University of Kurdistan

Department of Electrical & Computer Engineering

Microgrids

(Spring 2017)

Instructors: H. Bevrani & Q. Shafiee

Course Description

Microgrid is an ideal way to intelligently integrate renewable resources, enable customer participation in the electricity enterprise, add reliability, bring diversification of energy sources, and reduce carbon emissions and costs. The microgrids form the building blocks of the modern, smart power grid. This course provides both theoretical knowledge and practical foundation for understanding of Microgrids. Different aspects of these small-scale power systems, current challenges and research directions will be examined in detail.

Topics Covered

1. Modern Power Grids
2. Renewable Energy Sources and DGs
3. Power Electronics for Renewable Energy Sources
4. Grid Connected RESs and Ancillary Services
5. Microgrids: Concept, Structure and Operation Modes
6. Microgrid Planning
7. Microgrids: Dynamics and Modeling
8. Microgrid Control
9. Virtual Inertia
10. Microgrid Energy Management
11. Dynamic Impact on Power Systems

Grading

The course grade will be determined using the following:
- Homework and Activities: 15%
- Presentation of a Recent Work: 15%
- Final Exam: 35%
- Final Project: 35%

January 2017

References

[1] H. Bevrani, Q. Shafiee, *Course Lecture Notes*, Spring 2017.

[2] H. Bevrani, B. Francois, T. Ise, *Microgrid Dynamics and Control*, Wiley Press, 2017.

Homework Assignments

The homework assignments will be performed along the semester.

Note: Students may discuss the problems with other students, but are not allowed to share solutions (MATLAB m-files, etc.).

Final Project

During the last 1/2 of this course you will work on a special project of your choice. This will give you a chance to deepen your knowledge in your area of interest. You will provide a detailed written report and make an oral presentation to the entire class.