

OFFICE OF QUALITY PROFESSIONALS & SPECIAL SCHOOLS
Summary of State Board of Education Agenda Items
May 16-17, 2013

OFFICE OF EDUCATOR LICENSURE

18. Approval of Proposal from Mississippi State University for Supplemental Endorsement Program in Career Technical Education (983) as Recommended by the Commission on Teacher and Administrator Education, Certification and Licensure and Development

Background Information:

Mississippi State University requests that a new methods course, Teaching Science, Technology, Engineering and Mathematics (STEM) in the Middle School (TKT 4483/6483), be accepted as a course eligible to meet the requirement for successfully completing a Mississippi Department of Education (MDE) approved STEM Certification Workshop, module, or course for earning a 983 endorsement. This endorsement allows a person to teach 000273: Science, Technology, Engineering, and Mathematics Application.

The proposal and syllabus have been reviewed and recommended for approval by MDE's Office of Career and Technical Education and external reviewers.

Recommendation: Approval

Backup material attached

EDUCATION PROGRAM APPROVAL FORM (M) MODIFYING AN EXISTING PROGRAM

| | |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Institution: Mississippi State University | Date Submitted: March 2013 |
| Institutional Contact: Dr. Connie Forde | Contact's Phone: 662-341-3322 Contact's Email: sdevlin@colled.msstate.edu |
| Proposed Date of Implementation: Summ 2013 | Proposal to Modify an Existing: <input type="checkbox"/> Initial Teacher Education Program <input checked="" type="checkbox"/> Advanced Education Program <input type="checkbox"/> Licensure Requirement |

In addition to your current education program course outline/description, if applicable, you must include the following:

- an outline of the proposed program with clear indication of any proposed changes
- proposed course syllabi and course descriptions if applicable
- a list of faculty who will provide instruction for the proposed courses/program of study and faculty table that presents qualifications (i.e., SACS or NCATE faculty data forms)
- a list and copies of program outline for similar (or same) programs/courses of study at two or more IHLs (instate or out-of-state), or provide URLs if posted online
- documentation of MS IHL approval (if MS public institution)
- current professional association recognition
- any other documentation that further supports the rationale for the proposal

NOTE: Use the spaces below for a brief description; however, please attach a more detailed proposal, and/or the copy of the proposal submitted for IHL approval.

Briefly state your request: Approval of the TKT 4483/6483 methods course to satisfy the requirement for completing an MDE approved STEM Certification Workshop, module, or course for earning a 983 endorsement.

Briefly state your rationale: The current CTE guidelines require applicants for certification to complete an online learning workshop, module or course that is approved by MDE.

NOTE: Program approval requests must be submitted no later than January 15 for upcoming fall implementation, and by July 15 for upcoming spring implementation. Please allow up to six months for standard review procedures and final approval. After TAP approves a licensed degree program or a new licensure requirement, the new program or requirements will be subject to approval by the Licensure Commission on Teacher and Administrator Education, Certification and Licensure and Development and the State Board of Education before candidates are eligible for Mississippi Teacher Licensure.

E-mail this form to Gail Gettis at ggettis@mde.k12.ms.us or fax to 601-359-1728.

983 Science, Technology, Engineering, and Mathematics Application
STEM

- This is an “add on” endorsement that may be earned only by persons who hold a currently valid 5-year standard Mississippi Educator License with endorsement in any subject area (academic or occupational).

A #983 endorsement allows a person to teach the following course:

000273 Science, Technology, Engineering, and Mathematics Application

This endorsement requires the following:

1. Applicant must hold a currently valid 5-year standard Mississippi Educator License
2. Applicant must validate technology competency by attaining the established minimum score or higher on an assessment approved by the Mississippi Department of Education (MDE). The assessment must be directly related to technology competency required by the grade level and subject matter being taught. Approved assessment for this license is IC3.
3. Applicant must demonstrate the ability to function in and maintain a networked laboratory
4. Applicant must successfully complete a Certification for online learning workshop, module, or course that is approved by the MDE
5. Applicant must successfully complete a STEM Certification workshop, module, or course that is approved by the MDE

note: If the applicant meets all requirements listed above, that applicant will be issued an endorsement supplemental to their existing five-year license. If the applicant does not meet all requirements, the applicant will be issued an emergency endorsement, and all requirements for the supplemental endorsement must be satisfied prior to the renewal date of the standard license



