Course Number: EIA 3275C  
Prerequisite(s): EIA 1049, EIA2284C, EIA 3264C  
Course Credit: 3  
Course Title: Energy and Power in Technology Education  
Course Hours: 3

College Education  
Department: Workforce Education and Development


Supplies: TBA and TaskStream

Faculty Name: Dr. David White

Term and Year:
Place and Time:

Office Location: MST 119

Telephone: 599-3406
E-mail: david.white@famu.edu

<table>
<thead>
<tr>
<th>Office Hours</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
</table>

Course Description

This course will focus on the technological processes surrounding energy and power. Historical and contemporary forms of energy as they are related to science and mathematics will be explored and then tested within laboratory activities. Special emphasis will be placed on alternative energy sources such as wind and solar energy in addition to global efforts regarding sustainable energy will be examined. Students will be provided with instructional methods to be able to conduct an energy and power component in 6-12 Technology Education classrooms (Sophomore/Junior standing).

Course Purpose

The goals of this course is to give the student an understanding various types of energy and power and how this technological construct is aligned with various other technologies. At this point in time, alternative energies are a hot topic. With that stated, a goal of this course is to give the student a comprehensive understanding of past, present, and future energy and power technologies and how they have and will impact our global society. Additionally, student will be instructed on pedagogical concepts regarding the teaching of energy and power in technology education classroom.

TaskStream Code: 22B8UU
The Conceptual Framework in the Professional Education Unit (PEU) at Florida A&M University is an integrated approach to providing educational experiences that result in exemplary professional educators. The Framework is comprised of six themes with the mission of developing high quality classroom teachers, administrators and support personnel. The term “exemplary” refers to the kind of graduates the PEU strives to produce. The figure below provides a diagram of the Exemplary Professional Conceptual Framework.

### TECHNOLOGY

**•CF 2**

•Through this focal area, the FAMU professional education candidate will:

| CF: 2.1 (S) | Use of available technology and software to support student learning. | F: 4,12 | I: 6 |

### VALUES

**•CF3**

•Through this focal area, the FAMU professional education candidate will:

| CF: 3.3 (S,D) | Show respect for varied (groups) talents and perspectives. | F: 5,6 | I: 3 |

### CRITICAL THINKING

**•CF4**

•Through this focal area, the FAMU professional education candidate will:

| CF: 4.2 (S) | Use a variety of instructional/professional strategies to encourage students’ development of critical thinking and performance. | F:2,7 | I: 4 |

| CF: 4.5 (S) | Demonstrate the use of higher order thinking skills. | F: 8 | I: 4 |
PROFESSIONALISM

- CF 5
- Through this focal area, the FAMU professional education candidate will:

<table>
<thead>
<tr>
<th>CF: 5.3 (D)</th>
<th>Demonstrate commitment to professional growth &amp; development.</th>
<th>F: 3,7</th>
<th>I: 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF: 5.4 (K,S)</td>
<td>Use major concepts, principles, theories &amp; research related to the development of children and adults.</td>
<td>F: 7</td>
<td>I: 2</td>
</tr>
<tr>
<td>CF: 5.5 (S)</td>
<td>Construct learning opportunities that support student development &amp; acquisition of knowledge &amp; motivation.</td>
<td>F: 7</td>
<td>I: 5</td>
</tr>
</tbody>
</table>

**Academic Learning Compact**

This course falls under the courses offered in the Department of Workforce Education and Development and is thus covered by the associated Academic Learning Compacts (ALCs). ALCs answer three basic questions: What will students learn by the end of their academic programs? Have they learned what they have been taught by their professors? How do we measure these quantities? For details regarding the Department of Workforce Education and Development, ALCs, go to: http://www.famu.edu/assessment and click on Academic Learning Compacts.

**Overall Goals of the Course**

The overall goal of this course is to prepare candidates to become creative problem solvers and reflective practitioners within the content area of Technology Education provided within the course.
## Specific Behavioral Objectives

Matrix for Alignment with Standards and the
The Florida Agricultural and Mechanical University
College of Education Conceptual Framework

- **Standards with which the course objectives are aligned:**
  - The Florida Agricultural and Mechanical University College of Education and Human Services Conceptual Framework (FAMU CF)
  - Florida Educator Accomplished Practices (FEAP)
  - Florida Subject Area Competencies (FSAC)
  - International Technology Education and Engineering Association (ITEEA)
  - Interstate New Teacher Assessment and Support Consortium (INTASC)

