



**MURRAY**

**STATE UNIVERSITY**

**College of Education  
and Human Services**

**BIOLOGICAL SCIENCE EDUCATION  
BACHELORS OF ARTS AND BACHELORS OF  
SCIENCE  
(GRADES 8-12)  
PROGRAM SUBMISSION  
SEPTEMBER 2015**

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[http://www.murraystate.edu/academics/RegistrarsOffice/catalog\\_1516.aspx](http://www.murraystate.edu/academics/RegistrarsOffice/catalog_1516.aspx)

16 KAR 2:010

PGM Codes: 3 and 3885

The content courses in this program are used for transcript reviews for entrance into our  
Alternative Certification Option 6 Program. PGM Code: 165



## Executive Summary

### *Theme of the Unit*

The mission of the College of Education and Human Services is the preparation of leaders for successful careers that positively impact communities as advocates and practitioners, through student-centered, authentic, and engaging academic programs. The college envisions being recognized for producing graduates who foster excellence in their communities. The college's education programs support that mission and vision by ensuring candidates exemplify the knowledge, skills, dispositions, leadership qualities, and decision-making skills necessary to serve as effective educators in their communities. The goal of the college's educator preparation program is to produce candidates who demonstrate the characteristics of a Murray State University graduate, the proficiencies delineated by Kentucky Teacher Standards and the knowledge required by learned societies. "Educator as a reflective decision-maker" is the unit's theme. Undergraduate candidates demonstrate professional dispositions throughout their course work, field experiences, and student teaching. Murray State University candidates will become educators who demonstrate these dispositions: inclusive, responsible, enthusiastic, caring, confident, and ethical. Graduate candidates exhibit the same dispositions while developing their capacities as teacher leaders who foster excellence in their classrooms, schools, districts, and communities.

### *Unique Features*

Murray State University (MSU) has long recognized teacher preparation as a major institutional focus. Established in 1922 by the Kentucky General Assembly as Murray State Normal School, the institution was renamed Murray State College in 1948 and achieved university status in 1966 as Murray State University. This tax-supported residential comprehensive university is composed of the Hutson School of Agriculture, School of Nursing and Health Professions, and four academic colleges: College of Education and Human Services, Arthur J. Bauernfeind College of Business, College of Humanities and Fine Arts, and Jesse D. Jones College of Science, Engineering and Technology. The university fosters an exciting and challenging learning environment by emphasizing student-centered learning and educational experiences; preparing graduates to succeed in a culturally diverse, technologically oriented society; developing collaborative relationships with alumni and community constituents; promoting international education; and encouraging academic outreach.

MSU serves an 18-county region in the heart of the Jackson Purchase area of Western Kentucky. In fall 2015, the university's enrollment was 10,614 students. MSU has the highest graduation rate (53.1%) and the highest retention rate (72.4%) of among public comprehensive universities in the Commonwealth. Murray State University has consistently been ranked among the top Southern regional and liberal arts colleges in the *U.S. News & World Report's* annual publication, *America's Best Colleges* and has been listed in Kiplinger's *100 Best Values in Public Colleges*. Senior Surveys indicate that students are positive about their overall education as well as their chosen major in teacher education at Murray State. The Southern Association of Colleges and Schools (SACS) has continuously accredited Murray State since 1928.

Until July 2014, the College of Education departments were: Adolescent, Career and Special Education; Early Childhood and Elementary Education; and Educational Studies, Leadership and Counseling. During a summer 2014 university-wide academic reconfiguration, the College of Education transformed into the College of Education and Human Services (COEHS). The three existing departments were joined by the Department of Community Leadership and Human Services and the Center for Communication Disorders. Please reference the COEHS organizational flowchart at <http://coekate.murraystate.edu/ncate/st/general.htm>.

COEHS is a member of the American Association of Colleges for Teacher Education (AACTE), Teacher Education Council of State Colleges and Universities (TESCU) and is accredited by the National Council for the Accreditation of Teacher Education (NCATE). Initial accreditation from NCATE was received in 1954. Murray State University has actively pursued and maintained NCATE accreditation for its teacher preparation program. In fall 2016, the unit will seek Council for the Accreditation of Educator Preparation (CAEP) accreditation.

Several unit programs are provided at these Kentucky extended regional campuses: Henderson, Hopkinsville, Madisonville, and Paducah. Candidates can earn undergraduate degrees in elementary education, middle school education, learning and behavior disorders, and interdisciplinary early childhood education. Each semester, the unit hosts an extended campus team session to share unit initiatives, provide professional development, and host course instructional team meetings. All instructors teaching the same course at all sites meet to create a common vision for their course, design common course assignments and assessments, and discuss ways to ensure a consistent, quality course delivery at all site locations.

### ***Rationale for the Program***

According to the U.S. Department of Labor, job prospects are best for teachers in high-demand fields, such as mathematics, sciences, languages, and bilingual education. Locations in urban or rural school districts are also considered to be high need areas for content area teachers. Teachers who are geographically mobile and who obtain licensure in more than one subject are likely to have a distinct advantage in finding a job. The Secondary Education program includes University Studies courses, professional education courses and subject-matter content majors or areas. Students can choose from three certification levels: grades 8-12, grades 5-12, and grades P-12. These programs will prepare students in the specified grade ranges in curriculum content areas. The programs range from approximately 120 credit hours to 130 credit hours in content areas as well as professional education coursework. The programs provide access to current best practices and research through practicum experiences and field-based learning activities. The culminating experience is a semester-long teaching experience in the appropriate content area in a public school. Students in these programs are assigned dual advisors: a faculty member in the subject-matter department and one in the Department of Adolescent, Career and Special Education.

### ***Admission and Exit Requirements***

Continuous assessment procedures are used to document and systematically monitor candidate progress throughout the education program to ascertain candidates' proficiency in the Kentucky Teacher Standards. Checkpoints provide data to facilitate faculty efforts to make

recommendations for improvement, remediation, or candidates' continuance in the program. To become admitted to the teacher education program, candidates must meet the following requirements:

- Attend an admission to teacher education orientation.
- Pass all portions of the CASE exam.
- Earn an overall undergraduate GPA  $\geq 2.75$  on a 4.0 point scale.
- Complete a minimum of 24 credit hours with a GPA  $\geq 2.75$ .
- Earn a "B" or higher in the following courses: ENG 105, MAT 117 (or higher), COM 161, EDU 103 (or equivalent).
- Receive their advisor's recommendation to continue in the program through the interview process.
- Review and declare they will adhere to the Professional Code of Ethics for Kentucky School Personnel.
- Submit an official application to Teacher Education Services.

To be admitted to student teaching, candidates must be admitted to teacher education and meet these requirements:

- Attend an admission to student teaching orientation.
- File a formal application with Teacher Education Services two semesters prior to the student teaching term.
- Demonstrate teaching ability in field and practicum experiences.
- Complete 200 hours of field experiences and legislated components.
- Maintain a GPA  $\geq 2.75$  in overall coursework, professional education coursework, and major or area(s).

To begin student teaching, candidates must have senior, post-bac, or graduate status and have completed all major courses and specialty areas. In addition, they must meet these requirements:

- Complete all required professional teacher education courses with GPA  $\geq 2.75$ .
- Provide documentation of a current physical exam and a TB risk assessment.
- Obtain a criminal records check.
- Complete all PBIS modules.
- Supply TES with any required information.

To be recommended for initial certification, candidates must successfully complete student teaching and program requirements. They must earn passing scores on relevant *PRAXIS* specialty area tests and the *Principles of Learning and Teaching* exam. Because teacher certification requirements are subject to change, students who are registering for the tests need to refer to the Education Professional Standards (EPSB) website at [www.kyepsb.net](http://www.kyepsb.net) for current requirements.

### ***Modes of Delivery***

Course work is delivered through multiple venues: traditional (face-to-face), hybrid (part traditional, part online), and online.

## **Conceptual Framework**

All teacher certification programs at Murray State University share the same conceptual framework. This document is available at [http://coehsnet.murraystate.edu/program\\_submissions/](http://coehsnet.murraystate.edu/program_submissions/).

## **Continuous Assessment**

All teacher certification programs at Murray State University share a continuous assessment plan. This document is available at [http://coehsnet.murraystate.edu/program\\_submissions/](http://coehsnet.murraystate.edu/program_submissions/).