MISSISSIPPI STATE
UNIVERSITY™

DEPARTMENT OF INSTRUCTIONAL SYSTEMS AND WORKFORCE DEVELOPMENT

Box 9730

MISSISSIPPI STATE, MISSISSIPPI 39762-9730

February 14, 2013

TELEPHONE: 662-325-2281

FAX: 662-325-7599

Ms. Cindy Coon
Office of Licensure
Mississippi Department of Education
P.O. Box 771
Jackson, MS 39205-0771

Dear Ms. Coon:

Subject: Request to Approve Proposed TKT 4483/6483 Methods of Teaching STEM in the Middle School as Methods Course for 98³ "Add on" Endorsement

As department head of the Department of Instructional Systems and Workforce Development at Mississippi State University, I am requesting that the new proposed methods course TKT 4483/6483 Teaching STEM in the Middle School be accepted as a methods course required for the "add on" endorsement for 983 Science, Technology, Engineering, and Mathematics (STEM). The attached syllabus shows that the methods course includes learning objectives related to the curricular content of the STEM technology framework, pedagogy for middle school students, relevant instructional strategies related to STEM, and appropriate formative and summative assessments. This course will be presented to the College and University curriculum committees this spring with anticipated approval to offer in the next school year 2013-2014.

Should you have questions, please call me at 662-325-7258. We are very excited about offering this endorsement opportunity for our Mississippi teachers, and I look forward to receiving your approval of this course.

Sincerely,

Dr. Connie M. Forde
Professor/Department Head

Attachment: Course Syllabus for TKT 4483/6483 Methods of Teaching STEM in the Middle School

c Ms. Jean Massey
Dr. Mike Mulvihill
Dr. Teresa Jayroe



March 8, 2013

Comments for the State Licensure Commission Regarding TKT 4483/6483 *Methods of Teaching STEM in the Middle School*.

This proposal appears to be missing information – specifically documentation of IHL programs for STEM education and consideration of national STEM curriculum projects.

The proposed course is a good addition to put in place for the STEM endorsement. It should be helpful to any middle school teacher who works with STEM skills and such a course is certainly needed. After reviewing the proposed content, I have the following observations regarding this proposal.

Topic 4: Teaching the design process and how it used to develop products.

It appears that this topic will be supported by teaching CAD and perhaps using an introduction to 3-D printing. This may be problematic for two reasons.

1. Although CAD and rapid prototyping-related technologies, such as 3-D printing, are certainly important tools in the manufacturing design process, they support that process rather than define it. I am concerned that in this case the technology may overshadow the core concepts in such a short instruction to the topic. The focus needs to be on the engineering design process itself and how that process is used to solve problems and develop products.
2. In addition, not every community college site in Mississippi has 3-D printing; it seems unlikely that every middle school teacher will encounter the technology in their work environment. A solution to the problem would be to use modeling software to create the 3-D model. This would have the additional advantage that such content would be easier to develop for the online version of the course.
3. It is important that care is taken to make certain that simplifying content does create unintended errors that will need to be corrected in more advanced coursework.

An historical example is “simplification” of CAD in the technology discovery modules that treated the program as virtual graph paper. At the time that this was commonly in place, I was

teaching engineering graphics at L.S.U. for the industrial engineering department. The absolute coordinate method had the unfortunate effect of ingraining poor habits that were extremely difficult to break once the student went to college. This was not helpful to students who had been introduced to the content in these modules and made the college level work much more difficult than it was for students who were true beginners.

Graduate Version

4. The graduate version of this course is requiring a ten-page paper related to STEM in the middle school. It might be more in line with the purpose of STEM reform to focus this work on developing embedded application projects related to local industries.

