



Course Code OGEE-544DL	Course Title Smart Power Grid Management	ECTS Credits 7.5
Department Engineering	Semester Fall, Spring	Prerequisites None
Type of Course Required	Field Oil, Gas and Energy Engineering	Language of Instruction English
Level of Course 2 nd Cycle	Year of Study 1 st /2 nd	Lecturer(s) Dr Stelios Hirodontis
Mode of Delivery Distance Learning	Work Placement N/A	Co-requisites None

Objectives of the Course:

The main objectives of the course are to:

- Introduce students to cutting-edge technologies for connecting the power infrastructure to modern computerized communications networks
- Provide solid knowledge on standardization, applications, protocols, automation, architecture, and management of grids
- Develop the tools for quantitative and qualitative performance analysis of bidirectional communication, automation, renewable energy integration, and wireless sensor networks
- Provide solid technical knowledge on renewable energy sources and their integration into smart grids

Learning Outcomes:

After completion of the course students are expected to:

- Explain the main characteristics, differences, advantages, and disadvantages of smart grid networks
- Analyze and evaluate the performance and efficiency of smart grids and microgrids
- Evaluate the Multiple distributed smart microgrids with a self-autonomous, energy harvesting wireless sensor network
- Perform calculations for Wireless sensor networks for consumer applications in the smart grid
- Describe low-voltage, DC grid-powered LED lighting system with smart ambient sensor control for energy conservation in green building

Course Contents:

- Demand-side energy management
- The modernization of distribution automation featuring intelligent FDIR and

volt-variation optimization

- Advanced asset management
- Wide-area early warning systems
- The integration of renewable energy sources into smart grids
- The micro-grid in the electric system transformation
- Enhancing the integration of renewable in radial distribution networks through smart links
- Voltage-based control of DG units and active loads in smart micro-grids
- Electric vehicles in a smart grid environment
- Low-voltage, DC grid-powered LED lighting system with smart ambient sensor control for energy conservation in green building
- Multiple distributed smart micro-grids with a self-autonomous, energy harvesting wireless sensor network
- Wireless sensor networks for consumer applications in the smart grid
- ZigBee-based wireless monitoring and control system for smart grids

Learning Activities and Teaching Methods:

Lectures, Online Questions, Projects, Discussion

Assessment Methods:

Assignments, Online Exercises, Final Exam

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Krzysztof Iniewski	Smart Grid Infrastructure & Networking	McGraw-Hill	2012	

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Ekanayake, J., Jenkins, N., Liyanage, K., Jianzhong, W	Smart Grid: Technology and Applications	John Wiley	2012	