

# SYLLABUS <sup>1</sup>

**THIS COURSE UNIT IS TAUGHT IN ROMANIAN LANGUAGE**

## 1. Information about the program

1.1 Higher education institution	POLITEHNICA University Timișoara
1.2 Faculty <sup>2</sup> / Department <sup>3</sup>	Faculty of Electrical Engineering and Electric Power Engineering / Department of Electric Power Engineering
1.3 Chair	—
1.4 Field of study (name/code <sup>4</sup> )	Power Engineering
1.5 Study cycle	Master
1.6 Study program (name/code/qualification)	Electric Power Systems Management / 202020 / 2151

## 2. Information about discipline

2.1 Name of discipline/The educational classe <sup>5</sup>	Power market						
2.2 Coordinator (holder) of course activities	Associate prof. PhD. Vuc Gheorghe						
2.3 Coordinator (holder) of applied activities <sup>6</sup>	Associate prof. PhD. Vuc Gheorghe						
2.4 Year of study <sup>7</sup>	II	2.5 Semester	3	2.6 Type of evaluation	ES	2.7 Type of discipline <sup>8</sup>	DS

## 3. Total estimated time (direct activities (fully assisted), partially assisted activities and unassisted activities<sup>9</sup>)

3.1 Number of hours fully assisted/week	3.5 ,of which:	3.2 course	2	3.3 seminar/laboratory/project	1.5
3.1* Total number of hours fully assisted/sem.	49 ,of which:	3.2* course	28	3.3* seminar/laboratory/project	2
3.4 Number of hours partially assisted/week	,of which:	3.5 project, research		3.6 training	3.7 hours designing M.A. dizertation
3.4* Number of hours pasrtially assisted/ semester	,of which:	3.5* project of research		3.6* training	3.7* hours designing M.A. dizertation
3.8 Number of hours of unassisted activities/ week	3.5 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field			1
		Study using a manual, course materials, bibliography and lecture notes			1
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays			1.5
3.8* Total number of hours of unasssited asctivities/ semester	49 ,of which:	Additional documentation in the library, on specialized electronic platforms, and on the field			14
		Study using a manual, course materials, bibliography and lecture notes			14
		Preparation of seminars/ laboratories, homework, assignments, portfolios, and essays			21
3.9 Total hrs./week <sup>10</sup>	7				
3.9* Total hrs./semester	98				
3.10 No. of credits	5				

## 4. Prerequisites (where applicable)

4.1 Curriculum	<ul style="list-style-type: none"> <li>Electric power systems, Economy or Microeconomics</li> </ul>
4.2 Competencies	<ul style="list-style-type: none"> <li>Basic knowledge about the economy and markets, respectively about power</li> </ul>

<sup>1</sup> The form corresponds to the Syllabus promoted by OMECTS 5703/18.12.2011 (Annex 3), updated based on the Specific Standards ARACIS of December 2016.

<sup>2</sup> The name of the faculty which manages the educational curriculum to which the discipline belongs

<sup>3</sup> The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.

<sup>4</sup> Fill in the code provided in HG no. 376/18.05.2016 or in HG similars annually updated.

<sup>5</sup> The educational classes of disciplines (ARACIS – specific standards, art./paragraph 4.1.2.a) are: fundamental disciplines, field disciplines, majoring/specialization disciplines.

<sup>6</sup> The applied activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).

<sup>7</sup> The year of study to which the discipline is provided in the curriculum .

<sup>8</sup> The types of disciplines (ARACIS – specific standards, art./paragraph 4.1.2.a) are: extended knowledge discipline / advanced knowledge discipline and synthetic discipline (DA / DCAV and DS) or art./paragraph 4.1.2 b) complementary discipline (DC)).

<sup>9</sup> Within UPT, the number of hours from 3.1\*, 3.2\*,...,3.9\* are obtained by multiplying by 14 (weeks) the number of hours from 3.1, 3.2,...., 3.9.