Supporting literature for the proposal

5. *Project Lead the Way* (<http://www.pltw.org>), is the largest and most widely implemented STEM education program currently in progress and has been running since 1997. It has been continuously researched and modified and includes teacher education materials for STEM. There is a large component of this project focused on middle school teacher education for STEM. The omission of this nationally implemented project raises the question of why this research appears not be included in the design of this proposal.

I am very supportive of implementation of this type of course with some attention to the concerns listed above. If you have any questions, my cell number is (228) 282-0470.



Karen R. Juneau, Ph.D.
Associate Professor and Chair
Career and Technical Education
William Carey University

EDUCATION PROGRAM PROPOSAL REVIEW FORM (R)

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reviewer Name: Diane Fisher | Reviewer Phone: 601-266-6884 |
| Reviewer Title/Position: Associate Dean | Reviewer Email: diane.fisher@usm.edu |
| Institution Submitting Proposal: Mississippi State University | Date Submitted: Feb 2013 |
| Proposed Date of Implementation: Fall 2013 | Proposal to Implement a New Program or to Modify an Existing <input checked="" type="checkbox"/> Teacher Education Program <input type="checkbox"/> Ed Leadership Program <input type="checkbox"/> Licensure Requirement |
| <p>In addition to the <u>current education program outline/course description</u>, the proposal material should include for your review, where applicable,</p> <ul style="list-style-type: none"> ➤ a copy of the current program ➤ outline of the proposed program with clear indication of any proposed modifications ➤ proposed course syllabi and course descriptions ➤ a list of faculty who will provide instruction for the proposed courses/program of study and their curriculum vitae ➤ a list and example of a program outline for similar (or same) programs/courses of study at one or more IHLs (instate or out-of-state), or provide URLs if posted online ➤ documentation of institution administrative approval and MS IHL approval (if MS public institution) ➤ current special program recognition where applicable ➤ any other documentation that further supports the rationale for the proposal <p>As a qualified education professional, your review should ensure the program utilizes current content that is infused with state (InTASC) standards and national professional association standards, and the program provides instruction for program candidates on the most recently adopted state curriculum frameworks or common core for subject areas when appropriate, or adheres to other applicable state content and instruction policy and guidelines.</p> | |
| <p>Synopsis of proposal request for review (<i>see attached proposal for details</i>): Mississippi State requests approval of TKT 4483/6483 Methods Course to satisfy requirements for the 983 endorsement</p> | |
| <p>Provide findings/comments/recommendations (<i>if needed, please use additional space or provide an attachment</i>): See attached email</p> | |
| <p><input checked="" type="checkbox"/> recommend approval of this proposal for submission to the Licensure Commission on Teacher and Administrator Education, Certification and Licensure and Development.</p> <p><input type="checkbox"/> do not recommend approval of this proposal for submission to the Licensure Commission on Teacher and Administrator Education, Certification and Licensure and Development.</p> | |

E-mail this form to ggettis@mde.k12.ms.us or acarter@mde.k12.ms.us or fax to 601-359-1728.

Gail Gettis

Fr Diane Fisher [Diane.Fisher@usm.edu]
S Tuesday, February 19, 2013 11:56 AM
To: Gail Gettis
Cc: Ann P Blackwell
Subject: RE: two proposals

Gail,

I have reviewed the MSU proposals and would recommend approval of the online methods course. I currently have these goals embedded in my methods class, but it appears MSU wants to have a stand alone course in order to recruit teachers during the summer. From my understanding, career and technical teachers will be required to have online certification beginning in 2015.

My only question about the STEM course would be if the department has the necessary software (for example, CAD) and the robotics programming to actually teach the content. Often this is found in the science departments.

Please let me know if you have further questions.