## **Program Experiences**

### **A. Courses and Experiences**

The Biology Education program supports the unit's theme by nurturing individuals to become reflective decision-makers. Reflection is the focus of course activities and is the primary means by which candidates integrate course experiences with Kentucky performance Standards (KTS), College of Education and Human Services Dispositions, and the candidates' own experiences, values, and beliefs about education. At the program's beginning, candidates are asked to reflect upon their own values and beliefs about education and seek integration of those with the COEHS Dispositions through assignments such as philosophy statements, growth plans, practicum work, and other reflective assignments. This process continues as candidates develop portfolio items to reflect their growth and understanding of educational principles leading to the program's end with the eligibility portfolio as a summative evaluation of their knowledge and demonstration of their skills according to Kentucky performance standards. Throughout, program coursework is designed to require planning and reflecting at increasing levels of expertise. Secondary education program faculty collaborate with content area faculty to teach concepts, principles, theories, standards, and research related to evidence-based practices in secondary curriculum, and assessment. The pedagogy coursework models the use of active instructional methods, real-life applications, and cognitive strategies to stimulate learning and provide motivation for the secondary learner. Along with a strong component of content knowledge in the areas of certification, the program is designed to integrate theory into practice with field experiences scheduled as an integral part of methods courses. As program policy, candidates follow curriculum guidesheets and RACR audits (a university advising program tool), and confer with advisors to help them to monitor their personal progress and prepare them for the continuous self-assessment required of professional educators.

At admission to teacher education, candidates are interviewed by faculty and asked to respond to the COEHS dispositions and the Kentucky Code of Ethics. The *Professional Code of Ethics for Kentucky School Personnel* is presented at three additional times to candidates - during orientations to teacher education and student teaching and during the student teaching interview. The Kentucky teacher performance standards are integrated throughout core courses and secondary methods courses as demonstrated in the table below. Candidates are introduced to the standards in early coursework where they gain knowledge (K) of the role performance standards play in becoming reflective decision-makers. As coursework progresses, the standards are applied (A) in lesson plans and other instructional activities. At the end of the program, during

extended practicum and student teaching, candidates are evaluated (E) for each standard in an eligibility portfolio. The portfolio is independently scored by two faculty members with content and instructional knowledge in the discipline. In addition, the Murray program allows for post-baccalaureate students to return and earn certification in a content area.

The biology education program provides a comprehensive curriculum, including an inquiry-based course that serves as a teaching and assessment model for prospective K-12 science/biology teachers. Inquiry model of teaching and learning refutes the traditional view of science as an accumulation of knowledge and instead presents science to candidates as conducting the real work of scientists. It also provides training for higher level and critical thinking for all aspects of the candidates' lives. The biology department with a NSF grant has documented measurable difference in knowledge attainment of biology content comparing candidates who have taken inquiry methods and candidates who have not.

### ***Code of Ethics***

Teacher candidates read and examine the *Professional Code of Ethics for Kentucky School Personnel* when they attend an admission to teacher education orientation. They sign the *Declaration of Eligibility* to attest they (1) understand the standard for personal and professional conduct expected of a professional educator; (2) certify they have read, examined, and understand the *Professional Code of Ethics for Kentucky Certified School Personnel* and agree to abide by its terms during the course of preparation and careers as professional educators; and (3) affirm and declare that all information they give is true, correct, and complete to the best of their knowledge. This is one of the requirements for admission to teacher education.

Once the *Declaration of Eligibility* has been completed and signed, if the attestation changes during the time of participation in the teacher education program the Director of Teacher Education Services must be notified immediately and a new declaration must be submitted. Teacher candidates re-examine the *Professional Code of Ethics for Kentucky School Personnel* during the admission to student teaching orientation. They submit an updated *Declaration of Eligibility* at the conclusion of this orientation. Once candidates have completed all program and certification requirements, they submit a CA-1 application for Kentucky Certification. The application includes a section entitled *Character and Fitness*. By signing the form, candidates attest they have abided and will continue to adhere to the *Professional Code of Ethics for Kentucky School Personnel*.

### ***Teaching Reading and Writing Skills***

Candidates enhance their personal literacy skills by successfully completing two *Oral and Written Communication* university studies courses, ENG 105 *Critical Reading, Writing, and Inquiry* and COM 161 *Introduction to Public Speaking*. Furthermore, they complete additional hours of Historical, Literary, and Philosophical university studies courses based upon their choice of content. Students further refine their writing skills by completing the unit's writing-intensive student teaching semester. Methods courses with included field experiences provide students with hands on planning, teaching, and tutoring instruction with secondary level public school students. If the student chooses an English content area, they complete 24 credit hours in literature, English, and writing. Furthermore, candidates demonstrate writing proficiency by

passing the writing portion of the *Core Academic Skills for Educators* exam. The Praxis II examination in their content area is required for certification for students completing the degree. With these literacy skills in place, candidates are prepared to develop the reading and writing skills of students in their future classrooms.

***Field Experiences***

As per 16 KAR 5:040 legislation, Kentucky teacher candidates are required to complete a minimum of 200 clock hours of field experiences prior to student teaching. Candidates participate in varied activities in P12 school settings. Activities include engaging a diverse student population, observing in schools and related agencies (e.g. Family Resource Centers or Youth Service Centers), tutoring, interacting with families of students, attending school board and school-based council meetings, participating in a school-based professional learning community, and assisting teachers or other school professionals. Candidates record field experience hours and activities on the *LiveText Field Experience Module* system and the *Kentucky Field Experience Tracking System*. Course instructors, cooperating teachers, and university supervisors confirm candidates’ participation. The unit provides training, video clips, and step-by-step directions to facilitate candidates’, instructors’ and cooperating teachers’ recording efforts. The *Secondary Education Field Experiences Table* delineates this program’s field experiences.

**Secondary Education Field Experiences Table**

<b>Course</b>	<b>Field Hours</b>
<b>EDU 103</b>	<b>7 hours</b>
<b>EDP 260</b>	<b>7 hours</b>
<b>EDU 303</b>	<b>6 hours</b>
<b>EDU 403</b>	<b>3 hours</b>
<b>EDU 405</b>	<b>2 hours</b>
<b>SED 300</b>	<b>7 hours</b>
<b>SEC 420</b>	<b>57 hours</b>
<b>SEC 422</b>	<b>118 hours</b>

***EPSB Themes***

Effective educators need to be equipped with the knowledge, skills, dispositions, and decision-making skills necessary to address the needs of a diverse student population. Therefore, the Kentucky Education Professional Standards Board has identified four important themes (diversity, assessment, literacy, closing the achievement gap) to be integrated throughout candidates’ academic course work. Furthermore, the unit’s theme of *Educator as a Reflective Decision-Maker* is emphasized throughout candidates’ program preparation. The *EPSB Themes for Secondary Education Core Education Courses* table depicts the degree to which these themes are addressed in multiple courses.

## EPSB Themes for Secondary Education Core Education Courses

Course	EPSB THEMES				UNIT THEME
	Diversity	Assessment	Literacy	Gap	Reflective Decision-Maker
<b>EDP 260</b>	<b>A</b>				<b>A</b>
<b>EDU 103</b>	<b>A</b>	<b>K</b>		<b>A</b>	<b>E</b>
<b>EDU 303</b>	<b>K</b>	<b>K</b>	<b>K</b>	<b>K</b>	<b>A</b>
<b>EDU 403</b>	<b>A</b>	<b>A</b>		<b>A</b>	<b>A</b>
<b>ELE 421</b>	<b>E</b>	<b>E</b>	<b>E</b>	<b>E</b>	<b>E</b>
<b>SED 300</b>	<b>K</b>	<b>K</b>	<b>K</b>	<b>K</b>	<b>A</b>
<b>K – Knowledge, A – Application, E – Evaluation</b>					

### *Biology Education Content Course Descriptions*

**BIO 115** The Cellular Basis of Life (3). An introduction to the concepts and foundations of modern biology. Intended to familiarize students with the mechanisms and terminology of biology at the cellular level, the topics presented and discussed act as a framework for successful succession into higher level biology courses. Emphasis is placed on the investigative methods used by biologists leading to our current understanding of biological chemistry, cellular processes, cell interactions, genes and DNA technology.

**BIO 216** Biological Inquiry and Analysis (4). An inquiry-based introduction to concepts in biology. Research-oriented activities will emphasize the skills and attitudes necessary for understanding and conducting scientific inquiry. Three hours of lecture and two hours of laboratory per week. Prerequisites: ENG 105 and BIO 101 or 115.

**BIO 221** Zoology: Animal Form and Function (4). A study of the animal kingdom with emphasis on evolutionary and ecological relationships of animal groups, vertebrate anatomy and physiology, and evolutionary concepts. Three hours of lecture and three hours of laboratory per week.

**BIO 222** Botany: Plant Form and Function (4). A study of the evolution, anatomy, morphology, physiology, classification, and life cycles of major divisions of the plant kingdom. Three hours of lecture and three hours of laboratory per week.