<table>
<thead>
<tr>
<th>Objective Objectives</th>
<th>INTASC (I)</th>
<th>FSAC (FS)</th>
<th>FAMU CF (CF)</th>
<th>FEAP (FE)</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge/Content</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(All assessments/lectures/reading will be covered on either the Midterm or Final Examination)</td>
</tr>
</tbody>
</table>
| 1) Identify and describe the historical and contemporary purpose of various types of energy and power systems. | 3 | FS: 1.6, 6.1, 2 I: 4, 5, 6, 7 | CF: 3.3 FE: 5, 6 | • Research Paper  
  • Energy and Society Technology Learning Activity  
  • Discussion Board 1 |
| 2) Determine appropriate criteria for comparison, analysis, and selection of a variety of energy and power applications. | 4 | FS: 6.2 I: 2 | CF: 4.2, 4.5 FE: 2, 7, 8 | • Renewable Exhausitble and Inexhaustible Energy Sources Technology Learning Activity  
  • Laboratory Reports  
  • Final Project Documentation |
| 3) Describe the functions of energy and power systems with regard to the movement of people and products. | 4 | FS: 6.3 I: 16 | CF: 4.2, 4.5 FE: 2, 7, 8 | • Discussion Board 2 (video) |
| 4) Discuss the evolution of energy, and power systems and their impact on society. | 4 | FS: 10.3 I: 16 | CF: 4.2, 4.5 FE: 2, 7, 8 | • Discussion Board 1  
  • Discussion Board 2  
  • Laboratory Reports  
  • Residential Energy Audit Technology Learning Activity  
  • Energy and Society Technology Learning Activity  
  • Research Paper  
  • Final Project Documentation  
  • Laboratory Reports |
| 5) Describe various energy processing systems including transmission, conversion, storage and conservation to selected fields of study. | 4 | FS: 1.3, 6, 6.8 I: 16 | CF: 4.2, 4.5 FE: 2, 7, 8 | • Mechanical Power Systems Technology Learning Activity  
  • Laboratory Reports |
| Skills/Performance    |            |           |              |           | (All assessments/lectures/reading will be covered on either the Midterm or Final Examination) |
| 6) Develop knowledge and competency in energy and power applications of individual interest. | 6 | FS: 12.7, 13.4 I: 16 | CF: 5.5 FE: 7 | • Research Paper  
  • Final Project Documentation  
  • Class Presentation  
  • Lesson Plan |
| 7) Integrate and use STEM principles as they apply to energy and power systems design and performance. | 6 | FS: 12.6 I: 3 | CF: 5.5 FE: 7 | • Research Paper  
  • Final Project Documentation  
  • Class Presentation  
  • Energy, Power and STEM Technology Learning Activity |
| 8) Recognize the importance of additional curricular areas (communication, art, social studies, economics, etc.) during the design and presentation stages of problem solving. | 6 | FS: 12.6 & 7 I: 3 | CF: 5.5 FE: 7 | • Research Paper  
  • Final Project Documentation  
  • Class Presentation |
| Dispositions/Professionalism |            |           |              |           | (All assessments/lectures/reading will be covered on either the Midterm or Final Examination) |
| 9) Produce documentation (design processes, lesson plans, etc.) that is aligned with current state and national technology standards. | 5 | FS: 12.6 & 7 I: 3 | CF: 5.5 FE: 7 | • Research Paper  
  • Final Project Documentation  
  • Lesson Plan  
  • Class Presentation |
| 10) Continue to develop safety habits and laboratory management techniques. | 9 | FS: 11 I: 2 | CF: 5.3 FE: 3, 6, 7 | • Laboratory Reports  
  • Final Project Documentation  
  • Lesson Plan  
  • Basic Concepts Technology  
  • Class Presentation |
| 11) Identify local, state, and national professional organizations and explain the benefits of participation with regard to the energy and power industry. | 9 | FS: 12.7 I: 3 | CF: 5.3 FE: 3, 7 | • Energy and Society Technology Learning Activity |
| 12) Continue to develop a professional portfolio | 6, 9 | FS: 14.5 & 6 I: 4 | CF: 2.1, 5.3 FE: 3, 4, 7, 12 | • TaskStream Artifact Submissions |
1. **Definitions**
   A. Force
   B. Work
   C. Energy
   D. Power

2. **Systems**
   A. Technology
   B. Energy
   C. Control

3. **Energy**
   A. States of energy
      a. Potential
      b. Kinetic
      c. Internal
   B. Forms of energy
      a. Mechanical
      b. Pressure
      c. Gravitational
      d. Electrical
      e. Magnetic
      f. Electromagnetic
      g. Chemical
      h. Nuclear
      i. Thermal
   C. Sources of energy
      a. Exhaustible
      b. Inexhaustible
      c. Renewable

4. **Processing Energy**
   A. Energy laws
   B. Transmission
   C. Conversion
   D. Storage
   E. Conserving
   F. Applications in technology
      a. Historical perspectives
      b. Futuristic application
      c. International perspectives
   G. Impacts of use

