

WINTER 2021

## ECE 7070 – Power System Analysis

### COURSE DESCRIPTION:

Mathematical modeling of power system components, simulation of power systems and the assessment of power system stability will be the main focus of this course.

### COURSE OBJECTIVE:

The main objective of this course is to get an in depth understanding of how to model and simulate a power system for assessing its stability. The content covered includes: Introduction to power system operation; power flow analysis; review of transient stability modeling and simulation using the classical model; introduction of detailed machine models for transient stability analysis, modeling of exciters, governors, FACTS devices and wind energy conversion systems for power flow and transient stability analysis; methods of transient stability analysis; voltage stability.

### PRE-REQUISITES:

Undergraduate background in power systems and electrical machines.

### CONTACT HOURS:

3-hours per week

### COURSE CONTENT:

The following topics will be discussed:

1. Network modeling and power flow analysis.
2. Synchronous machine models and transient stability simulation.
3. Load modeling (including induction machine).
4. Power flow control, HVDC and FACTS.
5. Dynamic models of FACTS devices.
6. Wind power plant models.
7. Voltage stability.

Additional advanced research topics as determined by the instructor.

### HOMEWORK:

Homework will consist of assignments, and an individual design project.

### TEXTBOOK:

Power System Stability and Control by Dr. Prabha Kundur, McGraw Hill, 1994.

### GRADE ANNOUNCEMENTS:

**TBA – Due to COVID-19, this date to be announced by the Registrar's Office**

## EVALUATION:

Your final course grade is determined by your performance in the components list below in the Evaluation Table (seminar, assignments, project, mid-term, and a final examination. **Students must receive a minimum of 50% on the final examination and must complete and pass all components in the course in order to be eligible to receive a passing grade.**

Each component is weighted as follows:

COMPONENT	NO	VALUE %	TOTAL VALUE	DETAILS / ADDITIONAL INFO
Assignments	5	25%	25	
Project	1	25%	25	
Final Examination	1	50%	50	
<b>TOTAL</b>			100	

## GRADE SCALE:

LETTER	MARK	LETTER	MARK	LETTER	MARK	LETTER	MARK
A+	95-100	B+	80-84	C+	65-69	D	45-54
A	85-94	B	70-79	C	55-64	F	<45

## INSTRUCTOR INFO:

Name: ..... Udaya D. Annakkage  
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Office Hours:..... By appointment

## VOLUNTARY WITHDRAW:

**TBA – Due to COVID-19, this date to be announced by the Registrar’s Office**

## 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