Code # ED47 (2014) REV2

**New/Special Course Proposal-Bulletin Change Transmittal Form**

[x]  **Undergraduate Curriculum Council** - Print 1 copy for signatures and save 1 electronic copy.

[ ]  **Graduate Council** - Print 1 copy for signatures and send 1 electronic copy to mmcginnis@astate.edu

|  |
| --- |
| [x] **New Course or** [ ]  **Special Course (Check one box)***Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.*  |

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| --- | --- |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**COPE Chair (if applicable)** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Department Chair:**  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**General Education Committee Chair (If applicable)**   |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Undergraduate Curriculum Council Chair** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**College Dean** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Graduate Curriculum Committee Chair** |
|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…**Vice Chancellor for Academic Affairs** |

1. Proposed Course Prefix and Number (For variable credit courses, indicate variable range.)

MLED 3093

2. Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).

Teaching Middle Level Science Integrated with Technology, Engineering, and Mathematics

Short title: Teaching Middle Level STEM

3. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio problems, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.

Lecture

4. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental)?

Standard letter

5. Is this course dual listed (undergraduate/graduate)?

No

6. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)

No

7. Brief course description (40 words or fewer) as it should appear in the bulletin.

Study of theories and practices that promote integrated science, technology, engineering, and mathematics (STEM) teaching by middle level science specialty students.

8. Indicate all prerequisites and if this course is restricted to a specific major, which major. (If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).

a. Are there any prerequisites?

BIOL 1001, BIOL 1003, PHSC 1201, PHSC 1203, GSP 3203, MATH 1023

b. Why?

Students need to have a strong foundation in science and mathematics before studying how to teach science integrated with mathematics, technology, and engineering.

9. Course frequency(e.g. Fall, Spring, Summer). Not applicable to Graduate courses.

Spring

10. Contact Person (Name, Email Address, Phone Number)

Dr. Ron Towery, Arkansas State University, Jonesboro. PO Box 2350, State University, AR 72467. Rtowery@astate.edu . 870-972-3059

11. Proposed Starting Term/Year

Spring 2016

12. Is this course in support of a new program? No

If yes, what program?

13. Does this course replace a course being deleted? No

If yes, what course?

Enter text...

Has this course number been used in the past? No

*Submit Course Deletion Proposal-Bulletin Change Transmittal Form.*

14. Does this course affect another program? No

If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.

Enter text...

15. Justification should include:

a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)

This course serves as the introduction for prospective middle level science teachers to learn how to plan, facilitate, and assess units during which science, technology, engineering, and/or mathematics are integrated to support student science learning. Teaching practice recommendations from the Arkansas Department of Education *Competencies for Middle Childhood Teachers: Science, Grades 4-8* and the *Association for Middle Level Education* *Teacher Preparation Standards* will drive the goals and organization of the course. Science content and student practices will be aligned with the grades 4-8 *Arkansas Science Curriculum Frameworks, A Framework for K-12 Science Education,* and *Common Core Standards for Mathematics* and *Common Core English Language Arts & Literacy in Science and Technical Subjects*.

b. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.

The mission of the Department of Teacher Education encompasses three areas: teaching, service, and research. This course contributes significantly toward the accomplishment of the department’s goal of preparing Professionally Emerging Teachers and Emerging Professionals in the fields of middle level education.

**This course supports the Arkansas Department of Education’s competencies for middle level education.**

**Specifically, the course will address the following InTASC Standards**The Learner and Learning
Standard 1: Learner Development: The teacher (a) creates developmentally appropriate instruction that takes into account individual learners’ strengths, interests, and needs and that enables each learner to advance and accelerate her/his learning; and (b) understands how learning occurs—how learners construct knowledge, acquire skills, and develop disciplined thinking processes-and knows how to use instructional strategies that promote student learning.

Standard 3: Learning Environments: The teacher develops learning experiences that engage learners in collaboration and self-directed learning and that extend learner interaction with ideas and people locally and globally.

