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Spring 1-2016

### ETEC 214.01: Energy Storage and Distribution Systems

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APPLIED COMPUTING AND ENGINEERING TECHNOLOGY DEPARTMENT  
ENERGY TECHNOLOGY PROGRAM

Spring 2016

**Energy Storage Systems  
Syllabus**

**DEPARTMENT:** *Applied Computing and Electronics*

**COURSE NUMBER:** ETEC 214

**SEMESTER CREDITS:** 3

**MEETING TIMES:** NA, on-line class

**FACULTY:** Alan Fraser, PE

**CONTACT:** Email: Bradley.layton@mso.umt.edu

**OFFICE:** NA

**OFFICE HOURS:** NA

**Course Description:**

Students will create system models of energy storage in the electric distribution and transmission systems. Analytical and decision models will be created using Excel with applicability to the electric system. Prior experience with Excel is a necessity. The course will focus on the electric system.

**Prerequisites:**

Need a working knowledge of Excel (students will apply Excel as a modeling tool, 214 is not an Excel class), CSCI 172 Introduction to Computer Modeling; Introduction to Sustainable Energy I & II (NRGY 101 and 102); DC Circuit Analysis (EET 105); M 121 (MATH 111/ MAT 118); or consent of instructor.

**Course Objectives:**

Upon completion of this course, the student will:

- Understand how to develop, use and validate analytical models with Excel using mathematic and engineering principles
- Understand basic economic principles used to evaluate energy projects using the time value of money, and interest and discount rates
- Understand how to determine, apply and calculate system efficiencies
- Use energy and power calculations to model system efficiency, losses and operating costs
- Understand how to use dimensional analysis
- Describe, model and analyze various energy storage technologies including electric car, battery, pumped-hydro, and thermal (either hot or cold)



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- Apply pump and/or fan affinity laws
- Understand general principles of the electric grid including electric rate analysis and impacts of energy conservation
- Apply previous courses learning by applying math, writing, and teamwork skills, along with research techniques.

Reading materials will be available free and on-line.

Microsoft Excel software

PDF writer and reader (this can be found for free on the internet.)

Updated and activated anti-virus software (and email current validation to instructor)

### **Evaluation Procedures:**

Assignments 25%

Online participation (chats, discussions, etc) 25%

Quizzes 25%

Final Exam 25%

100% - 90% A

90% - 80% B

80% - 70% C

70% - 60% D

### **Times:**

All times posted for this course are for the Mountain Time Zone.

### **Assignments:**

Assignments are to be submitted due by the assigned time on the assigned date. Late assignments receive a score of 0; late assignments will be accepted only in extraordinary circumstances, and at the instructor's discretion.

**-Work assignments are always due by Sunday at 11 PM.**



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This is not a correspondence course or a course where you can proceed at your own pace. Active participation is required and graded as assigned in online discussions, chats, Q&A sessions, and other activities.

**-Discussion contributions are always due by Sunday at 11 PM, but should be contributed throughout the week. And, are more valued in grading if posted throughout the week.**

### **Tests:**

Quizzes are to be taken during the assigned dates and time. Some of the tests will be timed. Missed quizzes receive a score of 0; there is no makeup for missed quizzes. The final exam is comprehensive. The date and time of the Final will be determined

### **Discussion Board Expectations:**

This class will actively use the discussion board, and as you can see a large part of your grade depends on active discussion board participation. The discussion board activities consist of posting draft assignments, peer-reviewing your classmates draft assignments, participation in the weekly discussion topic, or other activities as defined by instructor. Given the amount of discussion board activity, my advice is to engage in the discussion board early in the week, and often.

If there are multiple spreadsheet problems in the weekly assignment, you are **not** expected to post your draft for all problems. You are expected to at least post a draft of one assignment problem. There is more credit value if you are posting 1) an assignment problem that has not already been posted, 2) a more complex assignment problem, 3) a different solution or methodology than previously posted, or 4) politely redirecting or guiding group to a different solution.

