professional ethics, as reflected in various professional codes of ethics.

Quantitative assessment will be done in ENR 101 and ENR 450. In ENR 101 students will be given homework or an in-class assessment related to the ethical topics covered in class. In ENR 450 students will be given a writing assignment that deals with an ethical issue. In both ENR 101 and ENR 450, these assessments will be scored according to a standard four-point rubric, and if fewer than 75% of the students receive a "Good" or "Excellent" score, the ENR faculty will meet to determine what revisions are needed to improve the ethics components of the curriculum.

Communication Integration Plan - Address competencies, implementation, and assessment: Clear communication ability is crucial in environmental science, conservation biology and natural resource management. Students are required to take courses to improve their oral and written communication skills, and opportunities to express those skills are woven throughout the curriculum. Specifically, students must take a class meeting the University Oral Communication requirement (such as COMM 150 Introduction to Human Communication, or COMM 250 Public Speaking), and they must take ENGL 103 (Accelerated Composition). Students in the Conservation Biology concentration or the Natural Resource Management concentration must take ENGL 314 (Technical Writing). Assessment of communication proficiency will take place in ENR 450 (Conservation Issues). This is a capstone course required by all concentrations. ENR 450 students are required to produce one or more term papers exploring a topic of relevance to environmental and natural resource management. These papers will be assessed for clarity and effectiveness of communication using a standard four-point rubric. If fewer than 75% of students score "Good" or "Excellent", the ENR faculty will meet to determine what curriculum changes are needed to strengthen the communication components.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment: We rely on basic general education requirements to provide a foundation of oral and written communication skills, basic science and math knowledge, and an introduction to the social sciences and humanities. Within our curriculum, there is a building process whereby students are taught the fundamentals of environmental science (ecology, taxonomy, etc.) and the basics of how to manage natural resources (both theory and practice). We rely on outdoor lab experiences to give students experience with everyday management problems. By the time students are juniors, they are proficient in the basics, and begin integrating their knowledge base into problem-solving activities.

Assessment of critical thinking will take place in ENR 450 (Conservation Issues), which is a capstone course required by all concentrations. ENR 450 students are required to produce one or more term papers exploring a topic of relevance to environmental and natural resource management. These papers will be assessed, using a standard four-point rubric, for critical reasoning applied to analysis of a conservation or natural resource management issue. If fewer than 75% of students score "Good" or "Excellent", the ENR faculty will meet to determine what curriculum changes are needed to strengthen the critical thinking components.

Form Originator: ALANJ, Alan Johnson **Date Form Created:** 3/8/2011

Form Last Updated by: RJKSN, Robert Koslinski **Date Form Last Updated:** 3/8/2011 **Form Number:** 3921

Approval

	3/9/11		4/1/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	3-10-11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date

<i>Robert J. Kowinski</i>	<i>3/20/11</i>	<i>Ann R. Helms</i>	<i>5/18/11</i>
Chair, College Curriculum Committee	Date	Provost	Date
<i>Dee Whitwell</i>	<i>3/10/11</i>	<i>Ann R. Helms</i>	<i>5/19/11</i>
College Dean	Date	President	Date

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Curriculum and Course Change System - General Education Checklist

Major Name: Forest Resource Management

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			X ENR 101, FNR 102	..
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Clemson's Forest Resource Management degree is accredited by the Society of American Foresters (SAF). As such, it is required to provide an ethical foundation for the practice of forestry. Specifically, the SAF Accreditation Standards require:

*Competencies must be documented as an

1. Understanding of forest policy and the process by which it is developed.
2. Understanding of how federal, state, and local laws and regulations govern the practice of forestry.
3. Understanding of professional ethics, including the SAF Code, and recognition of the responsibility to adhere to ethical standards in forestry decision-making on behalf of clients and the public.
4. Ability to understand the integration of technical, financial, human resources, and legal aspects of public and private enterprises."

