

Basic details

UID		Cohorts covered	Earliest cohort	Latest c
Long title	Power System Economics			
New code	ELEC70075	New short title		
Brief description of module (approx. 600 chars.)	This course is designed to provide understanding of the fundamentals of power system economics considering alternative market arrangements for the operation and planning of electricity systems. The key focus is on the modelling and analysis of market participants strategies including market power in a competitive electricity market, the impact of demand elasticity on the market outcomes and prices, operational reliability and ancillary services, network congestion and related locational marginal pricing including transmission access rights, coordination of trading between energy and balancing services, investment in generation and transmission assets.			
660 characters				
Available as a standalone module/ short course?	N			

Statutory details

	ECTS	CATS	Non-credit	HECOS codes
Credit value	5	10	N	
FHEQ level	Level 7			

Allocation of study hours

	Hours	
Lectures	20	
Group teaching	0	<i>Incl. seminars, tutorials, problem classes.</i>
Lab/ practical	0	
Other scheduled	0	<i>Incl. project supervision, fieldwork, external visits.</i>
Independent study	105	<i>Incl. wider reading/ practice, follow-up work, completion of assessments</i>
Placement		<i>Incl. work-based learning and study that occurs overseas.</i>
Total hours	125	
ECTS ratio	25.00	

Project/placement activity

Is placement activity allowed?	No
--------------------------------	---------------------------------

Module delivery

Delivery mode	Taught/ Campus	Other	
Delivery term	Term 1	Other	

Ownership

Primary department	Department of Electrical and Electronic Engineering
Additional teaching departments	N/A

Delivery campus

South Kensington

Collaborative delivery

Collaborative delivery?

N

External institution

N/A

External department

N/A

External campus

N/A

Associated staff

Role	CID	Given name	Surname
Module Leader		Goran	Strbac

Learning and teaching

Module description

Learning outcomes

On successfully completing this module, you will be able to:

- Explain the role of electricity market in supporting efficient system operation and investment in infrastructure;
- Analyse the market clearing process in a competitive electricity market;
- Analyse market driven revenues, including contracts, strategies of market participants and market power;
- Calculate the business cases for generation companies, transmission networks, and consumptions;
- Co-optimize the energy and reserve in a centralised electricity market;
- Design and characterize a profit-driven generation expansion model.

Module content

Fundamentals of electricity markets:

- Demand curve and elasticity of the demand
- Supply curve and marginal cost
- Market equilibrium and social welfare
- Consumers' surplus and suppliers' economic profit

Participants to electricity markets:

- Generation company (GENCO)
- Network Companies
- Retailer / supplier
- Large / small Consumers

Economics models:

- Transmission economics: marginal transmission prices, congestion surplus, network revenue, network investment
- Economics and reliability, concept of customer worth of supply.
- Co-optimisation of energy and reserve in a centralised electricity market
- Strategic planning for generation companies

Learning and Teaching Approach

The module will be delivered primarily through in-person lectures introducing the key concepts and principles, supported by various example study cases in electricity markets. The content is presented via a combination of slides, whiteboard, and visualizer. Learning will be reinforced through a coursework exercise.

Assessment Strategy	This module presents opportunities for both formative and summative assessment. You will be formatively assessed through exercises linked to the study cases presented in the lectures. You will have additional opportunities to self-assess your learning via exercises with model solutions.. You will be summatively assessed by a written closed-book examination at the end of the module and a written coursework report.
Feedback	You will receive feedback on examinations in the form of an examination feedback report on the performance of the entire cohort. You will receive individual written feedback on your coursework report and also live in the in-class discussions of study cases. Further individual feedback will be available to you on request via this module's online feedback forum, through staff office hours and discussions with tutors.
Reading list	- "Fundamentals of Power System Economics" (Wiley, 2004) D Kirschen, G Strbac - Chapter 12 in "Electric Power Systems" (Wiley 2012) Weedy, B. M.; Cory, B. J.; Jenkins, N.; Ekanayake, J. B.; Strbac, G

Quality assurance

Date of first approval **February 2022**

Date of last revision

Date of this approval

Module leader **Goran Strbac**

Notes/ comments

Office use only

QA Lead

Department staff

Date of collection

Date exported

Date imported

Assessment details

Grading method

Numeric

Pass mark

50%

Assessments

[illegible]

100%