Thanks,

Diane

Diane J. Fisher, Ph.D.
Associate Dean and Associate Professor
College of Education and Psychology
The University of Southern Mississippi
118 College Drive, #5023
Hattiesburg, MS 39406
Phone: 601-266-6884
Email: diane.fisher@usm.edu
Fax: 601-266-4175

EDUCATION PROGRAM PROPOSAL REVIEW FORM (R)

| | |
|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reviewer Name: Karen R. Juneau, Ph.D. | Reviewer Phone: (228) 282-0470 |
| Reviewer Title/Position: Associate Professor and Chair, Career & Technical Education, William Carey University | Reviewer Email: kjuneau@wmcarey.edu |
| Institution Submitting Proposal: Mississippi State University | Date Submitted: March 8, 2013 |
| Proposed Date of Implementation: Fall 2013 | Proposal to Implement a New Program or to Modify an Existing <input checked="" type="checkbox"/> Teacher Education Program Ed Leadership Program Licensure Requirement |

In addition to the current education program outline/course description, the proposal material should include for your review, where applicable,

- a copy of the current program
- outline of the proposed program with clear indication of any proposed modifications
- proposed course syllabi and course descriptions
- a list of faculty who will provide instruction for the proposed courses/program of study and their curriculum vitae
- a list and example of a program outline for similar (or same) programs/courses of study at one or more IHLs (instate or out-of-state), or provide URLs if posted online
- documentation of institution administrative approval and MS IHL approval (if MS public institution)
- current special program recognition where applicable
- any other documentation that further supports the rationale for the proposal

As a qualified education professional, your review should ensure the program utilizes current content that is infused with state (InTASC) standards and national professional association standards, and the program provides instruction for program candidates on the most recently adopted state curriculum frameworks or common core for subject areas when appropriate, or adheres to other applicable state content and instruction policy and guidelines.

Synopsis of proposal request for review (*see attached proposal for details*): **Mississippi State requests approval of TKT 4483/6483 Methods Course to satisfy requirements for the 983 endorsement**

Provide findings/comments/recommendations (*if needed, please use additional space or provide an attachment*): Please refer to attached letter.

☒ I **recommend approval** of this proposal for submission to the Licensure Commission on Teacher and Administrator Education, Certification and Licensure and Development.
☐ I **do not recommend approval** of this proposal for submission to the Licensure Commission on Teacher and Administrator Education, Certification and Licensure and Development.

E-mail this form to ggettis@mde.k12.ms.us or acarter@mde.k12.ms.us or fax to 601-359-1728.

EDUCATION PROGRAM APPROVAL REVIEW FORM

New or Modified Program

Internal Assessment

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Institution Submitting Request: Mississippi State University</p> <p>Summary of Request: MSU requests approval to use the TKT 4483/6483 Methods of Teaching STEM in the Middle School as Methods Course for a 983 supplemental endorsement.</p> | <p>Proposal Request Submitted for Approval to:</p> <p><input type="checkbox"/> Implement a New Education Program <input checked="" type="checkbox"/> Modify an Existing Education Program</p> <p>The proposed program or modification:</p> <p><input type="checkbox"/> Requires a New Licensure Code and/or Guideline <input checked="" type="checkbox"/> Aligns with Existing Licensure Code and/or Guideline</p> |
| <p>MDE Reviewer's Name: <i>Michael J. Marshall</i></p> | <p>MDE Reviewer's Title: <i>Bureau Director</i></p> |

Through the responsibility charged to the Commission on Teacher and Administrator Education, Certification and Licensure and Development (MS Code, Section 37-3-2), the Mississippi Department of Education must approve or disapprove all educator preparation programs in the state as recommended by the Commission; thus implementation of any new programs or modifications to existing programs by all education units shall be reviewed by MDE and recommended for approval by the Commission and/or State Board of Education.

Please review the attached proposal and syllabi for evidence that instruction throughout the proposed program or modification is developed using appropriate elements of state standards, guidelines and/or curriculum frameworks (where applicable) to adequately prepare teacher candidates for K-12 instruction or administration in Mississippi.

After your review of the proposed program's course content, please ensure the content contains appropriate references or inclusion of the following currently approved:

- State-Adopted Standards
- State Curriculum Frameworks (if applicable)
- Other Applicable K-12 Content or Instructional Requirements

Based on your professional expertise, please include specific recommendations to ensure the program's success based on best practices and state guidelines.