Content

Standard 4: Content Knowledge: The teacher (a) engages learners in applying methods of inquiry and standards of evidence used in the discipline; (b) creates opportunities for students to learn, practice, and master academic language in their content; (c) understands major concepts, assumptions, debates, processes of inquiry, and ways of knowing that are central to the discipline(s) s/he teachers; (d) knows and uses the academic language of the discipline and knows how to make it accessible to learners; and (e) has a deep knowledge of student content standards and learning progressions in the discipline(s) she teaches.

Standard 5: Application of Content: The teacher (a) develops and implements projects that guide leaners in analyzing the complexities of an issue or question using perspectives from varied disciplines and cross-disciplinary skills; (b) engages leaners in applying content knowledge to real world problems through the lens of interdisciplinary themes; (c) develops learners’ communication skills in disciplinary and interdisciplinary contexts by creating meaningful opportunities to employ a variety of forms of communication that address varied audiences and purposes; (d) engages learners in generating and evaluating new ideas and novel approaches, seeking inventive solutions to problems, and developing original work; and (d) develops and implements supports for learner literacy development across content areas.

Instructional Practice

Standard 6: Assessment: The teacher engages learners in understanding and identifying quality work and provides them with effective descriptive feedback to guide their progress toward that work; and (b) models and structures processes that guide learners in examining their own thinking and learning as well as the performance of others.

Standard 7: Planning for Instruction: The teacher (a) individually and collaboratively selects and creates learning experiences that are appropriate for curriculum goals and content standards, and are relevant to leaners; (b) understands content and content standards and how these are organized in the curriculum; (c) understands how integrating cross-disciplinary skills in instruction engages leaners purposefully in applying content knowledge; and (d) knows a range of evidenced-based instructional strategies, resources, and technological tools and how to use them effectively to plan instruction that meets diverse learning goals.

Standard 8: Instructional Strategies: The teachers (a) varies his/her role in the instructional process in relation to the content and purposes of instruction and the needs of learners; (b) provides multiple models and representations of concepts and skills with opportunities for learners to demonstrate their knowledge through a variety of products and performances; (c) uses a variety of instructional strategies to support and expand learners’ communication through speaking, listening, reading, writing, and other modes; (d) understands the cognitive processes associated with various kinds of learning and how these processes can be stimulated; and (e) understands how multiple forms of communication convey ideas, foster self-expression, and build relationships.

**Specifically, the course will address the following Competencies for Middle Childhood Teachers: Science, Grades 4-8:**

1. Integration of STEM (science, technology, engineering, and mathematics)
	1. Understand and model key concepts of science, technology, engineering, and mathematics (STEM)

1.2 Develop and deliver STEM-integrated, student-centered lessons and lab investigations taking into account factors such as safety measures, grades 4-8 classroom dynamics, problem solving, and project-based learning strategies, etc., which integrate grade-appropriate standards and practices

1.3 Understand and apply the engineering design process used to solve real-world problems in grades 4-8 lessons

1.4 Collect, evaluate, synthesize, and share real world data

1.5 Apply knowledge of STEM toward solving human and environmental problems

1.6 Utilize vocabulary, primary concepts, definitions, and models applicable to scientific investigations and engineering and design challenges

1.7 Develop and deliver STEM lesson assessments (formative and summative)

1.8 Recognize how an integrated approach can enrich the learning environment and build connections between STEM content areas

1.9 Appreciate of the nature of science and scientific inquiry through solving real-world problems

1.10 Develop and implement grades 4-8 STEM units and lessons

1.11 Share, model, and practice strategies to support the integration of STEM areas with the emphasis in the 4-8 classroom

2. Vision for K-12 science education: scientific and engineering practices, cross cutting concepts, and core ideas.

2.1 Demonstrate a command of the Next Generation Science Standards (NGSS) three dimensional vision for grades 4-8 science education- “… students, over multiple years of school, actively engage in scientific and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas in these fields.”