On the discussion board, post draft assignments in pdf form only; any spreadsheet posts will be deleted. Post peer-review comments under that particular topic or assignment problem so it will be easier for everyone to follow that issue. The correct labeling of comments, draft work, and posting peer-review comments under the associated subject will enhance the ease and value of discussion board activity. In other words, clearly state the subject of your post, the particular problem assignment, or post within that subject topic if that subject post already exists. (For example if problem #1 already has a post discussion started and you have a comment about problem #1, post your comments under the original problem #1 post.)



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As you can see, if you post later in the week, there is less time for others to peer-review your assignment. I understand that that may happen occasionally, but it should not be the norm. In other words, the timing of the posts also has more potential grade value if posted earlier in the week to allow and foment discussion. If you happen to post later in the week, your comments should enhance the previous discussion. Peer-reviewing is a valuable and sometimes, time consuming activity; therefore, it will be credited by the grader as such.

**Your discussion board posts should be:**

Respectful

Helpful

Clear and concise

Pertinent to the current week's topic or assignment problems

Clearly labeled and posted under the correct subject in the discussion board

Crafted to encourage the exchange ideas and concepts

**Policies for Dropping and Adding Courses, Changing Sections, Grading, and Credit Status:**

University Policy for dropping courses or requesting grading/credit status changes can be found in the catalog or on the web <http://www.umt.edu/catalog/academic/policy.htm>. All students should be familiar with this policy.

If you are having difficulty with the course for any reason and decide not to continue, please complete a drop or withdrawal form. A properly completed and approved drop or withdrawal form will prevent you from receiving a failing grade on your college transcript.

**Computer Hardware and Software:**

The information for this course is presented in several formats. The student must be able to open and read Microsoft Word as well as PDF files. Numerous web site references will be used. Since several of the documents that will be used in this course are relatively large PDF files, ***the speed of your computer and of your Internet access will impact your online experience.***



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If you have problems accessing course material, your browser may very well be the culprit. Because I will need to reset Test and Quiz access, please contact me directly if you have a technical problem while taking a Quiz or Test (See the Technical Glitches section under the Assessment/Grading Policies heading below for details). UM online Tech Support can be reached from the "Tech Support" tab in the Main Menu on Blackboard, or by calling 243-HELP (4357).

**Late Work:**

Late assignments and missed Quizzes or Exams will receive a score of zero. If you have an extenuating circumstance that will prohibit you from meeting a deadline, please contact me well in advance of the deadline and I will make reasonable accommodations.

**Online support** may be obtained via [courseware-support@umontana.edu](mailto:courseware-support@umontana.edu) or x4999

**Drop/Add Policy:**

Refer to: [http://www.umt.edu/catalog/policy\\_procedure.htm](http://www.umt.edu/catalog/policy_procedure.htm)

Please note: if you are receiving financial aid, dropping or withdrawing from a course may affect your financial aid status.

**Academic Honesty Policy:**

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by The University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at [http://life.umt.edu/vpsa/student\\_conduct.php](http://life.umt.edu/vpsa/student_conduct.php)

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**Disability Accommodation:**

Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please contact me after class or in my office. Please be prepared to provide a letter from your DSS Coordinator. For more information, visit the Disability Services website at <http://www.umt.edu/dss/> or call 406.243.2243 (voice/text).

**E-mail Policy at UM:**

According to the University e-mail policy, an "employee must use *only* UM assigned student e-mail accounts for all e-mail exchanges with students, since such communication typically involves private



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student information.” This means that **you *must* send any correspondence through your GrizMail account. For more information on setting up and using your GrizMail account, please go to <http://www.umt.edu/it/email/studentemail.htm>.**

**DATE OF LAST UPDATE TO SYLLABUS:**

January 2015

**CHANGES TO SYLLABI:**

Instructor reserves the right to modify syllabi and assignments as needed based on faculty, student, and/or environmental circumstances. If changes are made to the syllabus, amended copies will be dated and made available to the class.