As an accredited forestry school, there are no minimum hours in the standards, but ethics must be taught as part of the curriculum. A number of courses throughout our curriculum deal with ethics, including ENR 101 (Introduction to Environmental and Natural Resources), FOR 416 (Forest Policy and Administration), and FOR 425 (Forest Resource Management Plans). Assessment will focus on ENR 101 and FOR 425. In ENR 101 students will be given homework or an in-class assessment related to the ethical topics covered in class. In FOR 425, students will be required to develop a forest management plan in concert with the objectives of a landowner. The management plans produced by the students will be evaluated for conformity to standards of professional ethics. In both ENR 101 and FOR 425, assessments will be scored according to a standard four-point rubric, and if fewer than 75% of the students receive a "Good" or "Excellent" score, the forestry faculty will meet to make curricular revisions to improve the ethics components of the curriculum.

Communication Integration Plan - Address competencies, implementation, and assessment: Clear communication ability is crucial in the science and practice of forest resource management. Students are required to take courses to improve their oral and written communication skills, and opportunities to express those skills are woven throughout the curriculum. Specifically, students must take a class meeting the University Oral Communication requirement (such as COMM 150 Introduction to Human Communication, or COMM 250 Public Speaking), and they must take ENGL 103 (Accelerated Composition) and ENGL 314 (Technical Writing). Assessment of oral communication proficiency will take place in FNR 499 (Natural Resources Seminar), where students are required to make an oral presentation using PowerPoint. Assessment of written proficiency will take place in FOR 425 (Forest Resource Management Plans), where students will be required to develop a forest management plan in concert with the objectives of a landowner. The management plans produced by students will be assessed for clarity and effectiveness of written communication. For both oral and written assessments, a standard four-point rubric will be used, and if fewer than 75% of students score "Good" or "Excellent", the forestry faculty will meet to determine what curriculum changes are needed to strengthen the communication components.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment: As a professionally accredited forestry school, we are required by the Society of American Foresters to offer a curriculum which develops critical thinking skills to address the complex management of forest ecosystems. We rely on basic general education requirements to provide a foundation of oral and written communication skills, basic science and math knowledge, and an introduction to the social sciences and humanities. Within our curriculum, there is likewise a building process whereby students are taught about the components of forest ecosystems (ecology, taxonomy and physiology) and the basics of how to manage them through economic theory and practice. We rely heavily on outdoor lab experiences to give students experience with everyday forestry practices and problems. By the time students are juniors, they are proficient in the basics of measurement and identification, and begin integrating their knowledge base into problem-solving activities. Specifically, required courses in Silviculture (FOR 465), Forest Policy and Administration (FOR 416), Forest Wildlife Management (FOR 415), and other required or elective courses require students to develop problem-solving skills and integrate information to come to conclusions. Assessment of these skills will focus on FOR 425 (Forest Resource Management Plans), a capstone course developed specifically as a way to integrate knowledge in order to solve a real world problem. Students will be required to develop a forest management plan in concert with the objectives of a landowner. The critical thinking reflected in the management plan will be assessed using a standard four-point rubric, and if fewer than 75% receive a score of "Good" or "Excellent", the forestry faculty will meet to determine what changes are needed in the curriculum to better foster the development of critical thinking skills.

Form Originator: ALANJ, Alan Johnson Date Form Created: 3/8/2011

Form Last Updated by: ALANJ, Alan Johnson Date Form Last Updated: 3/9/2011 Form Number: 3925

Approval

000014

<i>Alan R. John</i>	<i>3/9/11</i>	<i>Janice W. Mardock</i>	<i>4/1/2011</i>
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
<i>Pat Saylor</i>	<i>3-10-11</i>		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
<i>Robert J. Kasinski</i>	<i>3/10/11</i>	<i>Chris R. Helms</i>	<i>5/18/11</i>
Chair, College Curriculum Committee	Date	Provost	Date
<i>Zeel Lubertus</i>	<i>3/10/11</i>	<i>James O. Johnston</i>	<i>5/19/11</i>
College Dean	Date	President	Date

1



Curriculum and Course Change System - General Education Checklist

000011

Major Name: Soils and Sustainable Crop Systems

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			..	X
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