2.2 Demonstrate a command of the eight NGSS scientific and engineering practices (Dimension 1):

* Asking questions (for science) and defining problems (for engineering)
* Developing and using models
* Planning and carrying out investigations
* Analyzing and interpreting data
* Using mathematics and computational thinking
* Constructing explanations (for science) and designing solutions (for engineering)
* Engaging in argument from evidence
* Obtaining, evaluating, and communicating information

2.5 Identify and implement lessons/units that integrate the scientific and engineering practices and crosscutting concepts with each of the core ideas as specified in the performance expectations of the NGSS

2.6 Demonstrate content and science investigation teaching methods for grades 4-8 in the particular core ideas of:

Engineering, Technology, and the Applications of Science

ETS 1: Engineering design

ETS 2: Links among engineering, technology, science, and society

2.7 Implement the Common Core State Standards for mathematics and English/Language Arts and ISTE Standards for Teachers as they support NGSS

2.8 Design and conduct science investigations in at least one, if not all, of the NGSS disciplinary core ideas with attention to gathering and interpreting scientific data

2.9 Demonstrate diverse teaching strategies for reading and writing informational texts like those read and written by scientists

6. Principles of Engineering Design, Technology, and Applications of Science

6.1 Demonstrate a deep understanding following active investigations in the principles of the engineering design cycle in the context of grades 4-8 science

Core Idea ETS1: Engineering Design

ETS1.A: Defining and Delimiting an Engineering Problem

ETS1.B: Developing Possible Solutions

ETS1.C: Optimizing the Design Solution

Core Idea ETS2: Links Among Engineering, Technology, Science, and Society

ETS2.A: Interdependence of Science, Engineering, and Technology

ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World

**The course will address the following competencies from the Association for Middle Level Education Teacher Preparation Standards (Accrediting Agency)**

Principle B: Content

Standard 2: Middle Level Curriculum: Middle level teacher candidates understand and use the central concepts, standards, research, and structures of content to plan and implement curriculum that develops all young adolescents’ competence in the subject matter. They use their knowledge and available resources to design, implement, and evaluate challenging, developmentally responsive curriculum that results in meaningful learning outcomes. Middle level teacher candidates demonstrate their ability to assist all young adolescents in understanding the interdisciplinary nature of knowledge. They design and teach curriculum that is responsive to all young adolescents’ local, national, and international histories, language/dialects, and individual identities (e.g., race, ethnicity, culture, age, appearance, ability, sexual orientation, socioeconomic status, family composition).

1. Subject Matter Content Knowledge
2. Middle Level Student Standards (state and national)

Principle C: Instructional Practice

Standard 4: Middle level candidates understand, use, and reflect on the major concepts, principles, theories, and research related to data-informed instruction and assessment. They employ a variety of developmentally appropriate instructional strategies, information literacy skills, and technologies to meet the learning needs of all young adolescents (e.g. race, ethnicity, culture, age, appearance, ability, sexual orientation, socioeconomic status, family composition).

a. Content Pedagogy

 b. Middle Level Instructional Strategies

**Specifically, the course will address the following Learning to Teach, Teaching to Learn Conceptual Framework Standards**

Curriculum: The teacher candidate will plan and use curriculum appropriate to students, content and course objectives by (a) planning instruction which applies to state and national standards; (b) planning and using a variety of instructional strategies; and (c) integrating the curriculum with content areas, technology, and life experiences as appropriate.

Subject Matter: The teacher candidate understands the central concepts, tools of inquiry, and the structures of the discipline(s) she or he teaches, and can create learning experiences that make these aspects of subject matter meaningful for students by (a) developing and using curriculum that encourages students to see, question, and interpret from diverse perspectives; and (b) engaging students in generating knowledge and testing hypotheses according to the methods of inquiry and standards of evidence used in the disciplines.

Teaching Models: The teacher candidate implements a variety of teaching models by facilitating students’ thinking processes and inquiry into concepts.

Reflective Teaching: The teacher candidate develops reflective skills by (a) planning and analyzing instructional techniques prior to teaching; (b) collaborating and communicating with colleagues to share ideas, insights, and learning activities; and (c) analyzing her/his teaching techniques in order to build on strengths and improve areas for further growth.

b. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.