**BIO 227** Human Anatomy Lecture (2). Basic morphology of the human body. Cannot be applied toward a biology major. Prerequisites: BIO 101 or BIO 115 and 216 or BIO 221. Co-requisite: BIO 227.

**BIO 228** Human Anatomy Laboratory (2). The basic morphology of the human body. Four hours of laboratory per week. Cannot be applied toward a biology major. . Prerequisites: BIO 101 or BIO 115 and 216 (BIO 221 may be substituted). Co-requisite: BIO 228.

**BIO 300** Introductory Microbiology (4). An introductory survey in general microbiology. Special emphasis is given to the study of the prokaryote microorganisms both in laboratory and lecture. Three hours of lecture and three hours of laboratory per week. Prerequisites: Eight hours of chemistry and eight hours of biology.

**BIO 308** Ethics in Biology (3). A comprehensive study of current ethical issues in biology, including topics in genetics and biotechnology, reproductive technology, species conservation, use of natural resources, and medicine and human/nonhuman interests. Understanding and application of value-choices and ethics is emphasized. One three-hour lecture per week. Prerequisites: BIO 115 and 216.

**BIO 320** Comparative Vertebrate Anatomy (5). Dissection and study of representative chordate systems with emphasis on the anatomy and evolution of fishes, amphibians, reptiles, birds, and mammals. May require additional laboratory supplies fee. Eight hours of class per week. Prerequisites: BIO 115, 216, and 221 or permission of instructor. (Spring)

**BIO 322** Animal Physiology (4). Introductory study of animal physiology. The organ and systems approach is used to compare animals. Emphasis on vertebrates and certain invertebrates. Three lectures and three hours laboratory per week. Prerequisites: Two semesters biology and two semesters chemistry; BIO 321 recommended. (Fall)

**BIO 330** Principles of Ecology (4). An introduction to the fundamental concepts of ecology as they pertain to plants and animals, including humans. Emphasis will be placed on the basic principles of evolutionary, population, community, and ecosystem ecology. Three lectures and two hours laboratory per week. Prerequisites: BIO 115, 216, 221, and 222 or permission of instructor.

**BIO 333** Genetics (4). An introduction to molecular and classical genetics with laboratory experiments involving various organisms used extensively in genetic studies. Three hours of lecture and three hours of laboratory per week. Prerequisites: BIO 115, 216, and 221.

**BIO 499** (1). The course exposes biology students to various career options through participation in the departmental seminar series, provides a review of biological concepts through directed study, and provides an assessment of the department's academic programs with a nationally standardized test. Prerequisite: Biology 222, 333, biology major and senior standing.

### ***Modes of Delivery***

Secondary education courses are delivered on the Murray State University campus using face-to-face and online delivery methods. Many instructors also use a blend of approaches, or hybrid model of delivery. Faculty use web-based learning platforms such as *Canvas* and *LiveText* to supplement and enhance face-to-face instruction.

#### **Modes of Delivery for Program Content Courses**

<b>Course Number</b>	<b>Face to Face</b>	<b>Web</b>	<b>On-Campus</b>
EDU 103	<b>X</b>	<b>X</b>	<b>X</b>
EDU 303	<b>X</b>		<b>X</b>
EDU 403	<b>X</b>		<b>X</b>
EDU 405	<b>X</b>		<b>X</b>
SEC 420	<b>X</b>		<b>Practicum Sites</b>
SEC 422	<b>X</b>		<b>Practicum Sites</b>
SEC 421	<b>X</b>		<b>Student Teaching Sites</b>
EDP 260	<b>X</b>	<b>X</b>	<b>X</b>
SED 300	<b>X</b>		<b>X</b>

### **B. Specialty Professional Association (SPA) Standards**

#### **National Science Teacher Association**

<b>NSTA STANDARD</b>	<b>Courses/Activities/Assessments</b>
<p><b>1. Content.</b> Teachers of science understand and can articulate the knowledge and practices of contemporary science. They can interrelate and interpret important concepts, ideas, and applications in their fields of licensure; and can conduct scientific investigations. To show that they are prepared in content, teachers of science must demonstrate that they</p> <p>(a) understand and can successfully convey to students the major concepts, principles, theories, laws, and interrelationships of their fields of licensure and supporting fields as recommended by the National Science Teachers Association;</p>	<p>BIO 112/ lecture            BIO 115/lecture/PRS questions            BIO 116 /hands-on investigations, discussion, simulations/ written and oral reports, tests            BIO 222            BIO 300/ laboratory investigations/written assignments and exams            BIO 322/lecture and laboratory activities/lecture exams, written assignments and oral exam            BIO 330/ lecture, hands-on activities/ written research papers            BIO 499/ seminars/ Biology Field</p>

	Test
<b>(b)</b> understand and can successfully convey to students the unifying concepts of science delineated by the National Science Education Standards;	BIO 115/lecture/PRS questions BIO 116/simulations & inquiry/presentations and tests BIO 300/ laboratory investigations/written assignments and exams BIO 330/ lecture, hands-on activities/ written research papers BIO 333/ lecture and laboratory activities/ written assignments and exams BIO 499/ seminars
<b>(c)</b> understand and can successfully convey to students important personal and technological applications of science in their fields of licensure;	BIO 112/ lecture, hands-on activities/ written research papers BIO 115/lecture/PRS questions BIO 116/simulations & inquiry/presentations and tests BIO 222/lecture BIO 300/ lecture & laboratory activities/ written assignments and exams BIO 330/ lecture, hands-on activities/ written research papers BIO 499/ seminars
<b>d)</b> understand research and can successfully design, conduct, report evaluate investigations in science	BIO 116/ 3 research investigations/scientific paper or poster BIO 322/ laboratory activities/ written assignments BIO 300/ lecture & laboratory activities/ written assignments and exams BIO 330/ lecture, hands-on activities/ written research papers BIO 333/ lecture and laboratory activities/ written assignments and exams BIO 499/ seminars
<b>(e);</b> and understand and can successfully use mathematics to process and report data, and solve problems, in their field(s) of licensure.	BIO 116/ data compilation and statistical analysis/scientific paper or poster BIO 300/ lecture & laboratory activities/ written assignments and exams BIO 322/ laboratory activities/ written assignments BIO 330/ lecture, hands-on activities/ written research papers BIO 333/ lecture and laboratory activities/ written assignments and

	exams BIO 499/ seminars
<p><b>2. Nature of Science.</b> Teachers of science engage students effectively in studies of the history, philosophy, and practice of science. They enable students to distinguish science from nonscience, understand the evolution and practice of science as a human endeavor, and critically analyze assertions made in the name of science. To show they are prepared to teach the nature of science, teachers of science must demonstrate that they:</p> <p>(a) understand the historical and cultural development of science and the evolution of knowledge in their discipline;</p>	<p>BIO 112/ lecture BIO 115/lecture/PRS questions BIO 116/ discussions/ applications &amp; tests BIO 222/lecture BIO 300/ lecture/ exams BIO 322/ lecture/exams BIO 330/ lecture BIO 333/ lecture and laboratory activities/ written assignments and exams BIO 499/attend seminars by professional scientists/attendance</p>
<p>(b) understand the philosophical tenets, assumptions, goals, and values that distinguish science from technology and from other ways of knowing the world;</p>	<p>BIO 112/ lecture BIO 115/lecture/exams Bio 116/readings and discussions of 'what is science'/ability to use evidence to substantiate conclusions BIO 330/ lecture BIO 333/ lecture and laboratory activities/ written assignments and exams BIO 499/ seminars</p>
<p>(c) engage students successfully in studies of the nature of science including, when possible, the critical analysis of false or doubtful assertions made in the name of science</p>	<p>BIO 115/lecture/exams BIO 116/ readings and discussions of 'what is science'/ability to critique scientific assertions BIO 222/lecture examples BIO 300/ lecture/exams BIO 320/lecture and discussion/understanding of evidence of evolution in vertebrates BIO 330/ lecture, hands-on activities/student projects BIO 333/ lecture and laboratory activities/ written assignments and exams BIO 499/seminars</p>
<p><b>3. Inquiry.</b> Teachers of science engage students both in studies of various methods of scientific inquiry and in active learning through scientific inquiry. They encourage students, individually and collaboratively, to observe, ask questions, design inquiries, and collect and interpret data in order to develop concepts and relationships from empirical experiences. To show that they are prepared to teach through inquiry, teachers of science must demonstrate that they:</p> <p>(a) understand the processes, tenets, and assumptions of multiple methods of inquiry leading to scientific knowledge;</p>	<p>BIO 116/conduct original research investigations/ final paper or poster BIO 222/ hands-on activities BIO 330/ lecture, hands-on activities/student projects BIO 333/ lecture and laboratory activities/ written assignments and exams BIO 499/attend seminars by professional scientists/attendance</p>