☒ I have reviewed the syllabi/course content and found that the infusion of appropriate state standards, frameworks or other related requirements are sufficiently addressed within the proposed new program or program modification for elementary, middle and/or secondary instruction/administration.

☐ I have reviewed the syllabi/course content and found that the infusion of appropriate state standards, frameworks or other related requirements are NOT sufficiently addressed within the proposed new program or program modification for K-12 instruction/administration.

COURSE SYLLABUS

TKT 4483/6483

Methods of Teaching STEM in the Middle School

Credit: 3 semester hours

Instructor of Record: Dr. Maria Earle

Catalog Description:

Three hours lecture. A study of objectives, materials, and methods appropriate for teaching STEM in the middle school.

Objectives:

1. To develop an understanding of the history and development of STEM in the middle school framework.
(INTASC #1, CFPO #3)
2. To develop an understanding of the competencies needed to teach the STEM in the middle school framework and be able to demonstrate these competencies successfully.
(INTASC #1, CFPO #3)
3. To develop an understanding of the purposes and goals of STEM and be able to develop appropriate lesson plans using the Understanding by Design template. (INTASC #1-9, CFPO #2, 3, 6, 8-12)
4. To develop an awareness of diverse needs, interests, and abilities of middle school students and be able to select appropriate methods of teaching and assessing for that age group.
(INTASC #1-8, CFPO #2, 3, 9-12)
5. To interpret minimum specifications of hardware and demonstrate proper procedures used to install hardware/software, manage, and troubleshoot in a networked environment.
(INTASC #1, CFPO #3, 11)
6. To demonstrate effective use of technology tools for the design process, robotics, power and energy, and economic and financial literacy.
(INTASC #1, 6, CFPO #3, 5)
7. To apply the self-actualization process in developing dispositions necessary to be successful as a classroom teacher.
(INTASC #9, 10, CFPO #1, 5)
8. To understand the role of professional associations as they apply to professional development in the area of STEM in the middle school.

(INTASC # 9, 10, CFPO #1)

9. To demonstrate effective teaching by modeling micro-lessons in STEM in the middle school areas.

(INTASC #1-8, CFPO #2, 3, 5, 7, 8, 10-12)

10. To demonstrate knowledge of appropriate assessment in STEM in the middle school areas.

(INTASC # 8, CFPO #3, 4, 10, 11)

Topics to be Covered:

1. Licensure requirements (MDE, 2008) (1 hour)
2. Teaching orientation, ethics, personality development and emerging careers (STEM, 2011; Einsiedel, 2009; Klaus, et al, 2007; Cole, 2011; CNET, 2011; VARK, 2011; States, 2011; USBLS, 2011) (3 hrs.)
 - a. Objectives and content
 - b. Instructional strategies for teaching orientation and ethics
 - c. Evaluating learning
3. Teaching technology literacy (Morrison & Wells, 2010; Baldauf, 2012; Parsons & Oja, 2012; Shelly & Vermaat, 2012) (5 hrs.)
 - a. Objectives and content
 - b. Instructional strategies for teaching technology literacy
 - c. Evaluating learning
4. Teaching the design process and how it is used to develop products (Chopra, 2011; Grover, 2009; CAD, 2011; Google Sketchup 8, 2011; Design, 2011) (5 hrs.)
 - a. Objectives and content
 - b. Instructional strategies for teaching the design process
 - c. Evaluating learning
5. Teaching emerging technologies (STEM, 2011; Einsiedel, 2009) (3 hours)
 - a. Objectives and content
 - b. Instructional strategies for teaching emerging technologies
 - c. Evaluating learning
6. Teaching 3-D models with CAD software and how it is used in the drafting and design industry (STEM, 2011; Chopra, 2011; CAD, 2011; Google Sketchup 8, 2011; Design, 2011) (5 hours)
 - a. Objectives and content
 - b. Instructional strategies for teaching CAD software
 - c. Evaluating learning

