

Course Code	TKEE163212											
Course Name	Electrical Power Protection											
Course Instructors	Harnoko											
Course Type	Selected Elective											
Course Classification	Engineering Topics											
Credit / Contact Hour per Week	3 / 150 minutes per Week											
Course Description	This course studies how to safeguard equipment and electrical systems against the links, overloads, and other operating disturbances, so that equipment damage and power outages due to interference can be minimized. In this case it is necessary to study the causes and processes of the occurrence of interference; components, workings, and characteristics of protective equipment; ability and endurance of equipment; how to integrate various protection devices in the form of coordination protection in order to achieve maximum security and selectivity and by taking into account the economic concept.											
Prerequisites Courses												
Covered Student Outcome	<b>Development of Engineering Solution (b)</b> <b>Engineering Design (c)</b>											
Learning Outcome	<ol style="list-style-type: none"> <li>1. Students are able to describe the nature of the disorder, its causes and consequences for the system, explaining the basic idea of protection relection, the protection zones and the qualities required on a protection system.</li> <li>2. Students are able to describes discrimination and selectivity methods, transducer circuits and their properties, types of protection releases, CB control systems, and how to provide reliable auxiliary power supplies.</li> <li>3. Students are able to mention various protection items, describing how protection releases describe unique password-like properties; explains the properties of the instant password; explains the properties of Kraft inequality and binary codes; explains the properties of McMillan inequality.</li> <li>4. Students are able to formulate and describe the characteristics of electromagnetic comparators, and can explain the workings and properties of different types of overcurrent releases, distance releases, and differential releases.</li> <li>5. Students are able to select the type of relay, set the setting, explain the limitations, and describe the range of different types of releases for high voltage line protection.</li> <li>6. Students are able to select the type of rele, set the setting, explain the limitations, and combine various releases for the high-voltage generator, motor, and busbar protection triggers.</li> </ol>											
Topic	<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Working Principles and Rele Construction</li> <li>3. Basic Provinces and Components of Protection</li> <li>4. Rele and Application Characteristics</li> <li>5. Channel Protection.</li> <li>6. Apparatus protection</li> </ol>											
Direct Aseessment	<table border="1"> <thead> <tr> <th>Direct Aseessment Plan</th> <th>Measured Learning Outcome</th> </tr> </thead> <tbody> <tr> <td>Assignments</td> <td>LO1,LO2,LO3,LO4,LO5,LO6</td> </tr> <tr> <td>Mid Exam</td> <td>LO1,LO2,LO3</td> </tr> <tr> <td>Final Exam</td> <td>LO3,LO4,LO5,LO6</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>		Direct Aseessment Plan	Measured Learning Outcome	Assignments	LO1,LO2,LO3,LO4,LO5,LO6	Mid Exam	LO1,LO2,LO3	Final Exam	LO3,LO4,LO5,LO6		
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Indirect Assesment	Questionnaire (EDOM)											
References	<p>[1] Ravindranath, B., M. Chander, Power System Protection and Switchgear, Wiley Eastern Limited, New Delhi</p> <p>[2] Warrington, A.R.V.C., Protective Relays, Their Theory and Practice, Chapman and Hall, London</p>											

	<p>[3] IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems</p> <p>[4] Protective Relays Application Guide, GEC Measurements The General Electric Company Limited of England</p>
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