**The mission statement of the School of Education and Behavioral Science, Department of Teacher Education and Leadership,** in part states that: “Our mission is… to apply that knowledge to improve education and the quality of life for all individuals in a pluralistic and democratic society.” This course directly addresses supporting teaching candidates so they will be successful applying knowledge of middle level student STEM learning, curriculum, instruction, and assessment so to improve middle level education and chances of their students’ future successes in education, career, and life.

The course provides teacher candidates seeking Arkansas Department of Education middle level licensure opportunities to prepare to teach integrated STEM curricula. This course was recommended by the Arkansas Department of Education.

c. Student population served.

This course is designed for undergraduate students enrolled in the Middle Level BSE degree program who have a science specialty.

d. Rationale for the level of the course (lower, upper, or graduate).

The course is an upper level course because it builds on a number of science and mathematics prerequisites.

16. Outline (The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

**Week 1: Introduction**

Topics will include:

* current educational research support for STEM teaching and learning,
* STEM as a career and academic pathway,
* distinctions among science, engineering, and technology,
* purposes and needs of STEM education,
* different perspectives about what STEM education is, including integrated STEM education (the perspective of STEM education modeled by this course), and
* challenges of facilitating STEM education in the middle level classroom.

**Weeks 2-3: STEM Activities**

During Weeks 2 and 3, students will

* experience two stand-alone activities that integrate science with mathematics (including measurement, data collection and interpretation),
* review the STEM lesson framework (5-E)
* discuss formative and summative assessment of the activities, and
* reflect on how to successfully facilitate math-science lessons in middle level classrooms.

**Weeks 4-6: Scientific Practices Unit**

Weeks 4, 5, and 6 will target the scientific practices. Students will

* experience a learning unit based on the scientific practices model,
* examine the scientific practices lesson framework,
* discuss what the middle level classroom looks like when students engage in scientific practices,
* discuss benefits and challenges of implementing scientific practices in the middle level classroom,
* demonstrate their learning through written and oral explanations of their process of answering the scientific question and defend the conclusion for their scientific question,
* discuss formative and summative assessment when students engage in scientific practices, and
* explain how scientific practices and the sample unit align with and support middle childhood learning, the Arkansas Science Frameworks, Common Core State Standards, and *A* *Framework for K-12 Science Education.*

**Weeks 7-9: Project-based Learning (PBL) Unit**

Weeks 7, 8, and 9 will target Project-Based Learning. Students will

* experience a learning unit based on the PBL model,
* examine a PBL lesson framework,
* discuss what the middle level classroom looks like when students engage in this model,
* discuss benefits and challenges of implementing PBL in the middle level classroom,
* demonstrate their learning by presenting their PBL sample unit orally and in writing,
* discuss formative and summative assessment when students engage in PBL, and
* explain how PBL and the sample unit align with and support middle childhood learning, the Arkansas Science Frameworks, Common Core State Standards, and *A Framework for K-12 Science Education.*

**Weeks 10-12: Engineering Design Unit**

Weeks 10, 11, and 12 will target Engineering Design. Students will

* experience a learning unit based on the engineering design model,
* examine an engineering design lesson framework,
* discuss what the middle level classroom looks like when students engage in this model,
* discuss benefits and challenges of implementing engineering design units in the middle level classroom,
* demonstrate their learning by presenting their sample engineering design solution orally and in writing,
* discuss formative and summative assessment when students engage in the engineering design model, and
* explain how the engineering design model and sample unit align with and support middle childhood learning, the Arkansas Science Frameworks, Common Core State Standards, and *A Framework for K-12 Science Education.*

**Weeks 13-15: Student Unit Demonstrations**

Weeks 13, 14, and 15 will target student-generated lesson development and implementation, such that students will

* collaborate in pairs to prepare a unit based on the scientific practices model, PBL model, or engineering design model;
* explain the unit to their peers including how the unit aligns with the model lesson framework; how they will prepare the unit before using it; how they will facilitate student engagement in the unit; how they will formatively and summatively assess students; and how the unit aligns and supports middle childhood learning, the Arkansas Science Frameworks, Common Core State Standards, and *A* *Framework for K-12 Science Education;*
* engage peers in one activity that is part of the unit; and
* lead a reflective discussion with peers, including but not limited to, challenges presented by the unit, changes they will make before using the unit with students, and how the unit will promote STEM learning.