<p>Distributed Competencies</p> <p>The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.</p> <p>Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Academic integrity and professional ethics will be introduced to Soils and Sustainable Crop Systems (SSCS) students in their first and second semester SSCS 101 and 102. In SSCS 102, students will complete in-class exercises related to ethics as well as an out-of-class essay on a relevant subject matter that will include an ethical component. These student essays will be evaluated by an ethics rubric established in the course syllabus. Where pertinent, lecture discussion periods will, in part, be dedicated to discussing the ethical issues pertinent to the overall curriculum as well as its attendant concentrations. Other required courses in the curriculum for each concentration will include an ethics component during the semester. For example in the Sustainable Crop Production concentration and in the Agricultural Biotechnology concentration, PLPA 310 (Introductory Plant Pathology), ethical issues related to plagiarism are taught and evaluated in reports. In the Soil and Water Environmental Science concentration, AGRIC 315 (Agricultural and The Environment), ethical issues related to excessive fertilizer use in the corn belt and reduced water quality in the Mississippi River Basin are discussed. In the SSCS capstone course, SSCS 401, each student will develop a personal, academic and professional ethic statement as a foundation for making responsible ethical decisions in a systematic way. In an essay, on a relevant SSCS science-based issue, an ethical component will be included that incorporates the personal, academic and professional ethic statement. The essay will be evaluated according to the ethics rubric as stated in the syllabus for SSCS 401. If more than 25% of the students in SSCS 401 fail to achieve an "Excellent" or "Good" on the ethics evaluation in the capstone course, the faculty will meet and make modifications that would strengthen ethic instruction throughout the curriculum.</p> <p>Communication Integration Plan - Address competencies, implementation, and assessment: The ability to communicate by oral and written means is essential for scientific discourse. In SSCS 102, students will receive instruction in professional communication skills, and then will write an essay demonstrating specific communication competencies named in the course syllabus. These essays will be assessed by a rubric. In advanced course work, numerous written scientific reports and attendant oral presentations are required that evaluate the communication competency. Students will prepare lab reports that adhere to professional standards of format and presentation. Students will also be required to take ENGL 315 (Scientific Writing) and / or COMM 250 (Public Speaking). In our capstone course, SSCS 401, students will prepare an essay on a relevant scientific subject that will be evaluated on communication competencies. If 75% of the essays in SSCS 401 do not meet the rubric's standards as published in the syllabus for the course for "Excellent" or "Good", we will consult with the faculty in ENG 315 and COMM 250 and will restructure how we instruct communications in our own courses.</p> <p>Critical Thinking Integration Plan - Address competencies, implementation, and assessment: Reasoning, critical thinking and problem solving are integrated throughout the SSCS curriculum. Where exposure and development of these skills occurs will vary based on a student's selected concentration in the SSCS curriculum. All students are required to enroll in SSCS 101 and 102 which address critical thinking skills as well as CSENV 350 (Practicum) which contain mandatory exercises designed specifically to help the students develop their skills in reasoning, critical thinking and problem solving. Students in CSENV 350 will make defensible claims derived from the scientific literature on the impact of a particular scientific topic in their particular concentration on agricultural production and / or the world economy. Students will write an essay in SSCS 401, our capstone course, for all concentrations in the major that will be evaluated by the critical thinking rubric established in the course syllabus. If more than 25% of the students in 401 fail to achieve either "Excellent" or "Good" scores per the rubric in the syllabus, then instruction relative to critical thinking will be evaluated and changed accordingly.</p>

Form Originator: CSCHLTS, Calvin Schoulties Date Form Created: 3/9/2011
 Form Last Updated by: CSCHLTS, Calvin Schoulties Date Form Last Updated: 3/11/2011 Form Number: 3928

Approval

	03-11-11		4/1/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date

000013

<i>Patricia A. Sawyer</i>	<i>3/11/11</i>		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
<i>Robert J. Kasinski</i>	<i>3/14/11</i>	<i>Alexis R. Helms</i>	<i>5/18/11</i>
Chair, College Curriculum Committee	Date	Provost	Date
<i>Ed Whitener</i>	<i>3/14/11</i>	<i>James J. Bl</i>	<i>5/19/11</i>
College Dean	Date	President	Date