7. Teaching sustainable design and technology and the impact on industry. (STEM, 2011; Chopra, 2011; CAD, 2011; Google Sketchup 8, 2011; Design, 2011) (5 hours)
 - a. Objectives and content
 - b. Instructional strategies for teaching the sustainable design process
 - c. Evaluating learning
8. Teaching power and energy, how it is used in industry and the effects it has on the environment. (STEM, 2011; Boyle, 2004; Clean, 2010; Dept of Energy, 2011; EIA, 2011; Energy, 2011; EduGreen, 2011; TVA, 2011) (4 hours)
 - a. Objectives and content
 - b. Instructional strategies for teaching about the power and energy industry and how it impacts the environment.
 - c. Evaluating learning
9. Teaching robotics and how it is used in industry. Simulate robotics programming. (STEM 2011; NASA, 2011; RoboMind, 2011; Robotics, 2011; Virtual, 2011) (5 hours)
 - a. Objectives and content
 - b. Instructional strategies for teaching robotics and how it is used in industry.
 - c. Evaluating learning
10. Teaching financial and economic literacy, the purpose and importance of credit, and the role financial decisions have in your personal life. (STEM, 2011; Garman and Forque, 2010; Tyson, 2009; Ramsey, 2009; Dollar, 2011) (5 hours)
 - a. Objectives and content
 - b. Instructional strategies for teaching financial and economic literacy
 - c. Evaluating learning
11. Teaching workplace skills (STEM, 2011; Klaus, et al, 2007) (4 hours)
 - a. Objectives and content
 - b. Instructional strategies for teaching workplace skills
 - c. Evaluating learning

Suggested Student Activities:

1. The student will read articles from professional publications that have significance to each unit in the STEM in the middle school framework, maintain a reading weblog, and post reflections to a reading blog.
2. The student will complete a learning log for each module.
3. The student will complete assignments related to instructional strategies that infuse STEM and meet the learning needs and preferences of middle school students. They will complete a wiki that will be used to present their work.
4. The student will complete selected assignments and quizzes in required framework applications to show mastery of those applications.
5. The student will plan a unit of instruction within the STEM in the middle school content area using the Understanding by Design template.
6. The student will develop all assessment tools required to deliver the unit plan developed for STEM in the middle school content area.
7. The student will deliver one lesson planned in the unit plan that infuses STEM in instruction.
8. The student will critique his/her own teaching delivery and that of other students.
9. The student will complete a group assignment using a wiki.
10. The student will complete daily assignments required by the instructor.

Methods of Instruction:

Instructional methods will include teacher and student active components. Lecture, discussion, demonstration, projects, project-based learning, cooperative learning will all be used. Students will apply learning by planning a unit plan and teaching one of the lesson plans. Technology required of middle school students will be infused throughout the course.

Graduate Assignments:

Graduate students will complete a ten-page research paper on a contemporary topic related to STEM in the middle school as approved by the instructor. Graduate students will present the paper to the class.

Evaluation of Student Progress:

Undergraduates:

| | |
|------------------------------------------|-----|
| Quizzes and exams | 15% |
| Learning log and blog postings | 10% |
| Group wiki assignment | 10% |
| UBD unit/lesson plan/delivery/critique | 20% |
| UBD unit/lesson materials and assessment | 20% |
| Instructional strategies assignment wiki | 10% |
| Daily assignments | 15% |

Graduates:

| | |
|------------------------------------------|-----|
| Quizzes and exams | 15% |
| Learning log and blog postings | 10% |
| Group wiki assignment | 10% |
| UBD unit/lesson plan/delivery/critique | 15% |
| UBD unit/lesson materials and assessment | 15% |
| Instructional strategies assignment wiki | 10% |
| Daily assignments | 15% |
| Graduate research assignment | 10% |

Grading Scale:

| | |
|--------|---|
| 90-100 | A |
| 80-89 | B |
| 70-79 | C |
| 60-69 | D |

Instructional Technology Statement:

Instructional technology is used to prepare materials for the course including lesson plans, instructional aids, projects, journals, etc. In delivery of the lesson, students learn to use electronic presentation technology, the SmartBoard, the document camera, the Internet. They use electronic databases as well as the Web for research; they post and retrieving information electronically.