<p><b>(b)</b> engage students successfully in developmentally appropriate inquiries that require them to develop concepts and relationships from their observations, data, and inferences in a scientific manner.</p>	<p>BIO 116/conduct original research investigations/ final paper or poster          BIO 222/laboratory projects          BIO 300/ laboratory activities/ written assignments          BIO 322/ inquiry-based laboratory activities/ lab exams &amp; written assignments          BIO 330/ lecture, hands-on activities/student projects          BIO 333/ lecture and laboratory activities/ written assignments and exams</p>
<p><b>4. Issues.</b> Teachers of science recognize that informed citizens must be prepared to make decisions and take action on contemporary science- and technology-related issues of interest to the general society. They require students to conduct inquiries into the factual basis of such issues and to assess possible actions and outcomes based upon their goals and values. To show that they are prepared to engage students in studies of issues related to science, teachers of science must demonstrate that they:</p> <p><b>(a)</b> understand socially important issues related to science and technology in their field of licensure, as well as processes used to analyze and make decisions on such issues;</p>	<p>BIO 112/ lecture          BIO 115/lecture/ PRS questions &amp; exams          BIO 222/lecture and discussion          BIO 300/ lecture/ discussion and exams          BIO 308/readings and discussions of ethical issues in bioscience/written papers and class participation          BIO 330/ lecture &amp; hands-on activities          BIO 333/ lecture          BIO 499/ seminars</p>
<p><b>(b)</b> engage students successfully in the analysis of problems, including considerations of risks, costs, and benefits of alternative solutions; relating these to the knowledge, goals and values of the students.</p>	<p>BIO 300/ lecture/ discussion and exams          BIO 308/readings and analysis of ethical issues in bioscience/written papers and class participation          BIO 330/ lecture &amp; hands-on activities          BIO 333/ lecture          BIO 499/ seminars</p>
<p><b>5. General Skills of Teaching.</b> Teachers of science create a community of diverse learners who construct meaning from their science experiences and possess a disposition for further exploration and learning. They use, and can justify, a variety of classroom arrangements, groupings, actions, strategies, and methodologies. To show that they are prepared to create a community of diverse learners, teachers of science must demonstrate that they</p> <p><b>(a)</b> vary their teaching actions, strategies, and methods to promote the development of multiple student skills and levels of understanding;</p>	<p>BIO 112/ lecture &amp; student projects          BIO 330/ lecture &amp; student projects          EDU 103 classroom observations and reflections          EDU 303 microteaching          SED 300 special education          SEC 420 practicum with classroom teaching          SEC 421 14 weeks of student teaching</p>
<p><b>(b)</b> successfully promote the learning of science by students with different abilities, needs, interests, and backgrounds;</p>	<p>EDU 303, SEC 420, SEC 421 – all lesson planning includes adaptation to students with special needs</p>
<p><b>(c)</b> successfully organize and engage students in collaborative learning using different student group learning strategies;</p>	<p>EDU 303, SEC 420, SEC 421 – all provide general teaching strategies          BIO 322/ cooperative groups/</p>

	written assignments
(d) successfully use technological tools, including but not limited to computer technology, to access resources, collect and process data, and facilitate the learning of science;	BIO 112/ lecture & student projects BIO 116/use technology to present scientific information and collect and analyze data/oral and written presentations  BIO 300/ lecture/ on-line assessments BIO 222/ laboratory activities BIO 322/ computer-assisted laboratory activities/ written assignments BIO 330/ lecture & student projects
(e) understand and build effectively upon the prior beliefs, knowledge, experiences, and interests of students; and	BIO 112/ lecture & student projects BIO 115/ lecture/ PRS questions BIO 116/use technology to present scientific information and collect and analyze data/oral EDU 303, SEC 420, SEC 421 – all provide general teaching strategies that address the needs and interests of students
(f) create and maintain a psychologically and socially safe and supportive learning environment.	BIO 112/ entire class BIO 308/ student-led class sessions BIO 330/ entire class EDU 303, SEC 420, SEC 421 – all include the CHAMPS proactive, proactive plan for classroom management
<b>6. Curriculum.</b> Teachers of science plan and implement an active, coherent, and effective curriculum that is consistent with the goals and recommendations of the National Science Education Standards. They begin with the end in mind and effectively incorporate contemporary practices and resources into their planning and teaching. To show that they are prepared to plan and implement an effective science curriculum, teachers of science must demonstrate that they:	EDU 303, EDU 405, SEC 420, SEC 421 all require lesson plans aligned with the appropriate content discipline  Kentucky Core Content aligns with NSE Standards
(a) understand the curricular recommendations of the National Science Education Standards, and can identify, access, and/or create resources and activities for science education that are consistent with the standards;	
(b) plan and implement internally consistent units of study that address the diverse goals of the National Science Education Standards and the needs and abilities of students.	EDU 303, EDU 405, SEC 420, SEC 421 all require lesson plans aligned with the appropriate content discipline Kentucky Core Content aligns with NSE Standards

<p><b>7. Science in the Community.</b> Teachers of science relate their discipline to their local and regional communities, involving stakeholders and using the individual, institutional, and natural resources of the community in their teaching. They actively engage students in science-related studies or activities related to locally important issues. To show that they are prepared to relate science to the community, teachers of science must demonstrate that they:</p> <p>(a) identify ways to relate science to the community, involve stakeholders, and use community resources to promote the learning of science;</p>	<p>BIO 112/ student service projects          BIO 116/ conduct a community service project/poster presentation          BIO 330/ student service projects</p>
<p>(b) involve students successfully in activities that relate science to resources and stakeholders in the community or to the resolution of issues important to the community.</p>	<p>BIO 112/ student service projects          BIO 116/ conduct a community service project/poster presentation          BIO 330/ student service projects</p>
<p><b>8. Assessment.</b> Teachers of science construct and use effective assessment strategies to determine the backgrounds and achievements of learners and facilitate their intellectual, social, and personal development. They assess students fairly and equitably, and require that students engage in ongoing self-assessment. To show that they are prepared to use assessment effectively, teachers of science must demonstrate that they:</p> <p>(a) use multiple assessment tools and strategies to achieve important goals for instruction that are aligned with methods of instruction and the needs of students;</p>	<p>BIO 116          BIO 300/ exams, quizzes, laboratory exams, written reports, on-line assessment</p> <p>EDU 405 Evaluation and Measurement – students complete an interdisciplinary unit with partners using a range of assessments tools, they also complete a field experience assessment project          All KTIP lesson plans include an impact and refinement statement for student learning</p>
<p>(b) use the results of multiple assessments to guide and modify instruction, the classroom environment, or the assessment process;</p>	<p>EDU 405 Evaluation and Measurement –students complete a field experience assessment project with a pre and post test with result used to modify instruction</p>
<p>(c) use the results of assessments as vehicles for students to analyze their own learning, engaging students in reflective self-analysis of their own work.</p>	<p>BIO 116/ peer reviews          BIO 300/ on-line exams          EDU 405 Evaluation and Measurement –students complete a field experience assessment project with a pre and post test with result used to modify instruction</p>
<p><b>9. Safety and Welfare.</b> Teachers of science organize safe and effective learning environments that promote the success of students and the welfare of all living things. They require and promote knowledge and respect for safety, and oversee the welfare of all living things used in the classroom or found in the field. To show that they are prepared, teachers of science must demonstrate that they:</p> <p>(a) understand the legal and ethical responsibilities of science teachers</p>	<p>BIO 112/hands-on activities          BIO 222/ laboratory activities          BIO 300/ readings/ quiz          BIO 308/discussion of ethics of research and animal use/ written papers and participation in discussions          BIO 330/ hands-on activities</p>