Major Name: TURFGRASS

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			X HORT 101 & HORT 409	..
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Ethical judgment is integrated throughout the Turfgrass curriculum. HORT 101 (Introduction to Horticulture), the freshman introductory course, lays the foundation for academic integrity, professionalism, and ethical conduct. Written exercises are required on a variety of topics that (1) allow students to connect the classroom subject matter with their past experiences and ideological premises; (2) require students to cite original sources for their compositions to avoid plagiarism. The rubric for the evaluation of students written responses will be published in the course syllabus. Several advanced core courses in the Turfgrass curriculum continue to address ethical issues in multiple contexts providing an opportunity for students to learn through repetition and to recognize the multiple arenas where professional and academic ethics come into play. In HORT 303 (Landscape Plants), reflective writing exercises include the copying and re-use of digital media, propagation of patented plant varieties, climate change effects on planted landscapes, and landscapes with positive impacts on urban environments. Students' "common sense" answers are tied to moral-ethical principles such as utilitarianism, hedonism, altruism, etc. HORT 409 (Seminar) serves as the capstone course required of all Turfgrass majors and is the primary course where the ethical judgment competency will be evaluated. Students prepare professional reports and presentations that require the student to demonstrate appropriate professional and academic ethics. Students work in small groups to analyze case studies from the Institute for Global Ethics (<http://www.globalethics.org/>). Ethical judgment and reasoning will be assessed by the instructor from students' written reports using a rubric with 4 possible grades available with the course syllabus. If 75% are not scored good or excellent it will trigger an improvement mechanism; assessment results will be used by instructors to improve existing courses and to inform the design of our new curricula.

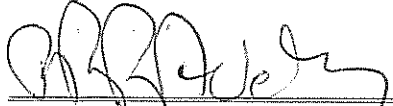
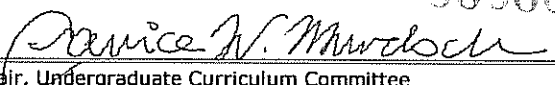
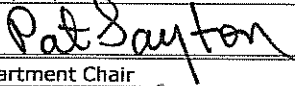
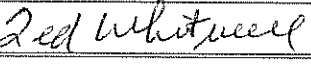
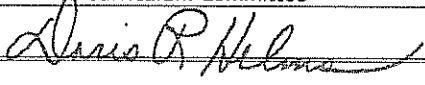
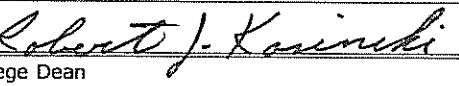
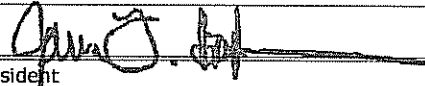
Communication Integration Plan - Address competencies, implementation, and assessment: In addition to the required English Composition (ENGL 103) and a required Oral Communication course selected from the University General Education List (COMM 150 or 250) communication skills are integrated throughout the Turfgrass curriculum. HORT 101 (Introduction to Horticulture) lays the foundation in a broad-based course with particular emphasis on applied landscape sustainability. Students are required to submit two types of writing during the semester: reflective essays and scholarly paragraphs. The reflective essay offers opportunities for integrating past experiences and thoughts with the class subject material. The scholarly paragraph exposes students to the rigors of properly citing the works being referenced using APA style format. Oral communication skills are entwined with group process skills development and are demonstrated during two group presentations. The rubric for the evaluation of both student written and oral responses will be published in the course syllabus. HORT 409 (Seminar) serves as the capstone course required of all Turfgrass majors and will be the primary course where the communication competency is evaluated. Students prepare professional reports and presentations that require the student to demonstrate appropriate professional and academic communication skills. Written and oral communication skills will be assessed through a capstone reflection paper and a series of taped mock interviews with green industry professionals using a rubric with 4 possible grades available with the course syllabus. If 75% are not scored good or excellent it will trigger an improvement mechanism; assessment results will be used by instructors to improve existing courses and to inform the design of our new curricula.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment: Critical Thinking is integrated throughout the Turfgrass curriculum. HORT 101 (Introduction to Horticulture), the freshman introductory course, lays the foundation for students to develop skills in critical thinking and problem solving. Concepts of sustainability and engagement introduced. Students are exposed to the sophisticated knowledge that there is seldom one right answer to environmental landscape problems. Critical thinking is assessed through the weekly writings on the variety of topics covered. Inductive and deductive reasoning are presented in context during HORT 305 (Plant Propagation). The concepts of anecdotal and evidence based arguments are formally presented. Students research how the textbook abstracts the primary literature into the principles and practices of plant propagation. Examples of extrapolation and oversimplification in the textbook are presented to the class by student speakers. HORT 409 (Seminar) serves as the capstone course required of all Turfgrass majors and will be the primary course where critical thinking competency is evaluated. Critical thinking will be assessed through an exercise on evaluating "scientific" data from media and commercial sources using a rubric with 4 possible grades available with the course syllabus. If 75% are not scored good or excellent it will trigger an improvement mechanism; assessment results will be used by instructors to improve existing courses and to inform the design of our new curricula.

