ELEC-E8423 Smart Grid - Course topics 2024 – Allocated to students

1. **(5.3.) Wind power generation variation and its modeling. Mousa Hossam &**
2. **(23.4.) Solar power generation variation and its modeling. Scalera Edoardo & Hiltunen Jere**
3. **(12.3.) Role of DR, storages and hydrogen in future energy systems. Fei Zhineng & Amanpour Saied**
4. **(5.3.) Battery energy storage systems. Zeb Farruk &**
5. **(14.5) Compressed air energy storages. Mikola Iiro & Kivekäs Jaakko**
6. **(19.3) Pumped hydro energy storages. Houvenaghel Matthys & Chanron Hugo**
7. **(19.3) Power to gas applications. Geust Alexander & Keski-Nisula Elias**
8. **(14.5.) Thermal heat storages for daily and seasonal use. Ramesh Rakesh & Järvinen Veikko**
9. **(14.5) Fuel cells as a part of power system. Ijaz Faheem & Vrana Martin**
10. **(23.4.) Electric vehicles and their charging systems. Lehto Tuomas & Matikainen Pyry**
11. **(26.3.) Modelling of Electric Vehicle charging load. Pulkkinen Anni & Arola Annika**
12. **(19.3) Demand response of EV loads. Ollus Felix & Heimonen Victor**
13. Demand response of HVAC loads.
14. **(7.5.) Electrical energy use in res buildings. Flex and DR potential of different energy uses. Regelin Antti & Rantala Kalle**
15. **(28.5.) DR limits set by human comfort requirements. Heat gains, heating cooling, and demand flex. Kumpulainen Touko**
16. **(26.3) Demand response of industrial loads. Visala Iiris & Viitanen Matti**
17. **(26.3) Demand response of commercial loads. Kantoniemi Niilo & Kuula Emma**
18. Self-healing networks; automatic switching applications (FLIR).
19. **(21.5.) Methods for fault location and detection in SG. Kosonen Santeri & Pallonen Lauri**
20. **(5.3.) Distribution system state estimation in SG. Salehi Amin & Tofighi Milani Seyyed**
21. Dynamic thermal rating of SG components
22. Monitoring and control of secondary substations
23. ***(7.5.) Communication solutions for SG. Jayaweera Muhandiramge Ruwansi &***
24. **(9.4.) AMR – systems in SG (Automatic Meter Reading). Metsola Kiira, Huttu Ilkka & Lundström Jenna**
25. **(12.3.) Power markets in Nordic Countries: Day ahead market and intra-day balancing. Aalto Lotta & Tornivaara Aino**
26. **(19.3) Power markets in Nordic Countries Freq. containment and restoration reserves. Iso-TryykäriEero&Korvenranta Olli**
27. **(7.5.) Prosumer / Consumers. Local energy resources and local energy matching. Helin Aleksi & Aho Pekka**
28. **(12.3.) Different market mechanisms for SG: bidding, real-time pricing, block chains. Xu Yang & Poissonnet Paul**
29. **(7.5.) Technical solutions in Micro Grids. Smeds Jesper & Granlund Viktor**
30. **(7.5.) Power and Energy Balance management in Micro Grids. Ahmad Hamza & Ahad Abdul**
31. **(7.5.) Interconnection of Micro Grids with each other / power system. Beversdorf Hanna & Virk Nekka**
32. **(19.3) Demand response in power system energy balance management. Buchert Rasmus & Branders Wilma**
33. ***(9.4.) Demand response in distribution grid congestion management. Jia Xueyong &***
34. **(23.4.) PV hosting capacity of low voltage and medium voltage grids. Pakkanen Atte & Päivärinta Ari**
35. **(21.5.) Active voltage control in SG. Müller Leo & Suurnäkki Santeri**
36. **(28.5.) Monitoring and control in SG. SCADA and NIS systems. Säämäki Fanni**
37. **(28.5.) Network impacts of distributed generation. Voltages and relay protection. Amarasinghe Indula & Weerasekara Vijayantha**
38. **(9.4.) Power Quality issues in SG. Hafeez Zubair & Fazeel Muhammad**
39. **(9.4.) Wind farms, their local grids and connection to the power system. Laaksonen Jenni & Pietilä Emmi**
40. **(23.4.) Solar farms, their local grids and connection to the power system. Abbas Hashim & Junejo Shafeo**
41. **(28.5.) Supergrids. Lindell Mikael & Jylhä Ilmari**
42. **(26.3.) Future street lights. Isokääntä Ronja & Westberg Vera**
43. ***(14.5.) Smart Meters and their Security Issues. Munazza Munazza &***
44. **(9.4.) Smart Grids and electrical safety. Luoma Iida, Karjalainen Oona & Sundholm Emilia**
45. **(23.4.) Concentrating solar power and its comparison to photovoltaics. Toivonen Jenni & Pälikkö Elmeri**
46. **(14.5.) Sector coupling of power and heat. Raulo Rita & Jalas Otto**
47. ***(14.5.) Deep heat energy wells for ground source heat pump systems. Leppik Raigo &***
48. **(9.4.) Electrical buses and their charging solutions. Kondakov Milla & Korhonen Milja**
49. **(23.4.) Electrical trucks and their charging solutions. Sjöholm Rasmus & Vallo Lauri**
50. **(21.5.) Energy communities. Huuskonen Anni & Mattila Katja**
51. **(28.5.) Demand response of a household with distributed energy resources, Emanuele Berté**
52. **(21.5.) Wide Area monitoring and control systems for Power grid, Cheng Hock Lim & Akter Irin**
53. **(28.5.) Capacity mechanisms to support power balance in VRES power systems. Stranden Sampo & Sjöblom Janne**
54. Power system condition monitoring and pre-emptive fault management.
55. Plasma drilling of deep bore holes.