for the welfare of their students, the proper treatment of animals, and the maintenance and disposal of materials;	
(b) know and practice safe and proper techniques for the preparation, storage, dispensing, supervision, and disposal of all materials used in science instruction;	BIO 112/ hands-on activities BIO 222/ laboratory activities BIO 300/ readings/ quiz BIO 330/ hands-on activities
(c) know and follow emergency procedures, maintain safety equipment, and ensure safety procedures appropriate for the activities and the abilities of students;	BIO 112/ hands-on activities BIO 116/ experimental investigations BIO 300/ readings/ quiz BIO 320/ hands-on activities BIO 300/ readings/ quiz BIO 330/ hands-on activities
(d) treat all living organisms used in the classroom or found in the field in a safe, humane, and ethical manner and respect legal restrictions on their collection, keeping, and use.	BIO 112/ lecture & hands-on activities BIO 116/conduct original research in an ethical manner/observations and research presentations BIO 322/ laboratory activities/ observation & written reports BIO 330/ hands-on activities
<b>10. Professional Growth.</b> Teachers of science strive continuously to grow and change, personally and professionally, to meet the diverse needs of their students, school, community, and profession. They have a desire and disposition for growth and betterment. To show their disposition for growth, teachers of science must demonstrate that they:	Kentucky New Teacher Standard 7 is the professional growth standard and it is aligned throughout the program. See Kentucky New Teacher Standard table for a curriculum map of the program
(a) engage actively and continuously in opportunities for professional learning and leadership that reach beyond minimum job requirements;	
(b) reflect constantly upon their teaching and identify ways and means through which they may grow professionally;	The theme of the unit is “Educator as Reflective Decision Maker”, so reflection is required in courses, practicum, and student teaching  Kentucky New Teacher Standard 5 is the reflection standard and it is aligned throughout the program. See Kentucky New Teacher Standard table for a curriculum map of the program
(c) use information from students, supervisors, colleagues and others to improve their teaching and facilitate their professional growth;	BIO 116/ critical evaluation of presentations BIO 222  The theme of the unit is “Educator

	<p>as Reflective Decision Maker”, so reflection is required in courses, practicum, and student teaching</p> <p>Kentucky New Teacher Standard 5 is the reflection standard and it is aligned throughout the program. See Kentucky New Teacher Standard table for a curriculum map of the program</p>
(d) interact effectively with colleagues, parents, and students; mentor new colleagues; and foster positive relationships with the community.	<p>BIO 116/ collaborative word &amp; service project</p> <p>Kentucky New Teacher Standard 6 is the collaboration standard and it is aligned throughout the program. See Kentucky New Teacher Standard table for a curriculum map of the program</p>

### Unifying Concepts

<b>A: Competency (numbers 1-5)</b>	<b>B: Required Courses or advising requirements</b>
1. Multiple ways we organize our perceptions of the world and how systems organize the studies and knowledge of science.	BIO 112, 116, 300,330, 499
2. Nature of scientific evidence and the use of models for explanation.	BIO 116, 115, 221, 300, 322, 330, 333, 499
3. Measurement as a way of knowing and organizing observations of constancy and change.	BIO 116, 221, 300, 322, 333
4. Evolution of natural systems and factors that result in evolution or equilibrium.	BIO 112, 116, 221, 222, 300, 330, 333, 499
5. Interrelationships of form, function, and behaviors in living and nonliving systems.	BIO 112, 221, 222, 300, 322, 330, 499

**Table A: Biology**

<b>A. Core Competencies (numbers 1-12)</b>	<b>B: Required Courses or advising requirements</b>
1. Life processes in living systems including organization of matter and energy.	BIO 112, 115, 221, 222, 300, 322, 330, 499
2. Similarities and differences among animals, plants, fungi, microorganisms, and viruses	BIO 112, 221, 222, 300, 322, 330, 333
3. Principles and practices of biological classification	BIO 112, 221, 222, 300, 499
4. Theory and principles of biological evolution	BIO 112, 116, 221, 222, 300, 320, 330, 333, 499
5. Ecological systems including the interrelationships and dependencies of organisms with each other and their	BIO 112, 221, 222, 300, 330, 499

environments.	
6. Population dynamics and the impact of population on its environment.	BIO 112, 221, 222, 300, 330, 333, 499
7. General concepts of genetics and heredity	BIO 115, 221, 330, 333, 499
8. Organizations and functions of cells and multi-cellular systems.	BIO 221, 222, 300, 320, 322, 499
9. Behavior of organisms and their relationships to social systems.	BIO 112, 221, 330, 499
10. Regulation of biological systems including homeostatic mechanisms	BIO 221, 320, 322, 330, 499
11. Fundamental processes of modeling and investigating in the biological sciences	BIO 115, 116, 300, 322, 330, 499
12. Applications of biology in environmental quality and in personal and community health	BIO 112, 116, 221, 300, 330, 333, 499

**Table B: Biology**

<b>B. Advanced Competencies (numbers 13-21)</b>	<b>B: Required Courses or advising requirements</b>
13. Bioenergetics including major biochemical pathways	BIO 115, 222, 300, 322, 333, 499
14. Biochemical interactions of organisms and their environments	BIO 115, 221, 222, 300, 322, 330, 499
15. Molecular genetics and heredity and mechanisms of genetic modification	BIO 115, 300, 333, 499
16. Molecular basis for evolutionary theory and classification	112, 300, 330, 333, 499
17. Causes, characteristics, and avoidance of viral, bacterial, and parasitic diseases	BIO 115, 221, 300, 330, 333, 499
18. Issues related to living systems such as genetic modification, uses of biotechnology, cloning, and pollution from farming.	BIO 112, 221, 222, 300, 308 (recommended), 330, 333, 499
19. Historical development and perspectives in biology including contributions of significant figures and underrepresented groups, and the evolution of theories in biology	BIO 115, 116, 221, 300, 322, 330, 333, 499
20. How to design, conduct, and report research in biology	BIO 221, 330, 333, 499
21. Applications of biology and biotechnology in society, business, industry, and health fields	BIO 115, 300, 308 (recommended), 322, 330, 333, 499

**Table C: Biology**

<b>C. Supporting Competencies (numbers 22-42)</b>	<b>B: Required Courses or advising requirements</b>
22. General chemistry.	CHE 201 & 202, BIO 300
23. Biochemistry	CHE 330, BIO 300, 322
24. Basic chemistry laboratory techniques	CHE 201 & 202, BIO 300

<b>Physics</b>	
25. Light	PHY 132/133, BIO 322
26. Sound	PHY 130/131, BIO 322
27. Optics	PHY 132/133, BIO 322
28. Electricity	PHY 132/133, BIO 322
29. Energy and order	PHY 130/131
30. Magnetism	PHY132/133
31. Thermodynamics	PHY 130/131
<b>Earth and space sciences</b>	
32. Energy and geochemical cycles	BIO 300
33. Climate	BIO 112, 222, 330
34. Oceans	BIO 222, 300
35. Weather	BIO 222
36. Natural resources	BIO 112, 300, 330
37. Changes in the Earth	BIO 112, 330
<b>Mathematics</b>	
38. Probability	BIO 221, 330, 333
39. Statistics	BIO 116, 221, 330, 333

### C. Kentucky Teacher Standards

The Kentucky Teacher Performance Standards are integrated throughout core courses and secondary education methods courses as demonstrated in the table below. Candidates are introduced to the standards in early coursework where they gain knowledge (K) of the role performance standards play in becoming reflective decision-makers. As coursework progresses, the standards are applied (A) in lesson plans and other instructional activities. At the end of the program, during student teaching, candidates are evaluated (E) for each standard in an eligibility portfolio. The portfolio is independently scored by two faculty members with content and instructional skill in the appropriate content area. Secondary and content area instructors use web-based learning platforms such as *Canvas* to supplement and enhance face-to-face instruction. The *Kentucky Teacher Standards* matrix demonstrates the integration of Kentucky Teacher Standards throughout secondary education coursework.

#### Kentucky Teacher Standards

Course	KTS 1	KTS 2	KTS 3	KTS 4	KTS 5	KTS 6	KTS 7	KTS 8	KTS 9	KTS10
<b>CSC 199</b>	<b>K</b>					<b>A</b>				
<b>EDP 260</b>		<b>K</b>	<b>K</b>	<b>A</b>		<b>A</b>	<b>A</b>	<b>A</b>		
<b>EDU 103</b>	<b>A</b>	<b>K</b>	<b>A</b>	<b>K</b>	<b>K</b>	<b>K</b>	<b>A</b>	<b>K</b>	<b>K</b>	<b>K</b>
<b>EDU 303</b>		<b>A*</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>K</b>	
<b>EDU 403</b>	<b>A</b>	<b>K</b>	<b>A</b>	<b>K</b>	<b>K</b>	<b>K</b>	<b>A</b>	<b>K</b>	<b>K</b>	<b>A</b>

<b>SEC 420</b>	<b>K</b>	<b>A</b>	<b>K</b>	<b>A</b>					<b>K</b>	
<b>SEC 422</b>	<b>E*</b>									
<b>SED 300</b>	<b>A</b>	<b>K</b>	<b>K</b>			<b>K</b>	<b>K</b>	<b>A</b>	<b>K</b>	
<b>K – Knowledge, A – Application, E – Evaluation, * - Signature Assignment</b>										