Form Originator: JADLRG, Jeffrey Adelberg Date Form Created: 2/25/2011

Form Last Updated by: JADLRG, Jeffrey Adelberg Date Form Last Updated: 3/7/2011 Form Number: 3871

Approval

	3/7/11		503009 4/1/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	3-10-11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	3/10/11		5/18/11
Chair, College Curriculum Committee	Date	Provost	Date
	3/10/11		5/19/11
College Dean	Date	President	Date



Curriculum and Course Change System - General Education Checklist

003007

Major Name: HORTICULTURE

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			X HORT 101 & HORT 409	..
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Ethical judgment is integrated throughout the Horticulture curriculum. HORT 101 (Introduction to Horticulture), the freshman introductory course, lays the foundation for academic integrity, professionalism, and ethical conduct. Written exercises are required on a variety of topics that (1) allow students to connect the classroom subject matter with their past experiences and ideological premises; (2) require students to cite original sources for their compositions to avoid plagiarism. The rubric for the evaluation of students written responses will be published in the course syllabus. Several advanced core courses in the Horticulture curriculum continue to address ethical issues in multiple contexts providing an opportunity for students to learn through repetition and to recognize the multiple arenas where professional and academic ethics come into play. In HORT 303 (Landscape Plants), reflective writing exercises include the copying and re-use of digital media, propagation of patented plant varieties, climate change effects on planted landscapes, and landscapes with positive impacts on urban environments. Students' "common sense" answers are tied to moral-ethical principles such as utilitarianism, hedonism, altruism, etc. HORT 409 (Seminar) serves as the capstone course required of all Horticulture majors and is the primary course where the ethical judgment competency will be evaluated. Students prepare professional reports and presentations that require the student to demonstrate appropriate professional and academic ethics. Students work in small groups to analyze case studies from the Institute for Global Ethics (<http://www.globalethics.org/>). Ethical judgment and reasoning will be assessed by the instructor from students' written reports using a rubric with 4 possible grades available with the course syllabus. If 75% are not scored good or excellent it will trigger an improvement mechanism; assessment results will be used by instructors to improve existing courses and to inform the design of our new curricula.

Communication Integration Plan - Address competencies, implementation, and assessment: In addition to the required English Composition (ENGL 103) and a required Oral Communication course selected from the University General Education List (COMM 150 or 250) communication skills are integrated throughout the Horticulture curriculum. HORT 101 (Introduction to Horticulture) lays the foundation in a broad-based course with particular emphasis on applied landscape sustainability. Students are required to submit two types of writing during the semester: reflective essays and scholarly paragraphs. The reflective essay offers opportunities for integrating past experiences and thoughts with the class subject material. The scholarly paragraph exposes students to the rigors of properly citing the works being referenced using APA style format. Oral communication skills are entwined with group process skills development and are demonstrated during two group presentations. The rubric for the evaluation of both student written and oral responses will be published in the course syllabus. Continued development of these communication skills are reinforced during HORT 306 (Plant Propagation Techniques Laboratory, co-requisite HORT 305). Students prepare their own laboratory data and statistical analyses for presentation to their peers. Faculty and teaching assistants critique the information in a question and answer session. Students get feedback on the quality of presentation and the entire class is tested on the presented information. HORT 409 (Seminar) serves as the capstone course required of all Horticulture majors and will be the primary course where the communication competency is evaluated. Students prepare professional reports and presentations that require the student to demonstrate appropriate professional and academic communication skills. Written and oral communication skills will be assessed through a capstone reflection paper and a series of taped mock interviews with green industry professionals using a rubric with 4 possible grades available with the course syllabus. If 75% are not scored good or excellent it will trigger an improvement mechanism; assessment results will be used by instructors to improve existing courses and to inform the design of our new curricula.