5. **Designed Control System**
   A. Closed vs. open loops
   B. Types of control
      a. On/off
      b. Directional
      c. Amplification
      a. Coding/decoding
      b. Signal Processing
      c. Logic
   D. Levels of Control
      a. Manual
      b. Automatic
      c. Programmable
      d. Intelligent

4. **Control Systems**
   A. Mechanical
      a. Simple Machines
      b. Complex Machines
   B. Electrical
      a. Basic circuits
         1. series
         2. parallel
         3. complex
         4. Ohm’s Law
      b. Analog
         a. DC
         b. AC
         c. Components
   C. Electronic
      a. Digital circuits
         1. diodes
         2. transistors
         3. logic gates
         4. complex IC’s
   D. Fluid
      a. Pneumatics
      b. Hydraulics
      c. Types of control
         1. directional
         2. flow (speed)
         3. pressure (force)
   E. Processor Control
   F. Integrated Systems

4. **Teaching Energy & Control**
   A. Resources
   B. Commercial training units
   C. Build and program units
   D. Simulations
   E. Careers in energy and control systems

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**Teaching Methods**

A variety of methods may be employed, including, but not limited to: lecture/discussion, field experience, guest speakers, audiovisual materials, computer applications, demonstrations, presentations and lab activities. This course will have a Blackboard component, and students must read relevant sections in current outside resources, including web-based documents and word-process assignments and have regularly available email, Internet and World Wide Web access. Documentation and artifacts for TaskStream are required.
Methods of Evaluation

1. Technology Learning Activities
2. Discussion Boards
3. Midterm and Final Examinations
4. Research Paper
5. Laboratory Reports
6. Lesson Plan
7. Portfolio
8. Presentation Evaluation

Grading:
Grades will be determined using a percentage of total points. The grading scale, with minimum percentages for each grade is provided below. This grading scale will be applied to individual evaluated activities as well as to the student’s final grade.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Points</th>
<th>Percentage/Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Learning Activity</td>
<td>20</td>
<td>90-100% A</td>
</tr>
<tr>
<td>Assignments (5) 20 pts. each</td>
<td>100</td>
<td>80-90% B</td>
</tr>
<tr>
<td>Laboratory Reports (4) 50 pts each</td>
<td>200</td>
<td>70-80% C</td>
</tr>
<tr>
<td>Blackboard Discussion Boards (2) 50 pts. each</td>
<td>100</td>
<td>60-70% D</td>
</tr>
<tr>
<td>Final Project</td>
<td>100</td>
<td>Below 59% F</td>
</tr>
<tr>
<td>Final Project Portfolio</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Class Presentation</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Research Paper</td>
<td>75</td>
<td></td>
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<tr>
<td>Midterm</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Final Exam</td>
<td>150</td>
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</tr>
<tr>
<td>Total</td>
<td>1000 pts</td>
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</tbody>
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Course Policies

Policy Statement on Non-Discrimination It is the policy of Florida Agricultural and Mechanical University to assure that each member of the University community be permitted to work or attend classes in an environment free from any form of discrimination including race, religion, color, age, disability, sex, marital status, national origin, veteran status and sexual harassment as prohibited by state and federal statutes. This shall include applicants for admission to the University and employment.

Academic Honor Policy The University’s Academic Honor Policy is located in the FANG Student Handbook, under the Student Code of Conduct- Regulation 2.012 section, beginning on page 55-56.

ADA Compliance To comply with the provisions of the Americans with Disabilities Act (ADA), please advise instructor of accommodations required to insure participation in this course. Documentation of disability is required and should be submitted to the Learning Development and Evaluation Center (LDEC). For additional information please contact the LDEC at (850) 599-3180.

Dispositions As a component of student assessment, the College of Education has instituted a system for monitoring the professional dispositions: Professionalism, Effective Communication, Respectful Behavior, Ethical Behavior, and Reflective Behavior. At the end of each semester each instructor will fill out an assessment instrument for each student which will be turned in to the department chair and kept in the student’s file. If a problem arises during the semester, a disposition feedback form may be completed by an instructor or school personnel and turned in to the student’s department chair. The severity of the behavioral deficiency will influence the chairperson’s handling of the situation. (See Assessment Instrument for Dispositions and Disposition Feedback Form for more detailed information. This policy includes provisions for professional dress, attendance, punctuality, use of cell phones, etc.
Additional Course Requirements

1. **Attendance:** Attendance is required for all class meetings. It is the responsibility of the student to make up any work/assignments missed due to illness or personal excuses. The student’s final grade will be reduced one letter grade for each absence beyond two unexcused absences. All excused absences must be reported to and verified through the FAMU academic affairs office.

