FALL 2019  ECE 7990 – HVDC Transmission 1

COURSE DESCRIPTION:
The course covers the fundamentals of HVDC transmission systems including existing and emergent conversion and transmission equipment. The objective is to provide mathematical modelling, analysis and design procedures in addition to the physical description of the equipment to benefit both the practicing HVDC engineer and the potential researcher.

PRE-REQUISITES:
ECE 4370 or equivalent, 1 lecture weekly

CONTACT HOURS:
3-hours per week

COURSE CONTENT:
1) Comparison of Ac and Dc Transmission Systems: Advantages and Disadvantages
2) Fundamentals of the Rectification and Inversion Process, Mathematical Analysis of the HVDC Converter
3) Design of semiconductor based valves
4) Control of HVDC Systems
5) Fault Detection and Protection.
6) Reactive Power Requirement and Filter Design for HVDC Systems
7) Analysis of Maximum Power Transfer Capability and Steady-State Stability of HVDC Systems
8) Emerging HVDC topologies (Voltage Sourced HVDC Converters, Capacitor Commutated Converters)
9) Ground Electrodes and Dc Transmission Lines
10) Use of Simulation Tools in analysis and Design of HVDC Systems

Additional advanced research topics as determined by the instructor.

HOMEWORK:
Homework will consist of assignments, preparation of a seminar on an assigned article from the research literature, and an individual design project.

TEXTBOOK:
1) No assigned textbook.
2) Course notes are provided
3) Students are required to access recent publications in the field

RECOMMENDED REFERENCE BOOKS:

COURSE WEBSITE:  http://ece.eng.umanitoba.ca/graduate/ece7990/
EVALUATION:
Your final course grade is determined by your performance in assignments, midterm, and a final exam. The weighting of each of these compulsory components is as follows:

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<tr>
<th>COMPONENT</th>
<th>NO</th>
<th>VALUE %</th>
<th>TOTAL VALUE</th>
<th>DETAILS / ADDITIONAL INFO</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>5</td>
<td>10%</td>
<td>60</td>
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<tr>
<td>Midterm Exam</td>
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<td>Final Examination</td>
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Policy on missed Term Test for legitimate reasons (e.g. sickness); No make-up test is given, remaining marks are scaled to 100%

INSTRUCTOR INFO:
Name: .................. A.M. Gole
Office: ................. E1-452 EITC
Tel: .................... (204) 474-9959
Email: .................... Aniruddha.Gole@umanitoba.ca

Office Hours: .......... By appointment

VOLUNTARY WITHDRAW:
18 November 2019

REQUIREMENTS/REGULATIONS
Student Responsibilities: It is the responsibility of each student to contact the instructor if he/she is uncertain about his/her standing in the course and his/her potential for receiving a failing grade. Students should also familiarize themselves with Sections 4 and 6 of the Regulations dealing with, among others, incomplete term work, deferred examinations, attendance and withdrawal, etc..

Lectures: Attendance at lectures is essential for successful completion of this course. Students must satisfy each evaluation component in the course.

ACADEMIC INTEGRITY
Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the General Academic Regulations and Requirements of the University of Manitoba, Section 7.1, students are reminded that plagiarism* or any other form of cheating is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university) regardless of media

- examinations
- assignments
- laboratory reports
- term exams

A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty

Please refer any questions regarding Academic Integrity to your course instructor.

*Plagiarism: to steal and pass off (the ideas or words of another) as one's own; use (another's production) without crediting the source