Diversity Statement:

Diversity is specifically addressed in Instructional Objectives # 3 and 6 and specifically in Topics # 3, 4, and 5.

Honor Code:

Academic misconduct will be dealt with in accordance with the guidelines and procedures outlined in the Academic Misconduct Policy, which may be accessed on the web at Visit <http://www.msstate.edu/dept/audit/PDF/1207.pdf>.

Accommodation for Students with Disabilities:

Students with disabilities are encouraged to discuss their needs with the instructor, preferably during the first week of the semester. All reasonable accommodations will be made to see that disabilities do not restrict a student's opportunity to learn. Help is also available from Student Support Services (<http://www.sss.msstate.edu/disabilities/>, 136 Etheredge Hall, 325-3335).

Texts:

Research and curriculum unit for workforce development vocational education. (2011). *STEM: Curriculum Framework for Mississippi Public Schools*. Retrieved January 13, 2013, from <http://www.rcu.msstate.edu/Curriculum/CurriculumDownload.aspx>

Bibliography:

Books

Boyle, G. (2004). *Renewable energy: Power for a sustainable future* (2nd ed.). Oxford, UK: Oxford University Press.

Chopra, A. (2011). *Google sketchup 8 for dummies*. Hoboken, NJ: Wiley Pub.

Cole, C. (2011). *Connecting students to STEM careers: Social networking strategies*. Eugene, OR: International Society for Technology in Education.

Einsiedel, E. F. (2009). *Emerging technologies: From hindsight to foresight*. Vancouver, BC: UBC Press.

Garman, E. T., & Forque, R. E. (2010). *Personal finance*. Mason, OH: South-Western Cengage Learning.

Grover, C. (2009). *Google sketchup: The missing manual*. Beijing, China: O'Reilly.

Klaus, P., Rohman, J. M., & Hamaker, M. (2007). *The hard truth about soft skills: Workplace lessons smart people wish they'd learned sooner*. New York, NY: Collins.

Tyson, E. (2009). *Personal finance for dummies*. New York, NY: Wiley Pub.

Web Sites

- Blackboard. (2011). *Blackboard*. Retrieved May 2, 2011, from <http://rcu.blackboard.com>
- Clean energy. (2010). *Clean Energy--Union of Concerned Scientists*. Retrieved April 28, 2011, from http://www.ucsusa.org/clean_energy/
- Computer-aided design. (2011, April 21). *Wikipedia, the Free Encyclopedia*. Retrieved May 02, 2011, from http://en.wikipedia.org/wiki/Computer-aided_design
- Cutting edge - The latest in emerging technologies - CNET News. (2011). *Technology News - CNET News*. Retrieved May 02, 2011, from <http://news.cnet.com/cutting-edge/>
- Department of Energy - For Students and Kids. (n.d.). *Department of Energy - Homepage*. Retrieved May 02, 2011, from <http://www.energy.gov/forstudentsandkids.htm>
- EIA energy kids-electricity. (n.d.). *EIA Energy Kids-Electricity*. Retrieved April 28, 2011, from http://www.eia.doe.gov/kids/energy.cfm?page=electricity_home-basics
- EIA energy kids-quiz. (n.d.). *EIA Energy Kids-Quiz*. Retrieved April 28, 2011, from <http://www.eia.doe.gov/kids/energy.cfm?page=quiz>
- EIA energy kids-secondary. (n.d.). *EIA Energy Kids-Secondary*. Retrieved April 28, 2011, from http://www.eia.doe.gov/kids/energy.cfm?page=activities_secondary
- Energy savers: Do-it-yourself home energy assessments. (2011, September 02). *EERE: Energy Savers Home Page*. Retrieved May 02, 2011, from http://www.energysavers.gov/your_home/energy_audits/index.cfm/mytopic=11170
- Free printable budget worksheet. (2010). *DollarTimes.com-Financial Calculators and Save Money Guide*. Retrieved April 29, 2011, from <http://www.dollartimes.com/download-and-print/>
- Google sketchup 8. (2011). *Google SketchUp*. Retrieved May 02, 2011, from <http://sketchup.google.com>
- Green schools. (2011). *Green Schools Initiative: Index*. Retrieved May 02, 2011, from <http://greenschools.net/>
- Inform: Building environmental literacy. (2011). *Welcome :: INFORM, Inc*. Retrieved May 02, 2011, from <http://www.informinc.org/pages/index.php>
- Issues, G. (2011). Buy, use, toss? Science & social studies curriculum--facing the future. *Sustainability & Global Issues Curriculum/Facing the Future*. Retrieved May 02, 2011, from <http://www.facingthefuture.org/Curriculum/BuyUseToss/tabid/469/Default.aspx>

