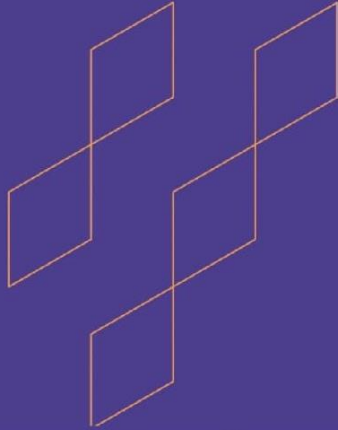




Course Specification

(Postgraduate Programs)

Course Title:	Special Topics in Smart Grid Technologies
Course Code:	2202-520
Program:	Master in Electrical Engineering
Department:	Electrical Engineering
College:	College of Engineering
Institution:	King Faisal University
Version:	V2
Last Revision Date:	17 April 2025

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A. General information about the course:

1. Course Identification:

1. Credit hours: (3)			
2. Course type			
A.	☐ University	☐ College	☒ Department
B.	☐ Required	☒ Elective	
3. Level/year at which this course is offered: Level 3/2nd year			
4. Course General Description:			
Introduction to smart grid; Smart grid technologies, Transformational impacts of the smart grid on the industry; Micro-grids and distributed energy resources; Power quality management in smart grid; information and communication technology for smart grid; Integration of renewable energy sources; Case studies in smart grid; CDM opportunities in smart grid systems.			
5. Pre-requirements for this course (if any):			
Graduate Student Standing			
6. Co-requisites for this course (if any):			
None			
7. Course Main Objective(s):			
Introduce the smart grid and identify its impacts on energy efficiency, energy management and integration of renewable energy systems			

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	38	85%
2	E-learning	7	15%
3	Hybrid - Traditional classroom - E-learning		
4	Distance learning		



3. Contact Hours: (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify).....	
Total		45 Hours

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods:

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Identify the key elements of Smart Grids and visualize the roadmap towards next generation electricity networks.	K1	Lectures	Short assignments
1.2	Evaluate technology options pertaining to renewable energy generation, energy storage, data handling and communications for Smart Grids.	K1	Lectures	Short assignments
1.3	Justify technological and economical choices in the context of existing commercial Smart	K1	Lectures	Short assignments





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	Grids projects and suggest improvements and expansions.			
2.0	Skills			
2.1	Analyze the new roles of utilities and consumers in Smart Grids and pinpoint business and market opportunities and potential gains.	S1	Lectures and Case studies	Examination
3.0	Values, autonomy, and responsibility			
3.1	Determine the relevance of Smart Grids projects, develop ways to evaluate their impacts and implications	V1	Lectures	Progress report Oral Presentation Final report
3.2				
...				

C. Course Content:

No	List of Topics	Contact Hours
1.		
2.		

Total		

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	Week 4,8,12,14	20%
2.	Midterm	Week 9	35%





No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
3.	Comprehensive report	Week 13	20%
4.	Course project	Week 16	25%
5.	Total		100%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities:

1. References and Learning Resources:

Essential References	Introduction to the Smart Grid: Concepts, technologies and evolution, Salman K. Salman, The Institution of Engineering and Technology (May 16, 2017)
Supportive References	Green and Smart Technologies for Smart Cities, Pradeep Tomar, Gurjit Kaur, First Edition, 2019, CRC Press, Taylor and Francis.
Electronic Materials	Handouts
Other Learning Materials	Scientific journal reading, reviewing and analysis

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom: 30 seats
Technology equipment (Projector, smart board, software)	Data show: 1 laptop
Other equipment (Depending on the nature of the specialty)	HOMER, ETAP

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect- Online Survey
Effectiveness of students' assessment	Students and Faculty	Direct and Indirect Assessment
Quality of learning resources	Students and Faculty	Indirect- Online Survey
The extent to which CLOs have been achieved	Students and Faculty	Direct and Indirect Assessment
Other	None	None

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)





G. Specification Approval Data:

COUNCIL /COMMITTEE	EE DEPARTMENT QUALITY COMMITTEE
REFERENCE NO.	MEETING # 10
DATE	APRIL 19, 2025