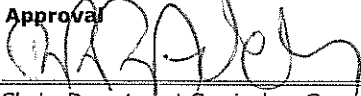

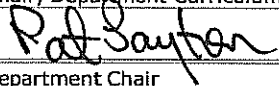
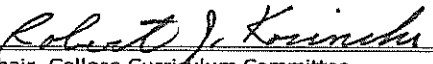
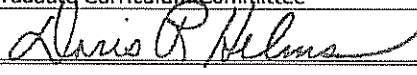
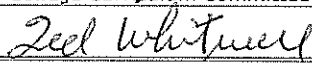
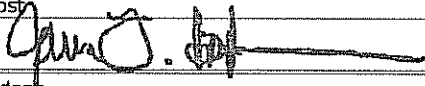
Critical Thinking Integration Plan - Address competencies, implementation, and assessment: Critical Thinking is integrated throughout the Horticulture curriculum. HORT 101 (Introduction to Horticulture), the freshman introductory course, lays the foundation for students to develop skills in critical thinking and problem solving. Concepts of sustainability and engagement introduced. Students are exposed to the sophisticated knowledge that there is seldom one right answer to environmental landscape problems. Critical thinking is assessed through the weekly writings on the variety of topics covered. Inductive and deductive reasoning are presented in context during HORT 305 (Plant Propagation). The concepts of anecdotal and evidence based arguments are formally presented. Students research how the textbook abstracts the primary literature into the principles and practices of plant propagation. Examples of extrapolation and oversimplification in the textbook are presented to the class by student speakers. HORT 409 (Seminar) serves as the capstone course required of all Horticulture majors and will be the primary course where critical thinking competency is evaluated. Critical thinking will be assessed through an exercise on evaluating "scientific" data from media and commercial sources using a rubric with 4 possible grades available with the course syllabus. If 75% are not scored good or excellent it will trigger an improvement mechanism; assessment results will be used by instructors to improve existing courses and to inform the design of our new curricula.

603008

Form Originator: JADLRG, Jeffrey Adelberg Date Form Created: 2/25/2011

Form Last Updated by: JADLRG, Jeffrey Adelberg Date Form Last Updated: 3/7/2011 Form Number: 3870

Approval

	3/7/11		4/7/2011
Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
	3-10-11		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
	3/10/11		5/18/11
Chair, College Curriculum Committee	Date	Provost	Date
	3/10/11		5/19/11
College Dean	Date	President	Date



Curriculum and Course Change System - General Education Checklist

000042

Major Name: Animal and Veterinary Sciences

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			..	X
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment: Students in AVS take AVS 415 - Contemporary Issues in Animal Science, which is a capstone course in all three emphases within the major. This course incorporates discussion on a wide range of topics regarding animal welfare, ethical decisions in animal production and working conditions of such production. Students write 10 essays critically evaluating a specific question related to a weekly topic and are assessed based on their integrations of facts to support their position on the issue. These papers are scored using a specific rubric of which 50% is related to ethical judgment. Over the course of the semester the goal would be to see a positive slope for improvement in the assessments of ethical judgment with ideally at least a 20% improvement. If no improvement is seen in these weekly assessments, the faculty will evaluate and strengthen ethical judgment throughout the curriculum in preparation for this course. Additionally, each student taking AVS 150/151 (including anyone pursuing a minor in AVS) takes CITI training for the Animal Care and Use Course, which provides basic training in the humane care and use of animals in research and teaching. This training must be tested and passed by all students to remain enrolled in the course. The AVS 150/151 series is a prerequisite for most AVS classes, and CITI training is required in all AVS courses that have an animal handling/contact component, thus providing an external review of our students' ethics. In this capacity we lay the foundation for the ethical use of animals at the beginning of the students' academic career and then assess their attainment of ethical judgment in a senior-level capstone course. Students develop work in these classes which can be utilized in their e-portfolio to further document ethical judgment.