2. **Final Exam:** There will be a comprehensive exam at the end of the course.

3. **Computer/Web/Email Applications:** A variety of graded activities in this course will be conducted using email, the web and BlackBoard. Students are required to use their FAMU email/Blackboard account and to know how to use file attachment features. Also, students must use Microsoft® Word® for all word-processed files, and will prepare a Microsoft® PowerPoint® presentation, and must be able to use an Internet browser. Some web-based resources will be formatted as PDF files. Students should have access to and know how to use Adobe® Acrobat Reader®. Grades will be posted on BlackBoard. Computer access for students is provided at a number of locations on campus. Students may access their FAMU email from other email accounts or computer systems that are not on the FAMU campus. However, it is the student’s responsibility to make sure the email and other computer systems are operational.

4. **Spelling:** Correct spelling is required for all work. Spelling a word incorrectly on any graded item will result in a loss of one-half point for each time the word is misspelled.

5. **Writing Assignments:** Students will complete several writing assignments. Writing assignments must be word-processed using Microsoft® Word®.

6. **Portfolio:** Students are required to purchase a TaskStream account. Three assigned artifacts must be uploaded to your TaskStream portfolio to pass this class.

7. **Professionalism:** Students are expected to conduct themselves in a professional manner at all time while in class. Evaluation of the student’s professionalism will be an important part of the assessment program in this course.

8. **Reading:** Students are expected to read handouts, web pages, web-based documents, etc. to prepare for lectures, quizzes and tests; as well as prepare for research and writing activities through reference reading.

9. **Research:** Several evaluated activities require the student to conduct research. Under normal conditions, the University library resources will meet all the student’s research needs. Internet research activities will also be conducted.

10. **Safety:** It is the student’s responsibility to adhere to and practice proper safety procedures in the use and operation of the tools, materials, machines, and processes required in this course. Safety eyewear is required when working in any technology labs during course or when participating in hands-on lab experiences. **All students must provide and use their own personal safety eyewear.** Students will not be permitted to work in any Technology Education laboratory without approved safety eyewear—no exceptions.

11. **Laboratory:** This class has an integrated lecture and lab. Some days may be all lectures or all labs or a combination of both depending on the class progress and activities.

12. **Presentations:** Students will prepare and deliver one presentations. Presentations must be supported by multimedia (typically PowerPoint). Students will also make several informal presentations during class as part of a group or as an individual.

13. **Deadlines:** All evaluated activities must be submitted on the deadlines identified. Ten percent (10%) will be deducted from the student’s grade for each day the activity is submitted late.

14. **Plagiarism and Ethical Behavior:** Students are expected to do their own work and act respectfully to each other and most importantly, the instructor. If student are caught cheating in any way, they may receive a failing grade for the course, dismissal from the program or dismissal from the University.

15. **TaskStream** is a required software package for all teacher education programs at Florida A&M University. Teacher education students must purchase, activate and maintain their own TaskStream accounts. Teacher education students may need to complete designated surveys or activities in TaskStream as part of this course. The instructor reserves the right to decide how and what class assignments are submitted for this course.

**FAMU Technology Education Student Equity Statement:**

Florida A&M University is committed to the human rights, dignity and social equity of all individuals; therefore, in accordance with University policy, the Technology Education Program will maintain a “no tolerance” policy with regard to behavior associated with: sexual connotations, physical gestures, inappropriate language or graphics on clothing. As potential future teachers, it is the expectation of the Technology Education Faculty that all Technology Education Majors and those who are enrolled in Technology Education classes reflect strong professional integrity and act in a manner worthy of the University and the Technology Education Program. The Technology Education Faculty will address any issues according to the University policy in order to create a safe and comfortable learning environment for all students.

- If a student feels that any misconduct as described above has occurred against them, witnesses, or is told of an incident of perceived misconduct then he/she should report the incident to the Equal Opportunity Programs Office. Reports of any incidents will be held in the strictest of confidence. Contact Info: Equal Opportunity Programs Office 676 Ardelia Court Tallahassee, FL 32307 (850) 599-3076/3219.
Laboratory Projects and Assignments

Laboratory Projects
There will be four class laboratory projects throughout the semester, in addition to your final lab project. Each project is designed to provide you with the basic technological skills that you will be using throughout your future courses within the Technology Education Program. Furthermore, each project will incorporate a standards based component that will assist you when designing your final project. The projects will be based on current Technology Education activities taught in contemporary classrooms. Additionally, successful completion of these labs will be a vital component to your becoming a well-rounded Technology Educator, as you will ultimately be transferring this content knowledge to your future classrooms. Written reflections will accompany each lab activity.

