

<b>SEMESTER</b> <i>Seventh</i>	<b>DEPARTMENT</b> <i>Telecommunication Engineering</i>	<b>COURSE TITLE</b> <i>Control System Lab.</i>
<b>COURSE CODE</b> <i>EC506</i>	<b>HOURS</b> 3 <b>UNITS</b> 1	<b>COURSE SPECIFICATIONS</b> <i>Practical Content</i>
<b>1. The Fundamental Components of the Control System:</b> <ul style="list-style-type: none"> <li>➤ Introduction to control valves, electric motors, sensors and transducers.</li> <li>➤ Linear time-invariant systems and representation.</li> <li>➤ Performance of open loop control system: Liquid- level control system.</li> </ul>		
<b>2. Control System Analysis:</b> <ul style="list-style-type: none"> <li>➤ Step response of open-loop control system.</li> <li>➤ Response analysis of open- loop control system: (time delay, gain, and settling time).</li> <li>➤ Open loop step response analysis for DC motor control.</li> </ul>		
<b>3. Closed Loop Systems:</b> <ul style="list-style-type: none"> <li>➤ Closed loop position control system design.</li> <li>➤ Effect of Feedback on disturbance &amp; Control System Design.</li> </ul>		
<b>4. PID Controller:</b> <ul style="list-style-type: none"> <li>➤ Description of characteristics of the P-controller, PI-controller, and PID-controller.</li> <li>➤ The effect of P controller and PI controller on different closed loop systems: <ul style="list-style-type: none"> <li>○ Temperature system.</li> <li>○ DC motor control system.</li> <li>○ Liquid- level control system.</li> </ul> </li> <li>➤ The effect of adding D controller.</li> </ul>		
<b>5. Application of a PID Controller:</b> <ul style="list-style-type: none"> <li>➤ Response requirements.</li> <li>➤ The parameters of the PID controller to meet the response.</li> <li>➤ Building PID controller using analogue and digital electronic.</li> </ul>		

**References:**

1. *Modern Control Engineering*, K. Ogatta, Prentice Hall, 1994.
2. *Modern Control Systems*, R. C. Dorf, Eddison Wesley, 1990.