- Issues, G. (2011). Curriculum and lesson finder--facing the future. *Sustainability & Global Issues Curriculum | Facing the Future*. Retrieved May 02, 2011, from <http://www.facingthefuture.org/Curriculum/FindCurriculumthatIsRightforYou/tabid/68/Default.aspx>
- NASA-ROVER--Robotic online virtual exploration rover. (n.d.). *NASA*. Retrieved April 29, 2011, from <http://www.nasa.gov/audience/foreducators/robotics/home/ROVER.html>
- Occupational Safety and Health Administration - Home. (n.d.). Retrieved May 02, 2011, from <http://www.osha.gov>
- Project management methodology: Project life cycle. (n.d.). *Project Management Methodology-Project Management Process*. Retrieved April 29, 2011, from <http://www.mppmm.com/project-management-methodology.php>
- Ramsey, D. (2009, September 5). Dave Ramsey's envelope system. *Dave Ramsey Homepage*. Retrieved April 29, 2011, from http://www.daveramsey.com/article/dave-ramseys-envelope-system/lifeandmoney_budgeting/
- Renewable energy. (n.d.). *EduGreen - Edugreen.teriin.org*. Retrieved April 28, 2011, from <http://edugreen.teri.res.in/explore/renew/renew.htm>
- RoboMind. (n.d.). *RoboMind*. Retrieved April 29, 2011, from <http://robomind.en.softonic.com/>
- Robotics: At your command: Control your R.O.V. (n.d.). *The Tech Museum*. Retrieved April 29, 2011, from <http://www.thetech.org/robotics/atyourcommand/index.html>
- Sang, C. (2011). YouTube-Mr. box-A short film on sustainability. *YouTube-Broadcast Yourself*. Retrieved May 02, 2011, from <http://www.youtube.com/watch?v=INLyfernZQ4>
- Secret life. (2011). *Secret Life*. Retrieved May 02, 2011, from <http://www.secret-life.org>
- States' Career Clusters Initiative. (n.d.). *States' career clusters*. Retrieved May 02, 2011, from <http://www.careerclusters.org/16clusters.cfm>
- TVA: Green power switch. (2011). *TVA: Green Power Switch*. Retrieved April 28, 2011, from <http://www.tva.gov/greenpowerswitch/>
- TeacherTube. (n.d.). Retrieved May 2, 2011, from <http://www.teachertube.com>
- The design process. (n.d.). *The Design Process*. Retrieved May 2, 2011, from <http://tinyurl.com/thedesignprocess>
- U.S. Bureau of Labor Statistics. (n.d.). Retrieved May 02, 2011, from <http://www.bls.gov>

VARK--A Guide to Learning Styles. (n.d.). Retrieved May 02, 2011, from <http://www.vark-learn.com>

Virtual robotics lab. (n.d.). *The Mind Project*. Retrieved April 29, 2011, from <http://www.mind.ilstu.edu/curriculum/modOverview.php?modGUI=208>

YouTube-Sustainability explained through animation. (2011). YouTube-Broadcast Yourself. Retrieved May 02, 2011, from <http://www.youtube.com/watch?v=B5NiTN0chj0>

Your environment. Your choice. Resources for waste education. (n.d.). *US Environmental Protection Agency*. Retrieved May 02, 2011, from <http://www.epa.gov/epawaste/education/teens/index.htm>