Individual Laboratory Projects
1. Simple Machines
2. Simple and Complex Machines
3. Wind Turbines
4. Hydroelectric Generator

Course Objective 2: FAMU CF: 4.1, 4.4; FEAPS: 1, 2, 4, 7; FSAC: 6.6; ITEEA 2, 11, 12, 13, 16; INASC: 1, 4
Course Objective 5: FAMU CF: 4.2, 4.5; FEAPS: 2, 7, 8; FSAC: 1.5, 1.6; ITEEA 6; INASC: 2
Course Objective 10: FAMU CF: 5.3; FEAPS: 3, 7; FSAC: 11; ITEEA 2; INASC: 9

Laboratory Safety
You are expected to conduct yourself in a safe manner at all times when working in the Technology Education Labs. Failure to practice safety will result in removal from the lab and possible additional disciplinary action depending on the infraction.

Assignments

Discussion Boards
You will have two discussion board assignments throughout the semester. Through discussion boards, you will identify and self-reflect with regard to your views and opinions regarding technology education issues such as standards, philosophies, and technology as it relates to different grade levels. Information will be provided related to discussion board topics: however, critical thinking on your part to express your opinions and views are essential. Furthermore you will demonstrate your professional skills by responding to your peer’s discussion board responses. The following topics will be on the discussion boards:

Discussion Board 1: Modern Marvels: Earth: It’s History and Future – Renewable Energy Video: This video deals with the broad scope and diversity of renewable energy; its sources, and its processes. For this discussion board you will identify 5 types of renewable energy within the video in addition to finding one website that deals with renewable energy that you could use for your future classroom. Post your responses on Blackboard. Look at a least two of your classmate’s postings and make comments through the “reply” feature of the discussion board.

Course Objective 1: FAMU CF: 3.3; FEAPS: 5, 6; FSAC: 1.6, 6.1, 6.2; ITEEA 4, 5, 6, 7; INASC: 3
Course Objective 4: FAMU CF: 4.2, 4.5; FEAPS: 2, 7, 8; FSAC: 10.3; ITEEA 16; INASC: 4

Discussion Board 2 – Modern Marvels: Gasoline Video: During the video write down 5 questions you might ask a High School class that reflect key points within the video. Additionally, identify 3 of the organizations that are represented in the video and discuss their importance. Post your questions on Blackboard. Look at a least two of your classmate’s postings and make comments through the “reply” feature of the discussion board.

BE SURE TO BE PROFESSIONAL WITH YOUR COMMENTS!

Course Objective 3: FAMU CF: 4.2, 4.5; FEAPS: 1, 2, 7, 8; FSAC: 6.3; ITEEA 16; INASC: 4
Course Objective 4: FAMU CF: 4.2, 4.5; FEAPS: 2, 7, 8; FSAC: 10.3; ITEEA 16; INASC: 4


**Technology Learning Activities**

You will have five Technology Learning Activities throughout the semester. The Technology Learning Activities are designed to identify characteristics of a professional teacher and compare them to your individual characteristics in addition to relating them to professional certification requirements, organizations, standards and opportunities within technology education field.

**Technology Learning Activity 1 – Energy and Society Technology Learning Activity.** Your understanding of how energy affects and has effects on society is essential to be successful in this course and as a Technology Educator. The concepts this Technology Learning Activity involves historical and contemporary aspects of energy and power and their impacts (both positive and negative) on cultures and societies both nationally and globally.

<table>
<thead>
<tr>
<th>Course Objective</th>
<th>FAMU CF: 3, 3; FEAPS: 5, 6; FSAC: 1, 6, 6, 6; ITEEA 4, 5, 6, 7; INASC: 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Course Objective 4: FAMU CF: 4, 2, 5; FEAPS: 2, 7, 8; FSAC: 10, 3; ITEEA 16; INASC: 4</td>
</tr>
<tr>
<td></td>
<td>Course Objective 11: FAMU CF: 5, 3; FEAPS: 3, 7; FSAC: 12, 7; ITEEA 3; INASC: 9</td>
</tr>
</tbody>
</table>

**Technology Learning Activity 2 – Residential Energy Audit Technology Learning Activity.** How your home and the homes of your potential students consumes energy is an important component of being and intelligent consumer and will provide you with vital information that you can use in your future classrooms. You will get to the Home Energy Saver (http://hes.lbl.gov/) website and do an actual web-based home energy audit. You will report on your potential energy savings after taking the audit.

| Course Objective | FAMU CF: 4, 2, 4, 5; FEAPS: 2, 7, 8; FSAC: 6, 2; ITEEA 2; INASC: 4 |

