



**University of Tehran**  
**School of Electrical and Computer Engineering**

<b>Course</b>	Energy Transmission Line Design and Project		
<b>Course type, level, credit</b>	Optional	Undergraduate	3 units
<b>Field, Major</b>	Electrical Engineering	Power	
<b>Co-requisite(s)</b>	<ul style="list-style-type: none"> <li>- Insulations and High Voltage</li> <li>- Power System Analysis II</li> </ul>		
<b>Prerequisite(s)</b>	<ul style="list-style-type: none"> <li>- Power System Analysis I</li> </ul>		
<b>Prerequisite by topic</b>	<ul style="list-style-type: none"> <li>- Basic Insulation Levels (BIL)</li> <li>- Transmission Line Parameters Calculation</li> </ul>		
<b>Goals</b>	Introduction of traditional and modern transmission line approaches is the aim of this course. In this course, transmission line electrical design, especially to determine proper conductor and insulator and also mechanical design, particularly to determine type, location and height of towers are discussed.		
<b>Outcome</b>	<p>Students who successfully passed the course would learn the following:</p> <ul style="list-style-type: none"> <li>- Calculating appropriate cross section and material for conductor and shield wire</li> <li>- Calculating of required insulator technical specifications based on power frequency and impulse overvoltages</li> <li>- Employing suitable techniques to tackle conductor mechanical oscillations</li> <li>- Selecting type, location and height of transmission line towers considering various influencing restrictions</li> <li>- Calculating mechanical forces on towers</li> <li>- Designing transmission lines under PLS-CADD software environment</li> </ul>		
<b>Topics</b>	<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Transmission line electrical design <ul style="list-style-type: none"> <li>- Calculating conductor cross section</li> <li>- Calculating insulator technical specifications</li> <li>- Overhead line right of way</li> </ul> </li> <li>3. Transmission line mechanical design <ul style="list-style-type: none"> <li>- Routing and surveying instruction</li> <li>- Spotting considering electrical, mechanical and environmental restrictions</li> </ul> </li> </ol>		

	<ul style="list-style-type: none"> <li>- Executive issues in transmission line projects</li> </ul> <p>4. Transmission line design based on PLS-CADD software</p> <ul style="list-style-type: none"> <li>- Introduction of PLS-CADD software</li> <li>- Design a sample transmission line based on actual data</li> </ul>
<b>Required software</b>	<ul style="list-style-type: none"> <li>- EMTP/ATP, EMTP/RV, or EMTDC/PSCAD</li> <li>- PLS-CADD</li> <li>- MATLAB</li> </ul>
<b>Assignments</b>	
<b>Projects</b>	4 course project
<b>Grading</b>	<p>Influential attendance: 10 %</p> <p>Project: 40 %</p> <p>Final exam: 50 %</p>
<b>Textbook(s)</b>	<p>[1] G. A. Heidari, Energy transmission line electrical design, Tabesh bargh, Tehran regional electric company, in Persian, second edition, 2011.</p> <p>[2] A. M. Ghazi Zahedi, M. A. Ranjbar, Energy transmission line design, Ministry of power, in Persian, 1986.</p>
<b>Further readings</b>	<p>[1] National instructions and international standards regarding transmission line design</p> <p>[2] R. Lings, EPRI AC Transmission Line Reference Book - 200 kV and Above, Electric Power Research Institute, Third Edition, Dec. 2005</p>