El Eng. 5570 – High Voltage Engineering  
(Offered in select fall semesters)

Catalog Description:
[Lec. 2.0, Lab 1.0] Introduction of high voltages, discharge behavior, arcs, insulators, ionization of gasses, high voltage components (cables, insulators,…), and standard tests.
Note: Lab section will be within the class. Student will not perform experiments. Experiments are performed in a confined portable high-voltage laboratory during the class.

Prerequisites:
none

Class schedule:
Three 50-minute lectures per week are typical (MWF 12:00pm – 1:00pm, EECH 239). Classroom time is divided between lectures, problem solving, and demonstration/animation of topics utilizing multimedia. Lab section is mainly performed within the classroom.

Status in Curriculum:
Elective for S&T students.

Textbooks and other required material:
For off-campus students, synchronous attendance is NOT mandatory.
Prior knowledge of power systems analysis and design is recommended.
Class notes have priority to textbook.

Class will be a combination of the following books (having at least one, is highly recommended):

The exam is based on the book, class notes, and homework.

Instructor:
Dr. P. Shamsi, Assistant Professor, Electrical Engineering

Office:
232 Emerson Hall
Email: shamsip@mst.edu
Phone: 573 – 341 – 7696

Office Hours:
Wednesdays 11:00am - 12:00 pm
Prerequisites by topic:
Basics of physics and electromagnetics. Power systems analysis.

Course learning outcomes/expected performance criteria:
1. Understanding high voltage engineering
2. Breaking voltages and arcs in gasses and solid insulators
3. Insulation and partial discharge
4. High voltage tests and standards

Topics covered:
1. Introduction and Fundamentals
2. Insulation and breaking voltages
3. Paschen's law
4. Arcs in gasses
5. Oil and solid insulators
6. Partial discharge and design of high voltage equipment
7. High voltage tests

Contribution of course to meeting the professional component:
1. Students are exposed to high voltage engineering
2. Topics are of great importance for engineers working on transmission line design, transformer design, and power systems engineering.

Course Evaluation:
This course is very different from any other course you have ever had. The goal of this course is to inform you about topics in high voltage engineering. The course is not designed to give you assignments. Also, the exam has no problems and is qualitative. Questions will require a short explanation of the answer/problem and no numerical solution is necessary. Any student can get a full mark by participating in class sessions and learning the concepts of each section.
This is the way this course is taught in many top universities who have similar courses. Also, laboratory is during the class sessions and I will demonstrate experiments. Depending on the semester, we will visit a substation or a similar facility.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Count</th>
<th>On campus students</th>
<th>Off campus students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm exam (retakes are possible)</td>
<td>1</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Class participation and clicker questions (extra)</td>
<td></td>
<td>10%</td>
<td>10%</td>
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Attendance is mandatory. There will be a midterm exam for this course which can be retaken to improve the grade. I reserve the rights to change the dates of the exams. In that case, I will notify the class at least 2 weeks before the exam and I will make sure everyone is satisfied with the new dates. Exams will be closed notes.
Homework:
There is no homework assignments for this course.

Disability Support Services:
“Any student inquiring about academic accommodations because of a disability is referred to Disability Support Services so that appropriate and reasonable accommodative services can be determined and recommended. Disability Support Services is located in 204 Norwood Hall. Their phone number is 341-4211, web page: http://dss.mst.edu, and their email is dss@mst.edu”. If you have a documented disability and anticipate needing accommodations in this course, you are strongly encouraged to meet with me early in the semester. You will need to request that the Disability Services staff send a letter to me verifying your disability and specifying the accommodation you will need before I can arrange your accommodation.

Honor Code:
Honor Code adherence is expected in all phases of this class. Missouri S&T’s "Student Academic Regulations" handbook is available online at http://registrar.mst.edu/academicregs/index.html. Page 30 of the Student Academic Regulations handbook describes the student standard of conduct relative to the System's Collected Rules and Regulations section 200.010, and offers descriptions of academic dishonesty including cheating, plagiarism or sabotage.

Honesty: In the ideal student, honesty is represented by the attitude of individuality. This is represented by a student constantly striving to perform all work themselves and to credit all statements, ideas, references, and etc. where it is due. A student also has the responsibility to ensure prevention of any academic dishonesty (ie: cheating, copying homework, etc.). A student must also refrain from using any sources or methods of completion that are unadvised and/or forbidden by individual instructors or campus standards. Lastly, Honesty is intrinsically based on Respect which is our next core belief in this honor code.

Respect: In this Campus it is vital for every student to respect themselves, other students, and all university employees. This entails accepting and obeying requests by campus officials and instructors so long as said request is within the proper bounds of their position. This also involves respecting the opinions and differences of other students as well as seeking to understand their differences rather than cause conflict. Students must also respect the educational processes of this campus. This includes instructor’s lessons, other student’s study habits or performance, as well as any other act that could have a negative impact on some form of intellectual development.

Academic Alert System:
Alert System is to improve the overall academic success of students by improving communication among students, instructors and advisors; reducing the time required for students to be informed of their academic status in a course; and informing students of actions necessary by them in order to meet the academic requirements in their courses.

Emergency Systems:
All students should familiarize themselves with the emergency systems and emergency exits of campus buildings.
http://ece.mst.edu/media/academic/ece/documents/classexp/Safety%20Lab%20Manual%20for%20ECE.pdf
Student Learning Assistance:
LEAD Learning Assistance http://lead.mst.edu
The Learning Enhancement Across Disciplines Program (LEAD) sponsors free learning assistance in a wide range of courses for students who wish to increase their understanding, improve their skills, and validate their mastery of concepts and content in order to achieve their full potential. LEAD assistance starts no later than the third week of classes. Check out the online schedule at http://lead.mst.edu/assist, using zoom buttons to enlarge the view. Look to see what courses you are taking have collaborative LEAD learning centers (bottom half of schedule) and/or Individualized LEAD tutoring (top half of the schedule). For more information, contact the LEAD office at 341-7276 or email lead@mst.edu.

The Burns & McDonnell Student Success Center
The Student Success Center is a centralized location designed for students to visit and feel comfortable about utilizing the campus resources available. The Student Success Center was developed as a campus wide initiative to foster a sense of responsibility and self-directedness to all S&T students by providing peer mentors, caring staff, and approachable faculty and administrators who are student centered and supportive of student success. Visit the B&MSSC at 198 Toomey Hall; 573-341-7596; success@mst.edu

I reserve for myself the right to make adjustments to the syllabus during the semester.

Prepared by: Dr. Shamsi, Date: June. 2015