17. Course requirements (e.g. research papers, projects, interviews, tests, etc.)

Students will

1. Complete two STEM activities targeting the integration of mathematics with Physical Science, Life Science, Earth or Space Science, and submit reports for both showing

* their work on the activities, including data collected, analysis of the data, claims based on evidence, and support for the claims;
* connections with Arkansas Science Frameworks, Common Core State Standards, and *A* *Framework for K-12 Science Education*;
* insights into formative and summative assessment of student learning during the activities; and
* reflections regarding successful implementation in the middle level classroom and challenges to implementation.

2. Complete three STEM units, one each targeting scientific practices, Project-based Learning, and engineering design, anchored in Physical Science, Life Science, Earth or Space Science, and submit reports for each showing

* their work on the units (format to be determined by the unit model);
* connections with Arkansas Science Frameworks, Common Core State Standards, and *A* *Framework for K-12 Science Education*;
* insights into formative and summative assessment of student learning during the activities; and
* reflections regarding successful implementation in the middle level classroom and challenges to implementation.

3. Plan an existing unit found in the professional literature focused on scientific practices, PBL, or engineering design, present the unit plans, and engage peers in one unit activity. The unit will be submitted, and include

* an outline of the unit (format determined by the unit model);
* the written activity lesson;
* how the unit engages students in scientific practices, PBL, or engineering design;
* how the unit connects with Arkansas Science Frameworks, Common Core State Standards, and *A* *Framework for K-12 Science Education*;
* how the unit will be assessed when used with students; and
* a reflection on the unit plans and facilitation of the activity with the peers.

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18. Special features (e.g. labs, exhibits, site visitations, etc.)

None

19. Department staffing and classroom/lab resources (Will this require additional faculty, supplies, etc.?)

No staffing changes.

20. What is the primary intended learning goal for students enrolled in this course?

Students will learn to develop lesson plans and units based on scientific practices, project-based learning, and engineering design.

21. Reading and writing requirements:

a. Name of book, author, edition, company and year

**Week 1**

National Research Council. (2012). A new conceptual framework. In *A Framework for K-12 Science Education* (pp. 7-20). Washington, DC: National Academies Press.

National Research Council. (2012). Guiding assumptions and organization of the framework. In *A Framework for K-12 Science Education* (pp. 23-34). Washington, DC: National Academies Press.

Kier, M. W., Blanchard, M. R., & Albert, J. L. (2014, February). Connecting students to STEM careers. *Science Scope,* 72-76.

Museum of Science, Boston. (2014). Science, engineering, and technology: Three disciplines, one world. http://www.eie.org/overview/science-engineering-technology

**Week 2 -3: Integrating Math and Science Activities**

Office of Science Outreach, University of Missouri. (2012). Engaging students in the 5-E instructional model. <http://gk12.missouri.edu/showmenature/lessons/5-E%20Overview-GK-12.pdf>

Schols, A., & Miller, K. B. (2012, September). Identifying mathematics content and integrating it into science instruction. *Science Scope*, 48-52.

Hurley, M. M., & Normandia, B. (2005, September). A taste of math and science. *Science Scope,* 26-29.

**Weeks 4-6: Scientific Practices**

National Research Council. (2000). *Inquiry and the National Science Education Standards* (pp. 1-85). Washington, DC: National Academies Press.

National Research Council. (2012). Scientific and engineering practices. In *A Framework for K-12 Science Education* (pp. 41-82). Washington, DC: National Academies Press.

Ryan, L., & Steinke, J. (2010, September). I want to be like…Middle school students’ identification with scientists on television. *Science Scope*, 44-49.

**Weeks 7-9 Project-based Learning**

Lamar, J. (2009). *PBL starter kit*. Novato, CA: Buck Institute for Education (pp. 1-126).