- KTS 1: Content Knowledge
- KTS 2: Design Instruction
- KTS 3: Learning Climate
- KTS 4: Implements Instruction
- KTS 5: Assessment
- KTS 6: Technology
- KTS 7: Reflection
- KTS 8: Collaboration
- KTS 9: Professional Development
- KTS 10: Leadership

#### D. Kentucky Core Academic Standards

All teacher certification candidates in the Murray State University education program become familiar with the Kentucky Core Academic Standards (KCAS) in EDU 103 *Issues and Practices of American Education* or the equivalent course specific to their discipline. This course is designed to provide students with an overview of the field of education. The instructor of this course introduces the KCAS to raise candidates’ initial awareness of KCAS as a framework for standards-based instruction. In EDU 303 *Strategies of Teaching*, the instructor spends several class sessions acquainting candidates with the KCAS. In this course, candidates develop lesson planning. All lesson plans, instructional, activities, and assessments must be aligned to the KCAS standards in the appropriate content area. Additionally, candidates take EDU 405 *Evaluation and Measurement in Education*. Candidates develop proficiency in designing standards-based assessment instruments and interpreting the results to inform future instruction. This course’s key assessment provides an introduction to the Teacher Performance Assessment (TPA) candidates complete during their student teaching experience.

In the secondary education program, candidates apply what they have learned about designing KCAS standards-based instruction and assessment instruments during the field and practicum experiences associated with these professional education methods courses.

#### Kentucky Core Academic Standards

<b>Course</b>	<b>KCAS Content Area</b>	<b>Activity</b>
EDU 303	Specific to content area	Lesson plans, micro-teaching activities, mock classroom situations
SEC 420	Specific to content area	Lesson plans, unit plans, field experiences
SEC 422	Specific to content area	Lesson plans, unit plans, field experiences
SEC 421	Specific to content area	Student teaching experience -Designing and implementing instruction

During the student teaching semester, candidates complete TPAs which demonstrate their proficiency in designing, implementing, and reflecting upon KCAS-aligned instructional units, lessons, and assessment instruments. They draft a KCAS standards-based instructional unit. Candidates use the results from a pre-assessment to modify the unit by differentiating instruction to address students' academic needs. They teach and reflect upon a series of lessons before administering the post-assessment. Candidates analyze post-assessment data to discern student growth, continuing academic needs, and achievement gaps to inform future instruction.

### E. Biology Program Faculty

<b>Name</b>	<b>Highest Degree, Field, &amp; University</b>	<b>Assignment: Indicate the role(s) of the faculty member (1)</b>	<b>Faculty Rank (2)</b>	<b>Scholarship (3), Leadership in Professional Associations, and Service (4); List up to 3 major contributions in the past 3 years (5)*</b>	<b>Status (FT/PT to institution, unit, and program)</b>
Bernot, Randall	Ph.D. Biology Kansas State University, KS	Faculty Part-time Teach, Part-time Research	Assistant Professor	Published Papers (2005, 2006): In <i>Aquatic Ecology &amp; Physa aduta. Environmental Toxicology and Chemistry</i>	Full-time to Institution, Part-time to unit, Part-time to program
Canning, David	DPhil Physiological Sciences, Oxford University	Faculty Part-time Teach, Part-time Research	Associate Professor	Published Paper (2004): <i>Developmental Biology</i> ; KY Biomedical Research Infrastructure Network Coordinator (2004-2005)	Full-time to Institution, Part-time to unit, Part-time to program
Derting, Terry	Ph.D., Ecology, Evolution, & Organismal Biology, Indiana University, IN	Faculty Part-time Teach, Part-time Research	Professor	Keynote Speaker: (2005) <i>Faculty Institutes for Reforming Science Teaching</i> , President (2004): <i>Association for College &amp; University Biology Educators</i> , <i>Principal Investigator</i>	Full-time to Institution, Part-time to unit, Part-time to program

				(2006): <i>Use of Tablet PCs to Improve Student Learning</i>	
Duobinis-Gray, Leon	Ph.D. Zoology and Physiology Louisiana State University, LA	Faculty Part-time Teach, Part-time Research	Associate Professor	Presentations: <i>Association of Southeastern Parasitologists</i> (2005-2006); Publication in <i>Copeia</i> (2006)	Full-time to Institution, Part-time to unit, Part-time to program
Fuller, Claire	Ph.D. Zoology, Oregon State University, OR	Faculty Part-time Teach, Part-time Research	Associate Professor	Publications in <i>J. Parasitology</i> , <i>Can. J. Zoology</i> (2006) and <i>J. Insect Science</i> ; President-elect, <i>Southeastern Society of Parasitologists</i> . Principal Investigator for <i>Student Challenge Award Program (Earthwatch Institute)</i> , 2002-.	Full-time to Institution, Part-time to unit, Part-time to program
He, Kate	Ph.D., Plant Ecology, Environmental Science University of Western Ontario, Canada	Faculty Part-time Teach, Part-time Research	Assistant Professor	(2006): (1) Presentations for the 5 <sup>th</sup> International Conference on Ecoinformatics; the 91 <sup>th</sup> ESA Annual Meeting; and the Ohio River Basin Consortium for Research & Education (2) MSU Chapter Advisor for the National Society of Collegiate Scholars	Full-time to Institution, Part-time to unit, Part-time to program
Johnston, Timothy	Ph.D., Microbiology Southern Illinois University, IL	Faculty Part-time Teach, Part-time Research	Professor	(2004-2006): Member, Amer. Association for Microbiology & the KY Academy of Science; (2005): Presentations for Ohio River Basin Consortium for Research &	Full-time to Institution, Part-time to unit, Part-time to program

				Education	
Nakamura, Suguru	Ph.D., Physiology & Medicine Tokyo Medical and Dental University of Japan	Faculty Part-time Teach, Part-time Research	Assistant Professor	(2004, 2006) Published Papers: <i>American Journal of Physiology</i> , <i>Journal of Laboratory and Clinical Medicine</i> ; (2005) NIH grant review member, ZDK1 GRB-9-01 “Kidney Disease” section; (2006) Grant review member: Netherlands Earth & Life Sciences Council	Full-time to Institution, Part-time to unit, Part-time to program
Saar, Dayle	Ph.D. Biology (Plant Sciences) Northern Illinois University, DeKalb, IL	Faculty Part-time Teach, Part-time Research	Assistant Professor	Published papers in <i>Sida</i> , <i>Contributions to Botany</i> (2005, 2006) and <i>Flora of North America</i> , vol. 8 (in press); Keynote speaker for annual meeting of American Dahlia Soc. (2007); MSU Herbarium curator (2005-present)	Full-time to Institution, Part-time to unit, Part-time to program
Timmons, Tom	Ph.D., ??? Auburn University, AL	Chair of Biology, Part-time Teach, Part-time Administration	Professor	(2004-2006): Assess Biology Program; Member Kentucky Academy of Science; Presentation-International Scholars Week	Full-time to Institution, Part-time to unit, Part-time to program
White, David	Ph.D. Biology, Aquatic Ecology University of Louisville, KY	Faculty Part-time Teach, Part-time Research	Professor	Editor Journal of the Kentucky Academy of Science (2006-). Editor Organization of Biological Field Station (1996-), President Association of Ecosystem Research Centers	Full-time to Institution, Part-time to unit, Part-time to program

				(2004)	
White, Stephen	Ph.D. Zoology Ohio State University, OH	Faculty Part-time Teach, Part-time Research	Associate Professor	Advisor MSU Wildlife and Fisheries Society and MSU Ducks Unlimited (2004-), Faculty Senate President	Full-time to Institution, Part-time to unit, Part-time to program
Wright, Sterling	Ph.D. Neurophysiology University of TX, Austin, TX	Faculty Part-time Teach, Part-time Research	Associate Professor	Published Papers (2004, 2005): <i>European Journal of Physiology</i> , <i>Biophysical Chemistry</i> ; (2004-2006) Advisor, Pre-Professional Health Club	Full-time to Institution, Part-time to unit, Part-time to program
Whiteman, Howard	Ph.D. Biology Purdue University, IN	Faculty Part-time Teach, Part-time Research	Associate Professor	Assoc. Editor (2004-2006): <i>Journal of Herpetology</i> , Author (2003-2006): <i>Principles of Ecology Laboratory Manual</i> , <i>Field Biology: Laboratory Manual and Study Guides</i>	Full-time to Institution, Part-time to unit, Part-time to program
Zimmerer, Ed	Ph.D. Zoology, Rutgers University, NJ	Faculty Part-time Teach, Part-time Research	Professor	Publication in <i>Journal of KY Academy of Science</i> (2006). Presentations to: The American Society of Ichthyologists and Herpetologists (2005 and 2006), Society of Integrative and Comparative Biology (2005), and the Southeastern Ecology and Evolution Conference (2004)	Full-time to Institution, Part-time to unit, Part-time to program