**Technology Learning Activity 3 – Renewable, Exhaustible and Inexhaustible Energy Sources Technology Learning Activity.** Knowledge of energy sources allows you to make informed decisions and use critical thinking skills to implement projects and processes that you will use in your future classrooms. This Technology Learning Activity allows you to explore various energy sources through investigation of several energy websites. Further, it will also help you with many other aspects of this course including your final project.

| Course Objective 2: FAMU CF: 4, 2, 4, 5; FEAPS: 2, 7, 8; FSAC: 6, 2; ITEEA 2; INASC: 4 |

**Technology Learning Activity 4 – Energy, Power and STEM Technology Learning Activity.** Science, Technology, Engineering and Mathematics (STEM) are an important component of energy and power concepts and processes. This Technology Learning Activity will allow you to explore how STEM can be used to convert energy from one form to another. Additionally STEM concepts such as work, force, horsepower etc, will be explored. Again, this Technology Learning Activity will also help you with many other aspects of this course including your final project.

| Course Objective 7: FAMU CF: 5, 5; FEAPS: 7; FSAC: 12, 6; ITEEA 3; INASC: 6 |

**Technology Learning Activity 5 – Mechanical Power Systems Technology Learning Activity.** Mechanical Power systems are utilized in technological processes from simple machines such as mousetraps to complex machines such as control systems on spacecrafts. This Technology Learning Activity will allow you to explore these processes in addition to identifying transmission, conversion, storage and conservation used within mechanical power systems.

| Course Objective 5: FAMU CF: 4, 2, 4, 5; FEAPS: 2, 7, 8; FSAC: 1, 3, 1, 4, 1, 5, 2, 6, 6, 8; ITEEA 16; INASC: 4 |

**Research Paper**

This assignment allows you to develop an interest and knowledge base pertaining to an area of energy and power technologies of your choice not covered in class. The focus of this assignment is on contemporary or futuristic design process. Historical studies are not acceptable for this project; however, a component of historical background is required.

**Assignment Requirements**

The goal for this assignment is to develop a quality research project that you will be proud to use as a teaching aid in your future classroom. Your research should include and describe impacts of your chosen energy and power technology, descriptions of basic tools used to bring an idea from conception to a final product. Additionally link your research to technology systems and other subject areas (STEM, language arts, social studies, etc.). Your topic must be pre-approved.

**Classroom Equation** – Explain ways this material would be relevant in a Technology Education Classroom.

The paper should be word-processed, 12 point type, Times or Arial regular font, .75-inch margins all around, line spacing of 1.5, and not exceed three pages. APA formatting is required with a minimum of five citations. Papers will be submitted to Blackboard and will be checked on TurnItIn.com, so do not plagiarize.

| Course Objective 1: FAMU CF: 3, 3; FEAPS: 5, 6; FSAC: 1, 6, 6, 6; ITEEA 4, 5, 6, 7; INASC: 3 |
| Course Objective 4: FAMU CF: 4, 2, 4, 5; FEAPS: 2, 7, 8; FSAC: 10, 3; ITEEA 16; INASC: 4 |
| Course Objective 6: FAMU CF: 5, 5; FEAPS: 7; FSAC: 12, 7, 13; ITEEA 16; INASC: 6 |
| Course Objective 7: FAMU CF: 5, 5; FEAPS: 7; FSAC: 12, 6; ITEEA 3; INASC: 6 |
| Course Objective 8: FAMU CF: 5, 5; FEAPS: 7; FSAC: 12, 6, 12, 7; ITEEA 3; INASC: 6 |
| Course Objective 9: FAMU CF: 5, 5; FEAPS: 7; FSAC: 12, 6, 12, 7; ITEEA 3; INASC: 6 |
Final Project

The goal for this assignment is to develop a quality research project by producing a tangible energy and power technology activity not covered in class. This should be an activity that can be done in either a Technology Education High or Middle school setting and that you will be proud to use as a teaching aid in your future classroom. You may collaborate with no more than 2 other classmates. Identification of your topic should be done as soon as possible, and must be approved in advance. Project presentations will be given during the last week of classes.

You will be provided several research sources to produce your activity. Along with the physical project, you will produce a project portfolio with complete documentation. The portfolio must be typed and presented in a clear-bound folder. Neatness will count heavily on your portfolio presentation. The final project portfolio must include the following components:

- **A Detailed Design Brief:**
  The following should be included in your design brief:
  - A Background and Rationale for the Project; A Problem Statement; Evidence of Research; Time Constraints and an Evaluation Summary. Additionally, describe the social and economic impacts of the product or process. Also describe the links to other technology systems and other subject areas (e.g. STEM, social studies, etc.).

- **Lesson Plan:**
  For your final project portfolio, you will produce a lesson plan that will identify basic components that will assist in your potential students learning. You will be exposed to several different Technology Education lesson plans (available via Blackboard) and relate them to your final project. You must include what Sunshine State and National standards will apply, materials needed, and an assessment instrument (quiz, test, Technology Learning Activity, etc.).

