

Course unit title:	Introduction to Power Systems		
Course unit code:	AEEE350		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	3		
Semester when the unit is delivered:	4 (Spring)		
Number of ECTS credits allocated :	5		
Name of lecturer(s):	Dr. Alexis Polycarpou		
Learning outcomes of the course unit:	<ol style="list-style-type: none"> <li>1. Comprehend basic principles of Electricity generation, transmission and distribution. Acquire basic knowledge relating to the Principle of operation of a Generator.</li> <li>2. Understand basic Transmission system considerations: Transmission line cable parameters, series impedance, short and medium transmission line models, Ideal Transformer operation and basic magnetic principles.</li> <li>3. Distribution system considerations: Types of load (static, dynamic loads), Introduction to general characteristics of Motor loads</li> <li>4. Power in 3-phase AC systems: Definition and calculations of Active, Reactive and Apparent power. Calculation of Power with circuit analysis. Short transmission line considerations.</li> <li>5. Mathematical analysis of Delta and Star connected loads. Calculation of system voltages and currents.</li> </ol>		
Mode of delivery:	Face-to-face		
Prerequisites:	AEEE222	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	<ul style="list-style-type: none"> <li>• Revision of mathematical techniques used for power system analysis.</li> <li>• Impedance characteristics and components polar and rectangular format.</li> <li>• Power in three phase systems</li> <li>• Mathematical formulation relating to the identification of power at a system. Circuit analysis to obtain power and power factor.</li> <li>• Generation, transmission, distribution system characteristics in Cyprus. Principle of power generation using oil fuelled generator.</li> <li>• Generator operation and three phase sinusoidal voltages.</li> <li>• Introduction of Distribution systems: Distribution system considerations.</li> <li>• Types of load, Power quality, voltage sags, Distribution network planning.</li> <li>• Motor loads: Characteristics of motors, General circuit diagram of an induction motor, effect on power quality.</li> <li>• Basic magnetic principles, operation of transformer in Power systems.</li> <li>• Transformer circuit diagram</li> <li>• Introduction of Transmission system: Transmission system consideration, Cable parameters, series impedance of a line, short transmission line model.</li> <li>• Mathematical analysis of system parameters with star connected loads</li> <li>• Mathematical analysis of system parameters with delta connected loads</li> <li>• Revision and exam preparation instructions.</li> </ul>		
Recommended and/or required reading:	Lecture Notes		

Textbooks:	<b>Power system Analysis</b> Second Edition, Hadi Saadat, McGraw-Hill, 2002
References:	<b>Elements of power system analysis</b> , William D, Stevenson Jr, 4 <sup>th</sup> ed. Mc Graw-Hill, 2002 <b>Electrical technology</b> , E. Hughes, Longman, 1995
Planned learning activities and teaching methods:	<p>Students are taught the course through lectures (3 hours per week) in classrooms or lectures theatres, by means of traditional tools or using computer demonstration. Auditory exercises, where examples regarding matter represented at the lectures, are solved and further, questions related to particular open-ended topic issues are compiled by the students and answered, during the lecture or assigned as homework.</p> <p>Topic notes are compiled by students, during the lecture which serve to cover the main issues under consideration. Students are also advised to use the subject's textbook or reference books for further reading and practice in solving related exercises. Tutorial problems are also submitted as homework and these are solved during lectures or privately during lecturer's office hours.</p> <p>Students are prepared for final exam, by revision on the matter taught, problem solving and concept testing and are also trained to be able to deal with time constraints and revision timetable. The final assessment of the students is formative and is assured to comply with the subject's expected learning outcomes and the quality of the course.</p>
Assessment methods and criteria:	<ul style="list-style-type: none"> <li>• Tests: 40%</li> <li>• Final Exam 60%</li> </ul>
Language of instruction:	English
Work placement(s):	No