### Education Program Faculty

NAME	HIGHEST DEGREE, FIELD, & UNIVERSITY	ASSIGNMENT	FACULTY RANK	CERTIFICATIONS, EXPERIENCE, SCHOLARSHIP, LEADERSHIP IN PROFESSIONAL ASSOCIATIONS, AND SERVICE	STATUS
Allen, David	Ph.D, Education-School Improvement, Text State University-San Marcos	Director of Center for Environmental Education Teaches assessment and environmental education courses	Assistant Professor	<ul style="list-style-type: none"> <li>• <i>Educational Testing Services, Assessment Specialist – 10 years, Middle School Science – 6 years, High School Science – 3 years</i></li> <li>• <i>Allen, D. (August 2015). Project Learning Tree survey of use. Annual conference of the Japanese Society of Environmental Education, Nagoya, Japan.</i></li> <li>• <i>Allen, D. (October 2014). Perceptions of environmental education from across a university campus. Annual conference of the North American Association for Environmental Education. Ottawa, Ontario, Canada.</i></li> <li>• <i>Waite, D., &amp; Allen, D. (2003). Corruption and abuse of power in educational administration. Urban Review, 35(4), 281-296</i></li> </ul>	Full-time to institution Part-time to unit Part-time to program
Brown, Cory	Ph.D, Multicultural and Equity Studies in Education, Ohio State University	Assistant Professor Teaches foundation courses	Assistant Professor	<ul style="list-style-type: none"> <li>• <i>High School English – 2 years, Full-Time Academic Advisor, University of Cincinnati – 5 years, University Appointments, Education – 10 years.</i></li> <li>• <i>Dixson, A. D., Dodo-Seriki, V. and Brown, C. T. (2014). Culturally relevant pedagogy at the intersections of race, gender, and class. Paper presented at the biennial meeting of the International Conference on Urban Education, Montego Bay, Jamaica.</i></li> <li>• <i>Dodo-Seriki, V., Brown, C. T., and Fasching-Varner, K.</i></li> </ul>	Full-time to institution Part-time to unit Part-time to program

				<p>(Accepted and in preparation, 2015). <i>The permanence of racism in teacher education</i>. In J. K. Donnor, R. Reynolds, M. Lynn, and A. D. Dixson (Eds.). <i>Is the post-racial still racial?: Understanding the relationship between race and education</i>. NSSE Yearbook, Teachers College Record.</p> <ul style="list-style-type: none"> <li>National Council of Teachers for English Assembly of Research - Program Reviewer and Planning Committee, 2015 (New Orleans, Louisiana)</li> </ul>	
Campoy, Renee	Ed.D. Curriculum & Instruction University of Missouri-St. Louis	Assistant Dean (Part-time) Teaches EDU 405 (part-time) NCATE Coordinator	Professor	<ul style="list-style-type: none"> <li>Book: (2004) Case study analysis in the classroom</li> <li>Presentation: (2006) AERA</li> <li>BOE Team member: (2005-present)</li> </ul>	Full-time to Institution, Full-time to Unit, Part-time to Program
Gierhart, Greg	MA, Education, Murray State University	Hart Residential College Head Teaches instructional strategies and math methods courses	Lecturer	<ul style="list-style-type: none"> <li><i>Certifications &amp; Experience: KY Teaching Lic., Middle school Spanish, Science, and Math, endorsement for teaching early elementary, DPP, School Administration. 10 years experience – middle school.</i></li> <li><i>Murray Lion's Club, National Council of Teachers of Mathematics, National Science Teachers Association, Association of Supervisors and Curriculum Development, International Literacy Association, Association for Middle Level Education, Phi Delta Kappan, Phi Kappa Phi</i></li> <li><i>KY Department of Education, Math &amp; Science Leadership Networks</i></li> </ul>	Full-time to institution Part-time to unit Part-time to program
Matlock, Pam	MA Special Education, Murray State University	Paducah Campus 2+2 Education Coordinator Teaches special education	Lecturer	First Book, Chapter Advisor - Monthly distribution of new books to low socioeconomic students in public schools, KEA - SP, Chapter Advisor - Global Education Outreach Committee, Chairperson	Full-time to institution Part-time to unit Part-time to program

		courses			
Stormer, Kimberly	Ph.D. Instructional Leadership Academic and Curriculum University of Oklahoma	Middle Level Education Program Coordinator, Teaches middle level education courses.	Assistant Professor	Taught for 7.5 years in large urban school district; and Worked as a School Improvement Specialist for the Oklahoma State Department of Education Diversity Chair Kentucky Council Teachers of English Advisor Murray State Middle Level Association	Full-time to institution Part-time to unit Part-time to program
Jacobs, Martin	Ed.D. Curriculum and Instruction, Florida International University	Part-time to Program: Middle School Reading	Professor	Scholarship focused upon Teacher Leadership, with presentation and publication outcomes Faculty Representative: Murray State Board of Regents 11 years P12 teacher; 5 years elementary assistant principal	Full-time to institution Part-time to unit Part-time to program
Musselman, Meagan	Ph.D. Curriculum & Instruction Southern Illinois University	Teacher Leader Program Coordinator, Teaches middle level undergraduate education courses and graduate courses across multiple levels	Associate Professor	Taught math and science in public middle schools; and Education consultant to area schools President of Kentucky Association of Teacher Educators	Full-time to institution Part-time to unit Part-time to program
Gierhart, Greg	MA-Murray State University Pursuing PhD Southern Illinois University-Carbondale	Early Childhood and Elementary Education Teach mathematics to IECE and elementary education majors.	Lecturer	Taught 10 years in a rural school district Provisional Certificate For Teaching In The Middle Grades 5-8 Mathematics Field: Science Professional Certificate for Middle School Teaching	Part-time to institution Part-time to unit Part-time to program
Hyde ,Lori	MA- Murray State University in Reading and Writing	REA 407 at the Paducah Campus	Adjunct Instructor	6 <sup>th</sup> grade Reading and Writing at Lone Oak Middle School Certified Elementary Education Certified Reading and Writing Literacy Specialist K-12 Super Saturdays Instructor	Part-time to institution Part-time to unit Part-time to program
Myers, Hannah	MA- Murray State University in Education and Education Administration	MID 307	Adjunct Instructor	Magistrate for Hopkins County- Co-Chair of Build Smart Murray Campaign Chairman of the City Council	Part-time to institution Part-time to unit Part-time to program

## **F. Curriculum Contract/ Guidesheet**

Program coordinators work with faculty to ensure current guidesheets are available for course instructors and students. These may be accessed on the unit's intranet site at <http://coekate.murraystate.edu/coecms/ncate/manager/advsheet/>.