- **Detailed Drawings:**
  For your final project portfolio, you will produce detailed drawings that include: orthographic drawings (front, top and side views), and an isometric view produced in Autodesk Inventor.

**Course Objective 2:** FAMU CF: CF: 5.5; FEAPS: 7; FSAC: 13.2; ITEEA 3; INASC: 6
**Course Objective 4:** FAMU CF: 5.5; FEAPS: 7; FSAC: 12.6, 12.7; ITEEA 3; INASC: 6
**Course Objective 7:** FAMU CF: 5.5; FEAPS: 7; FSAC: 12.7; ITEEA 3; INASC: 6

**Course Objective 9:** FAMU CF: 5.5; FEAPS: 7; FSAC: 12.6, 12.7; ITEEA 3; INASC: 6
**Course Objective 10:** FAMU CF: 5.5; FEAPS: 7; FSAC: 12.7; ITEEA 3; INASC: 6

**Presentation Criteria:** You will produce a class presentation that relates to your final project. Your presentation should engage your audience in all aspects of your project. You should develop a quality presentation that you will be proud to use as a teaching aid in your future classroom. Additionally, this will help you to continue to develop the public speaking skills all educators need to teach. The format must be in PowerPoint, and you will make a presentation no longer than 15 minutes and no shorter than 10 minutes.

**Class Presentation**

**Course Objective 6:** FAMU CF: 5.5; FEAPS: 7; FSAC: 12.7, 13.4; ITEEA 16; INASC: 6
**Course Objective 9:** FAMU CF: 5.5; FEAPS: 7; FSAC: 12.6, 12.7; ITEEA 3; INASC: 6
**Course Objective 10:** FAMU CF: 5.3; FEAPS: 3, 7; FSAC: 11; ITEEA 2; INASC: 9
<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Assignments/Lab</th>
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</table>
| 1    | Introduction and Orientation  
Course Syllabus  
Lecture: An Introduction to Energy and Power | Review the PowerPoint: Types of Energy and Power. Read Chapter 1 of the Text. Be prepared to discuss these topics in class. Lab: Safety |
| 2    | Lecture: Types of Energy and Power | Review the PowerPoint: Renewable and Inexhaustible Energy Sources. Read Chapter 1 of the Text. Be prepared to discuss these topics in class. Lab: Simple Machines Energy and Society Technology Learning Activity* |
| 3    | Lecture: Renewable and Inexhaustible Energy Sources  
Video: Earth: It’s History and Future – Renewable Energy | Review the PowerPoint: Nuclear Energy. Read Chapter 2 of the Text. Be prepared to discuss these topics in class. Lab: Simple And Complex Machines Discussion Board 1 |
| 4    | Lecture: Nuclear Energy | Review the PowerPoint: Solar Energy. Read Chapter 3 of the Text. Be prepared to discuss these topics in class. Lab: Wind Turbines Residential Energy Audit Technology Learning Activity |
| 5    | Lecture: Solar Energy | Review the PowerPoint: Wind Energy. Read Chapter 4 of the Text. Be prepared to discuss these topics in class. Lab: Wind Turbines |
| 6    | Lecture: Wind Energy | Review the PowerPoint: Green Energy Technologies. Read Chapter 5 of the Text. Be prepared to discuss these topics in class. Lab: Wind Turbines Renewable, Exahustible and Inexhaustible Energy Sources Technology Learning Activity |
| 7    | Lecture: Green Energy Technologies  
Review for Midterm | Review the PowerPoint: Fundamentals of Electricity and Electronics. Read Chapter 6 of the Text. Be prepared to discuss these topics in class. Lab: Wind Turbines |
| 8    | Midterm | Review the PowerPoint: Power Systems. Be prepared to discuss this topic in class. Lab: Hydroelectric Generator |
| 9    | Lecture: Power Systems | Review the PowerPoint: Electronic and Mechanical Power Systems. Read Chapter 7 of the Text. Be prepared to discuss these topics in class. Lab: Hydroelectric Generator Energy, Power and STEM Technology Learning Activity* |
| 10   | Lecture: Electronic and Mechanical Power Systems | Review the PowerPoint: Fluid Power Systems. Read Chapters 8&9 of the Text. Be prepared to discuss these topics in class. Lab: Hydroelectric Generator Mechanical Power Systems Technology Learning Activity |
| 11   | Lecture: Fluid Power Systems  
Video: Modern Marvels: Gasoline | Review the PowerPoint: Control Technology and Automation. Read Chapter 10 of the Text. Be prepared to discuss these topics in class. Lab: Hydroelectric Generator Discussion Board 2 |
| 12   | Lecture: Control Technology and Automation | Review the PowerPoint: Teaching Concepts in Energy and Power Technologies. Read Chapter 11 of the Text. Be prepared to discuss these topics in class. Lab: Final Project |
| 13   | Lecture: Teaching Concepts in Energy and Power Technologies | Lab: Final Project  
Reading: Chapter 13 |
| 14   | No Lecture | Lab: Final Project |
| 15   | No Lecture | Lab: Final Project |
| 16   | Review for Final Exam | Class Presentations*  
All Work Due |
| 17   | Final Exam | |