<sup>10</sup> The total number of hours/week is obtained by summing up the number of hours from 3.1, 3.4 și 3.8.

	systems.
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## 5. Conditions (where applicable)

5.1 of the course	<ul style="list-style-type: none"> <li>Classroom, laptop, projector, whiteboard, internet connection.</li> </ul>
5.2 to conduct practical activities	<ul style="list-style-type: none"> <li>Laboratory / project room, laptop, projector, whiteboard, internet connection, specific software (Powerworld, Matlab or Octave)</li> </ul>

## 6. Specific competencies acquired through this discipline

Specific competencies	<ul style="list-style-type: none"> <li>Understanding and assimilating the basic concepts of the functioning of competitive markets;</li> <li>Ability to understand the impact of competitive operating conditions of power systems on their operating regimes;</li> <li>Ability to solve the issues of establishing the operating regimes resulting from the competitive operating conditions of the electric power systems.</li> </ul>
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> <li>C1. In-depth knowledge of the basic concepts specific to the management of electric power systems;</li> <li>C2. Using knowledge for the independent analysis of problems specific to the management of power systems;</li> <li>C3. Using principles, theories, specialized methods to solve new theoretical and practical problems, to communicate and support the chosen solutions;</li> <li>C4. Using the criteria and methods for evaluating complex problems and constructively communicating the results of one's own evaluation;</li> <li>C5. Development of research projects using the ability to synthesize and interpret a set of information, solve basic problems and evaluate possible conclusions;</li> </ul>
Transversal competencies ascribed to the specific competencies	<ul style="list-style-type: none"> <li>CT1. Execution of complex professional tasks specific to the management of electric power systems, in conditions of professional independence;</li> <li>CT2. Assuming leadership and organizational roles within professional groups;</li> <li>CT3. Effective use of learning techniques and methods for personal and professional development</li> </ul>

## 7. Objectives of the discipline (based on the grid of specific competencies acquired)

7.1 The general objective of the discipline	<ul style="list-style-type: none"> <li>To familiarize students with the issue of liberalization of electricity markets. Familiarization with the basic entities of the market, such as the stock exchange or the independent system operator, but also with the problems that arise in the case of the operation of the energy system in the conditions of the competitive market.</li> </ul>
7.2 Specific objectives	<ul style="list-style-type: none"> <li>To understand the new operating conditions of the electricity market;</li> <li>To understand the specific technical aspects and their interaction with the competitive principles of the market.</li> </ul>

## 8. Content

8.1 Course	Number of hours	Teaching methods
Energy sector restructuring	4	Creative combination of the participatory lecture with the debate, the problematization, the documentation on the web, the exemplification, the concrete exercise correlated with the current topic
Liberalization of the energy market. The mechanism of the energy exchange. Energy market risk management.	5	
Open access to the transmission network	4	
Ancillary services. Outsourcing ancillary services.	5	
Power system management	5	
Market power. Power market distortion	2	
Independent system operator	3	

Bibliography <sup>11</sup>		
1. M. Nemes, Sisteme electrice de putere: probleme actuale – Ed. Orizonturi universitare, 2003		
2. J. Duncan Glover, Mulukutla S. Sarma, Thomas Overbye - Power Systems Analysis and Design, Brooks/Cole Publishing Co. Pacific Grove, CA, USA		
3. Grigsby, Leonard L., Electric power systems - CRC Press Taylor & Francis Group, 2006		
4. Bergen R. A., Vittal V., Power System Analysis, Second Edition, Prentice Hall, New Jersey, 2000		
5. Vuc, Gh., Managementul energiei electrice, Editura AGIR, București, 2001		
6. Vuc, Gh., Gestiunea energiei și managementul proiectelor energetice, Ed. 2, Editura Orizonturi Universitare, Timișoara, 2008		
<b>8.2 Applied activities<sup>12</sup></b>	<b>Number of hours</b>	<b>Teaching methods</b>
Determining the economic elements involved in optimizing the operating regime of electric power systems	2	Creative combination of the participatory lecture with the debate, the problematization, the documentation on the web, the exemplification, the concrete exercise correlated with the current topic
Network access cost components computation	3	
Network access charging methods. Analysis of the influence of congestion	2	
Power market risk. Determining the proposed risk portfolio.	3	
Market concentration analysis. Market power assessment	1	
Control of energy transactions between coordination areas. AGC and ACE systems	2	
The influence of competitive conditions on investments in the system. Long-term marginal costs	1	
Bibliography <sup>13</sup>		
1. M. Nemes, Sisteme electrice de putere: probleme actuale – Ed. Orizonturi universitare, 2003		
2. J. Duncan Glover, Mulukutla S. Sarma, Thomas Overbye - Power Systems Analysis and Design, Brooks/Cole Publishing Co. Pacific Grove, CA, USA		
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4. Bergen R. A., Vittal V., Power System Analysis, Second Edition, Prentice Hall, New Jersey, 2000		
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**9. Corroboration of the content of the discipline with the expectations of the main representatives of the epistemic community, professional associations and employers in the field afferent to the program**