**Murray State University**  
**Department of Biology**  
**BS – Biology/Secondary Certification (Grades 8-12)**

Student \_\_\_\_\_ M# \_\_\_\_\_ Advisor \_\_\_\_\_

**UNIVERSITY STUDIES FOR B.S. DEGREE (46 HOURS)**

<b>Oral and Written Communication (7 Hours)</b>		<b>Hours</b>	<b>Semester</b>	<b>Grade</b>
ENG 105	Critical Reading, Writing, and Inquiry	4	_____	_____
COM 161	Introduction to Public Speaking	3	_____	_____
<b>Scientific Inquiry, Methodologies, and Quantitative Skills (15 Hours)</b>				
CHE 201	General College Chemistry	5	_____	_____
CHE 202	General Chemistry	5	_____	_____
MAT 150	Algebra and Trigonometry	5	_____	_____
<b>World's Historical, Literary, and Philosophical Traditions (6 Hours)</b>				
CIV 201 or 202	World Civilization I or II	3	_____	_____
HUM 211	The Western Humanities Tradition	3	_____	_____
<b>Global Awareness, Cultural Diversity, and the World's Artistic Traditions (3 Hours)</b>				
Approved University Studies _____		3	_____	_____
<b>Social and Self-Awareness and Responsible Citizenship (6 Hours)</b>				
Elective	BIO 308 recommended	3	_____	_____
EDP 260	Psychology of Human Development	3	_____	_____
<b>University Studies Approved Electives (9 Hours)</b>				
PHY 130/131	General Physics I	4	_____	_____
EDU 103	Issues and Practices of American Education	3	_____	_____
Approved University Studies Elective _____		3	_____	_____
<b>Secondary Certification Courses (32 hours)</b>				
EDU 303	Strategies of Teaching	3	_____	_____
EDU 403	Structures and Foundations of Education	2	_____	_____
EDU 405	Evaluation and Measurement in Education <sup>1</sup>	3	_____	_____
SEC 420	Practicum in Secondary Schools <sup>1</sup>	3	_____	_____
SEC 422	Extended Practicum <sup>2</sup>	4	_____	_____
SEC 421	Student Teaching in the Secondary Sch	14	_____	_____
	<small>*Writing-Intensive Course</small>			
SED 300	Educating Students with Disabilities	3	_____	_____
<b>Required Major Courses (38 hours)</b>				
BIO 100T	Transitions	1	_____	_____
BIO 115	Cellular Basis of Life	3	_____	_____
BIO 216	Biological Inquiry and Analysis	4	_____	_____
BIO 221	Animal Form and Function	4	_____	_____
BIO 222	Plant Form and Function	4	_____	_____
BIO 300	Microbiology	4	_____	_____
BIO 320	Comparative Vertebrate Anatomy	5	_____	_____
BIO 322	Animal Physiology	4	_____	_____
BIO 330	Principles of Ecology	4	_____	_____
BIO 333	Genetics	4	_____	_____
BIO 499	Senior Biology Seminar	1	_____	_____
<b>Chemistry Co-Requirements for Biology Major (11-12 hours)</b>				
CHE 312	Organic Chemistry I w/Laboratory	5	_____	_____
CHE 320	Organic Chemistry II	3	_____	_____

*Student takes three Chemistry classes above or the three Chemistry classes below.*

CHE 210	Brief Organic Chemistry	3	_____	_____
CHE 215	Brief Chemistry Laboratory	1	_____	_____
CHE 330	Basic Biochemistry	3	_____	_____
<b>Physics Co-Requirements for Biology Major</b>				
PHY 132/133	General Physics II with Laboratory	5	_____	_____
<b>Required Minor (3-21 hours)</b>				
_____	-	_____	3	_____
_____	-	_____	3	_____
_____	-	_____	3	_____
_____	-	_____	3	_____
_____	-	_____	3	_____
_____	-	_____	3	_____
_____	-	_____	3	_____

**Total Curriculum Requirements – 130-149 hours**

<sup>1</sup>SEC 420 and EDU 405 must be taken together and two semesters before student teaching.

<sup>2</sup>SEC 422 must be taken one semester before student teaching.

**PRAXIS TEST:**

The following scores on the Specialty Exams are required to be eligible for a teaching certificate:

Biology (5235)– Passing Score of 146

Principles of Learning and Teaching (5624) – Passing Score of 160

Teacher certification requirements are subject to change. Before registering for the test(s), please refer to the Education Professional Standards Board (EPSB) website at [www.epsb.ky.gov](http://www.epsb.ky.gov) for current requirements or contact the Division of Professional learning and Assessment at 502-564-4606 or 888-598-7667.

**GRADE POINT AVERAGE REQUIREMENTS:**

Grade point averages are reviewed during three checkpoints: admission to teacher education (see Requirements for Admission to Teacher Education), admission to student teaching (requires a 2.75 average overall; a 2.75 average in content area; a 2.75 average in professional education) and at the time of completion/graduation (2.75 overall).

**IMPORTANT: Upon completion of 60 undergraduate credit hours (junior status), students enrolled or desiring enrollment in education coursework beyond 12 hours credit MUST be admitted to the Teacher Education Program. Students must be admitted to Teacher Education prior to enrollment in upper level teacher education courses.**

**REQUIREMENTS FOR ADMISSION TO TEACHER EDUCATION AND STUDENT TEACHING AT MURRAY STATE UNIVERSITY Rev. (9/2015)**

*Teacher Education*

To be admitted to teacher education, students must:

1. Attend an admission to teacher education orientation.
2. Earn passing scores on the Core Academic Skills for Educators (CASE) test with these subject scores – Reading 156, Writing 162, and Mathematics 150. Request ETS to send scores to Teacher Education Services electronically by using this code, R1494. If any of the PPST subject areas were passed prior to September 1, 2014, use these PPST scores -

Reading 176, Writing 174, and Math 174. GRE (Graduate Records Exam) scores may be used for Graduate Students only with a minimum passing score of 150 in verbal, 143 in quantitative, and 4.0 in analytical writing.

3. Earn an overall undergraduate GPA of  $> 2.75$  on a 4.0 scale at the point of admission. This 2.75 minimum GPA remains a requirement throughout the teacher certification program.
4. Complete a minimum of 24 credit hours with a GPA  $> 2.75$  to include the following coursework:
  - a. ENG 101, 102, 104 or 105 with a “B” or higher
  - b. MAT 117 (or higher level math) with a “B” or higher
  - c. COM 161 or HON 165 with a “B” or higher
  - d. EDU 103 with a “B” or higher (or AED 380 or EDU 104 or CTE 200 or MSU 123 or ELE 605 [graduate students])
5. Participate in the admission to teacher education interview and receive their academic advisor’s recommendation to continue the program.
6. Review the Professional Code of Ethics for Kentucky School Personnel. Sign the
  - a. Declaration of Eligibility (pink sheet) affirming a commitment to uphold the code and
  - b. acknowledging awareness of information required for state certification. If answers given on the Declaration of Eligibility change during the time of participation in the teacher education program, the Director of Teacher Education Services must be notified immediately.

These requirements must be documented in *Recruiter*. CASE or GRE scores must be sent to MSU (R1494) via ETS. Admission will only be granted following a successful review by Teacher Education Services.

**NOTE: Students who have not been admitted to Teacher Education will not be eligible to enroll in upper level courses that specify admission to teacher education as a prerequisite.**

## **Student Teaching**

**To be admitted to student teaching**, students must have

- 1) been granted admission to Teacher Education;
- 2) filed a formal application in Teacher Education Services two semesters prior to the term in which student teaching is desired (Applications are distributed at scheduled student teaching orientations only.);
- 3) earned and maintained GPA  $\geq 2.75$  in major/areas, professional education, and overall;
- 4) demonstrated teaching ability in field and clinical situations;
- 5) documented completion of 200 or more field hours and components (beginning 9/1/2013);
- 6) senior, post-bac, or graduate status and have completed all major courses and specialty areas;
- 7) been admitted to Teacher Education;
- 8) completed all required professional teacher education courses (EDU 103, EDP 260,
- 9) EDU 303, SED 300 and EDU 403, etc. – see specific requirements by major or area) with a GPA  $> 2.75$  GPA;

- 10) filed a valid and current medical examination, which includes a TB risk assessment (to begin student teaching within six months of exam);
- 11) obtained a criminal records background check; and
- 12) supplied TES with any other required information (transcripts, course substitution forms, etc.).

**General Requirements for Kentucky Certification**

Graduates who wish to be recommended by MSU for an initial Kentucky teaching certificate must have

- 1) successfully completed an approved teacher education program including student teaching;
- 2) filed an application for certification (CA-1) with Teacher Education Services at MSU;
- 3) obtained at least minimal scores required on PRAXIS specialty area tests and the appropriate Principles of Learning and Teaching Test (PLT);
- 4) completed all applicable **computer literacy and applications** requirements;
- 5) earned a bachelor’s degree;
- 6) mailed a copy of criminal record check to EPSB; and
- 7) sent official transcript to EPSB.

In addition, in Kentucky, full certification requires the completion of the Kentucky Teacher Internship Program. To be recommended for certification in other states, all Kentucky requirements must be met.

**NOTE: Requirements for teacher certification are established by the Kentucky Education Professional Standards Board (KEPSB). Students are cautioned that changes in these requirements may occur after publication of the current Murray State University *Bulletin*. For the most current information, students should check with an advisor in one of the departments in the College of Education.**

Student \_\_\_\_\_

Advisor \_\_\_\_\_

Date \_\_\_\_\_

Date \_\_\_\_\_

**G. Syllabi**

Common course syllabi, posted on the unit’s intranet site, ensure all course instructors provide a consistent, quality delivery of each education course. Furthermore, these guidesheets also contain important Admission to Teacher Education information. Guidesheets are shared during advising sessions, aligned with candidates’ MSU RACR audits, and posted on <http://coekate.murraystate.edu/coecms/ncate/manager/advsheet/>.

**EDUCATION CORE AND METHODS COURSES**

**EDU 103**

**EDU 303**

**EDP 260**

**SED 300**

**EDU 403**  
**EDU 405**  
**SEC 420**

**BIOLOGY CONTENT COURSES**

**BIO 116**  
**BIO 221**  
**BIO 320**