All Lab and Assignment Criteria Available via Blackboard  
* Denotes TaskStream Artifact Submission
References and Supplementary Materials

Syllabus Reference Materials:

- California University of Pennsylvania (http://www.cup.edu)
- Florida Department of Education Website (http://www.fldoe.org)
- Florida Technology Education Association Website (http://www.ftea.com)
- Illinois State University (http://www.ilstu.edu)
- International Technology Education Association (http://www.ITEEAconnect.org)

Supplementary Online Materials

- Hyperphysics http://hyperphysics.phy-astr.gsu.edu/hbase/work.html
- United States Department of Energy http://www.energy.gov/

References


Candidate’s Name: __________________  Student ID: __________ Program Area: ______________

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<thead>
<tr>
<th>Criteria for rating</th>
<th>Favorable</th>
<th>Acceptable</th>
<th>Marginal</th>
<th>Unacceptable</th>
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<tr>
<td></td>
<td>4</td>
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<tr>
<td>The candidate <strong>consistently</strong> and <strong>thoroughly</strong> demonstrates indicators of performance. (90–100 %)</td>
<td>The candidate <strong>usually</strong> and <strong>extensively</strong> demonstrates indicators of performance. (89-80%)</td>
<td>The candidate <strong>sometimes</strong> and <strong>adequately</strong> demonstrates indicators of performance. (79-70%)</td>
<td>The candidate rarely or <strong>never</strong> and <strong>inappropriately</strong> or <strong>superficially</strong> demonstrates indicators of performance.</td>
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**Professionalism : The Teacher Candidate demonstrates professionalism**
(Please use a ✓ to indicate level of performance.)

**Outcome**
F (4)  A (3)  M (2)  U (1)

**Punctuality**
- Does not exceed three unexcused absences, per university catalog 2009-2010
- In class at or before specified time, per Registrar
- Attends class, field experiences, meetings
- Appropriate dress and grooming
- Completes assignments on or before due date
- Emotional Management
  - Handles feeling appropriately
  - Reacts reasonably to situations
  - Finds a healthy balance between emotions
- Demonstrates the appropriate use of personal technology during class
- Follows established protocol and procedures
- Follows established procedures and policies

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**Effective Communication: The Teacher Candidate demonstrates effective communication skills**
(Please use a ✓ to indicate level of performance.)

- Uses standard English language in various settings
- Uses appropriate tone of voice for the setting
- Clearly articulates concepts (avoids words such as you know, um, uh-uh, and okay)
- Models appropriate respectful communication that is not demeaning or harmful (avoids loud outbursts and profanity)
- Avoids confrontational behavior

**Outcome**
F (4)  A (3)  M (2)  U (1)
### Criteria for rating

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The candidate **consistently and thoroughly** demonstrates indicators of performance. (90–100%)

The candidate **usually and extensively** demonstrates indicators of performance. (89-80%)

The candidate **sometimes and adequately** demonstrates indicators of performance. (79-70%)

The candidate **rarely or never and inappropriately or superficially** demonstrates indicators of performance.

---

### Respectful Behavior: The Teacher Candidate demonstrates respectful behavior

(Please use a ✓ to indicate level of performance.)

- Considers opinions of others with an open mind (respects diversity)
- Listens to others in a variety of settings
- Provides equitable learning opportunities for all
- Considers background interests and attitudes
- Reacts reasonably to situations (avoids verbal confrontational behavior)

Outcome

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### Ethical Behavior: The Teacher Candidate demonstrates ethical behavior

(Please use a ✓ to indicate level of performance.)

- Demonstrates academic honesty
  - Avoids plagiarizing
- Demonstrates honesty inside and outside of the classroom
- Demonstrates trustworthiness
- Understands the importance of professional code of ethics
- Advocates fairness

Outcome

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### Reflective Behavior: The Teacher Candidate demonstrates reflective behavior

(Please use a ✓ to indicate level of performance.)

- Accepts feedback and suggestions, and incorporates in subsequent practice in various settings
- Demonstrates accurate self-analysis regarding one's strengths and weaknesses

Outcome

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