Communication Integration Plan - Address competencies, implementation, and assessment: Students in AVS have several options to fulfill the communications competency. They may take the traditional COMM 150 or 250 course OR they can take AVS 406 (required of all students) - Senior Seminar in combination with an animal evaluation course (optional for students; choose 1 from: 302, 309, 311 or 323). Students prepare a 25-minute presentation to their classmates and the course instructor in AVS 406. The presentation is scored using a rubric and is recorded for student self assessment as well. The evaluation courses include oral presentations where students defend their judgments in an up to two-minute speech. Students complete at least 6 oral presentations in their evaluation courses. A specific rubric is used in both courses to document competencies in oral communication. In AVS 406, 60% of their seminar grade directly correlates to oral communication and presentation style. In the evaluation courses, the oral speeches are each worth 50 points each, of which 30 points are specific to oral communication/presentation. If more than 25% of students fail to demonstrate a minimum of "Good" performance in the AVS oral communications assessments, we will revise and restructure these courses to improve communications.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment: Students in AVS take AVS 415 - Contemporary Issues in Animal Science, which is a capstone course in all three emphases within the major. This course incorporates discussion on a wide range of topics regarding animal welfare, ethical decisions in animal production and working conditions of such production. Students write an essay critically evaluating a specific question related to a weekly topic and are assessed based on their integrations of facts to support their position on the issue, thus employing critical/higher order thinking skills. These papers are scored using a specific rubric and critical thinking/analysis/synthesis represents 20% of these assignments. Over the course of the semester the goal would be to see a positive slope for improvement in the assessments of critical thinking with ideally at least a 20% improvement. If this goal is not achieved in critical thinking on average, then the faculty will evaluate and strengthen critical thinking throughout the curriculum leading up to and encompassing this course. Students develop work in this class which can be utilized in their e-portfolio to further document critical thinking.

Form Originator: KVERNON, Kristine Vernon Date Form Created: 2/9/2011

Form Last Updated by: KVERNON, Kristine Vernon Date Form Last Updated: 2/9/2011 Form Number: 3767

Approval

<i>A. B. Behr</i> 9 Feb 2011		<i>Janice W. Marvold</i> 3/4/2011
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Kristine Vernon

2.8.11

502043

Chair, Department Curriculum Committee	Date	Chair, Undergraduate Curriculum Committee	Date
<i>A. Blum</i>	<i>2-9-11</i>		
Department Chair	Date	Chair, Graduate Curriculum Committee	Date
<i>Robert J. Kosinski</i>	<i>2/10/11</i>	<i>Marie R. Helms</i>	<i>5/18/11</i>
Chair, College Curriculum Committee	Date	Provost	Date
<i>Dee Whitcomb</i>	<i>2/10/11</i>	<i>James J. ...</i>	<i>5/19/11</i>
College Dean	Date	President	Date

1



Curriculum and Course Change System - General Education Checklist

000033

Major Name: BS in Biological Sciences

Specific General Education Requirements

Requirement	Select from Gen Ed List	Select from Restricted Gen Ed List	Specific Course(s)	No Change
		Specify restrictions - e.g. PHIL courses only	Specify courses or cluster* of courses if appropriate	
English Composition			ENGL 103	
Oral Communication*	X
Academic & Professional Development			..	X
Mathematics	X
Natural Science with lab	X
Math or Natural Science	X
Arts & Humanities (Literature)	X
Arts & Humanities (Non-Literature)	X
Social Sciences	X
Cross-Cultural Awareness	X
Science and Tech. in Society	X

*Departments may specify a cluster of courses to meet the Oral communication competency but must include a plan for implementation and assessment in the following textbox:

Distributed Competencies

The faculties of each degree program will decide the most appropriate ways to integrate learning experiences in each of the areas below. Quantification in terms of credit hours is avoided in favor of the presumption that faculties will want to place a serious effort in each area and distribute this effort to a significant degree throughout their curricula.