- In order to establish the content of the course and the applied works, the teaching method, the subject holder consulted teachers with great experience in the field, graduates in higher education institutions in the country and abroad and specialists from energy companies such as Transelectrica, Enel, EON or Electrica network operators and design, execution and maintenance companies or studies in the field.

**10. Evaluation**

Type of activity	10.1 Evaluation criteria <sup>14</sup>	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Knowledge of the components of the electric	Questionnaires containing theoretical and practical questions covering the entire	50%

<sup>11</sup> At least one title must belong to the department staff teaching the discipline, and at least one title must refer to a relevant work for the discipline, a national and international work that can be found in the UPT Library.

<sup>12</sup> The types of applied activities are those mentioned in 5. If the discipline contains more types of applied activities then they are marked, consecutively, in the table below. The type of activity will be marked distinctively under the form: „Seminar:”, „Laboratory:”, „Project:” and/or „Practice/Training:”.

<sup>13</sup> At least one title must belong to the staff teaching the discipline.

<sup>14</sup> The Syllabus must contain the evaluation method of the discipline, specifying the criteria, the methods and the forms of evaluation, as well as mentioning the share attached to these within the final mark. The evaluation criteria must correspond to all activities stipulated in the curriculum (course, seminar, laboratory, project), as well as to the methods of continuous assessment (homework, essays etc.)

	power systems, of the modes of their interconditional operation within the system, of the regimes specific to normal operating situations and of the corresponding calculation methods.	contents come complete with hand written evaluation consisting of complex applications.	
<b>10.5 Applied activities</b>	<b>S:</b>		
	<b>L:</b>		
	<b>P:</b> The ability to apply in practice the notions presented in the lectures correlated with the knowledge acquired in previous disciplines. The ability to analyze the steady-state regimes of power systems and to solve specific problems. The ability to evaluate and compare comparative results and simulations.	Public oral support, sustaining the results obtained and exemplifying the specific operations performed.	50%
	<b>Pr:</b>		
	<b>Tc-R<sup>15</sup>:</b>		
<b>10.6 Minimum performance standard</b> (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified <sup>16</sup> )			
<ul style="list-style-type: none"> <li>• correct answers to at least 45% of the theoretical questions;</li> <li>• solving at least 45% of the application part.</li> </ul>			

**Date of completion**

**Course coordinator  
(signature)**

**Coordinator of applied activities  
(signature)**

**Head of Department  
(signature)**

**Date of approval in the Faculty  
Council <sup>17</sup>**

**Dean  
(signature)**

<sup>15</sup> Tc-R= Homework-Reports

<sup>16</sup> For this point turn to "Ghid de completare a Fișei disciplinei" found at: [http://univagora.ro/m/filer\\_public/2012/10/21/ghid\\_de\\_completare\\_fisa\\_disciplinei.pdf](http://univagora.ro/m/filer_public/2012/10/21/ghid_de_completare_fisa_disciplinei.pdf)

<sup>17</sup> The approval is preceded by discussing the study program's board's point of view with regards to the syllabus.