**Weeks 10-12: Engineering**

Crismond, D., Gellert, L., Cain, R., & Wright, S. (2013, October). Minding design missteps. *Science and Children*, 80-85.

Gooding, J., & Metz, B. (2012, Summer). Collaboration for communication. *Science and Children*, 26-31.

Lachapelle, C., Sargianis, K., & Cunningham, C. M. (2013, November). Engineering it, learn, it: Science and engineering practices in action. *Science and Children*, 70-76.

Lottero-Perdue, P. S., Lovelidge, S., & Bowling, E. (2010, March). Engineering for all. *Science and Children*, 24-27.

National Research Council. (2012). Disciplinary core ideas-engineering, technology, and applications of science. In *A Framework for K-12 Science Education* (pp. 201-214). Washington, DC: National Academies Press.

National Research Council. (2012). Equity and diversity in science and engineering education. In *A Framework for K-12 Science Education* (pp. 277-290). Washington, DC: National Academies Press.

Purzer, S., Duncan-Wiles, D., & Strobel, J. (2013, January). Cost or quality. *Science and Children,* 34-39.

**Weeks 13-14**

Student presentations.

**Week 15**

Final Exam.

b. Number of pages of reading required per week: 22

c. Number of pages of writing required over the course of the semester: 50

22. High-Impact Activities (Check all that apply)

[x] Collaborative assignments

[ ] Research with a faculty member

[ ] Diversity/Global learning experience

[ ] Service learning or community learning

[ ] Study abroad

[ ] Internship

[ ] Capstone or senior culminating experience

[ ] Other Explain: Enter text...

23. Considering the indicated primary goal (in Box #20), provide up to three outcomes that you expect of students after completion of this course.

**Outcome #1:** (For example, what will students who meet this goal know or be able to do as a result of this course?)

Students will be able to plan a middle level unit modeled after the scientific practices, engineering design, or PBL.

Learning Activity:(For example, what instructional processes do you plan to use to help students reach this outcome?)

Students will study scientific practices, engineering design, and PBL and explore ways it can be integrated into science lessons.

Assessment Tool: (For example, what will students demonstrate, represent, or produce to provide evidence of their learning?)

Students will develop a middle level unit plan level modeled after the scientific practices, engineering design, or PBL and the instructor will evaluate it using a rubric.

*(Repeat if needed for additional outcomes 2 and 3)*

**Outcome #2:**

Learning Activity:

Assessment Tool:

**Outcome #3**:

Learning Activity:

Assessment Tool:

24. Please indicate the extent to which this course addresses university-level student learning outcomes:

* 1. Global Awareness

[x] Minimally
[ ] Indirectly
[ ] Directly

* 1. Thinking Critically

[ ] Minimally
[ ] Indirectly
[x] Directly

* 1. Using Technology

[ ] Minimally
[ ] Indirectly
[x] Directly

**From the most current electronic version of the bulletin, copy all bulletin pages that this proposal affects and paste it to the end of this proposal.**

**To copy from the bulletin:**

1. Minimize this form.
2. Go to <http://registrar.astate.edu/bulletin.htm> and choose either undergraduate or graduate.
3. This will take you to a list of the bulletins by year, please open the most current bulletin.
4. Find the page(s) you wish to copy, click on the “select” button and highlight the pages you want to copy.
5. Right-click on the highlighted area.
6. Click on “copy”.
7. Minimize the bulletin and maximize this page.
8. Right-click immediately below this area and choose “paste”.
9. For additions to the bulletin, please change font color and make the font size larger than the surrounding text. Make it noticeable.
10. For deletions, strike through the text, change the font color, and enlarge the font size. Make it noticeable.

MLED 3093. Teaching Middle Level Science Integrated with Technology, Engineering and Mathematics

Study of theories and practices that promote integrated science, technology, engineering, and mathematics (STEM) teaching by middle-level science specialty students. Must be admitted to the Teacher Education Program. Prerequisites: BIOL 1001, BIOL 1003, PHSC 1201, PHSC 1203, GSP 3203, MATH 1023. Spring.