# Department of Electrical Engineering
# Assignment
# Date: 14/04/2020

## Course Details

**Course Title:** Smart Grid Design and Operation **Module:** 3
**Instructor:** _____ **Total Marks:** 30

## Student Details

**Name:** _____ **Student ID:** _____

**INSTRUCTIONS**:

1. Answers to each question (1 and 2) must be written in form of Research *Paper*.
2. Each answer must be supported by related research articles (at least 3)
3. The answers must be in your own words and references must be cited wherever it is necessary
4. Plagiarized content will NOT be accepted (Max allowed similarity Index: 15%)
5. The solution must be uploaded before the end of deadline mentioned on the *Online Portal* of subject.

**Question No. 1**

a. Present in detail the problems and limitations of existing electric grid. How does unreliability of existing grid system results in loss of billions of dollars to the consumers?
b. Why should pursue a smart grid? If it should, what functions should the smart grid address?
c. Smart grid is customer oriented. What does this term mean and how does this relate to efficiency of grid?
d. Are customers interested in receiving advanced energy and other informational services through the electricity grid? How can this have monitory benefits for the customers and other stakeholders?
e. A smart grid network consists of a number of components. Discuss the its major components and operations in an integrated system.

**Question No. 2**

Please select any three research papers of *same research area* from the list given at the end. Write the answers of the following question n form of a research paper

a. Discuss the major problems, findings, conclusions and discussion by researchers in order to mitigate a solution
b. Write the detailed review of work performed in both the researches
c. Discuss how the proposed models can be useful for the implementation at different stakeholder levels in Pakistan

Resources for Question No. 2


1. J. Wang and H. Zhou, "Conceptual Design and the Future Development for Operation Smart System in China Southern Power Grid," in IEEE Transactions on Smart Grid, vol. 4, no. 3, pp. 1621-1629, Sept. 2013.
2. V. Poulios, M. Mangani, E. Kaffe, F. Kienzle and B. Loepfe, "Smart grid real lab of ewz: findings from a large-scale demonstration project," in CIRED - Open Access Proceedings Journal, vol. 2017, no. 1, pp. 1984-1987, 10 2017.
3. S. O. Muhanji, A. Muzhikyan and A. M. Farid, "Distributed Control for Distributed Energy Resources: Long-Term Challenges and Lessons Learned," in IEEE Access, vol. 6, pp. 32737-32753, 2018.
4. M. H. Amini, J. Mohammadi and S. Kar, "Distributed Holistic Framework for Smart City Infrastructures: Tale of Interdependent Electrified Transportation Network and Power Grid," in IEEE Access, vol. 7, pp. 157535-157554, 2019.
5. W. E. Elamin and M. F. Shaaban, "New real-time demand-side management approach for energy management systems," in *IET Smart Grid*, vol. 2, no. 2, pp. 183-191, 6 2019.
6. M. Latifi, A. Khalili, A. Rastegarnia, W. M. Bazzi and S. Sanei, "Demand-side management for smart grid via diffusion adaptation," in IET Smart Grid, vol. 3, no. 1, pp. 69-82, 2 2020.
7. T. Ji, X. Ye, M. Li, Q. Wu and X. Yang, "Operating mechanism for profit improvement of a smart microgrid based on dynamic demand response," in IET Smart Grid, vol. 2, no. 3, pp. 364-370, 9 2019.
8. Y. Liu, C. Yuen, R. Yu, Y. Zhang and S. Xie, "Queuing-Based Energy Consumption Management for Heterogeneous Residential Demands in Smart Grid," in IEEE Transactions on Smart Grid, vol. 7, no. 3, pp. 1650-1659, May 2016.