Ethical Judgement Integration Plan - Address competencies, implementation, and assessment:

Scientific ethics (honesty in the recording and presentation of data, admitting experimental deficiencies that might have influenced the data, proper credit given to prior investigators) and more general academic ethics (like avoidance of plagiarism) are taught throughout our curriculum. At the beginning of our curriculum, a module on ethics is taught in BIOSC 101 by a faculty member from Philosophy and Religion, who prepares a set of questions to evaluate student understanding. In addition, students in both BIOSC 101 and BIOL 111 write an essay on a biological issue with an ethical component. These essays will be evaluated by an ethics rubric published in the syllabus of those courses. Academic honesty issues are also discussed in BIOSC 101. Ethical issues are discussed in several advanced classes. In Cell Biology Lab (BIOSC 462), ethical issues related to the conduct of science (authorship, plagiarism, falsification of data and publication restrictions) are discussed. Student mastery of these issues is evaluated at the beginning and the end of the semester by English faculty using a series of essays graded with a consistent rubric, and the course will be revised if deficiencies are found. Students in our capstone course (Senior Seminar, BIOSC 493) prepare an essay on an ethical issue related to biology. The essay will be evaluated according to an ethics rubric published in the course syllabus. If more than 25% of the BIOSC 493 students fail to achieve an evaluation of "Excellent" or "Good" on the ethics evaluation in the capstone course, the faculty will strengthen the ethics instruction throughout the curriculum so that standards are met.

Communication Integration Plan - Address competencies, implementation, and assessment:

Clear communication is the basis of scientific discourse. One of the four Biological Sciences departmental competencies is "Students will prepare research reports, presentations, and other work products that adhere to professional standards of format and presentation." To meet this departmental priority, students in our curricula get instruction in scientific writing in BIOL 110/111, and also take Scientific Writing and Communication (ENGL 315), a course that we asked English to develop for Biological Sciences. We are also developing a special speech course with Communication Studies (currently under COMM 250) for scientific oral communication. Scientific writing is also an essential element of most laboratory courses taken by our majors. In Cell Biology Lab (BIOSC 462), students will create posters that will be evaluated by a team, including Biological Sciences and English faculty, using a consistent rubric. Students are asked to prepare an essay in our senior capstone course (BIOSC 493). This essay will be evaluated according to a scientific communication rubric that will be published in the course syllabus. If 75% of the essays in BIOSC 493 do not meet the rubric's standards for "Excellent" or "Good" performance, we will consult with the faculty in ENGL 315 and COMM 250 courses and

restructure communications instruction in our own courses.

Critical Thinking Integration Plan - Address competencies, implementation, and assessment:

Two other departmental priorities of Biological Sciences are that the artifacts produced by BIOSC students should "contain defensible claims that are based on analyzed data or the literature," and should "critically analyze the limitations of data or the literature." Before any instruction in scientific thought occurs, students in BIOL 110 will be given the nationally-normed Critical Thinking Assessment Test (known as "CAT") as a pretest. Students are then introduced to scientific critical thinking in BIOSC 101 and BIOL 110/111. Students get similar instruction in scientifically rigorous critical thinking in our intermediate level courses such as General Microbiology (MICRO 305) and Evolutionary Biology (BIOSC 335). In Cell Biology laboratory, critical thinking and hypothesis formation will be taught and then evaluated by the CAT, now given as a posttest. Therefore, almost all our students will take both a CAT pretest and a posttest. If there is inadequate improvement in the scores by the time students get to the advanced labs, instruction will be revised. Finally, in our senior capstone course (BIOSC 493), students discuss advanced topics in their field, and scientifically rigorous thinking is continually reinforced. Students will write an essay that will be evaluated by a critical thinking rubric published in the course syllabus. If more than 25% of the BIOSC 493 students fail to achieve either "Good" or "Excellent" scores on the rubric used to evaluate critical thinking, instruction in this area going back to the freshman year will be reconsidered.

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Approval

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<i>Robert J. Kosinski</i>	2/10/11	<i>Chris P. Helms</i>	5/18/11
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