



**Palestine Technical University-Kadoorie**  
**Faculty of Engineering and Technology**  
**Course Syllabus**



<b>Course Title:</b>	Supervision systems	<b>Course Number:</b>	12120528																				
<b>Year:</b>	2024	<b>Semester:</b>																					
<b>Department:</b>	Industrial Automation Engineering	<b>Designation:</b>																					
<b>Prerequisite(s):</b>	Electrical circuit 2 + electronics																						
<b>Instructor:</b>	Dr. Muath WAHDAN																						
<b>Instructor's e-mail:</b>	muath.wahdan@ptuk.edu.ps																						
<b>Office Hours:</b>	13:00 - 14:00 Monday, and Wednesday. 09:00-10:00 Sunday, Monday and Tuesday.																						
<b>Class Time:</b>	10:00 – 12:00 Sunday, Tuesday, and Thursday.	<b>Class Room:</b>	H 216																				
<b>Course Description:</b>	Analysis, diagnosis, fault, finding and repair of electrical systems and equipment guided planning analysis, Design and drafting tasks, supervision, and facilitation of performance, evaluation performance of motor control systems, PLC systems application, SCADA systems, Program and verify programmable controller systems, to contract acting and estimating procedure.																						
<b>Textbook(s):</b>	<ol style="list-style-type: none"> <li>1. Amiya R Mohanty "Machinery condition monitoring principles and practices" CRC Press (2015).</li> <li>2. R.Radvanovsky and J. Brodsky "Handbook of SCADA/Control Systems Security" 2nd Edition,2016.</li> </ol>																						
<b>Other required material (References):</b>	<ol style="list-style-type: none"> <li>1. Handschin, E. "Energy Management Systems", Springer Verlag, 1990.</li> <li>2. Handschin, E. "Real Time Control of Electric Power Systems", Elsevier, 1972.</li> <li>3. John D. Mc Donald, "Electric Power Substation Engineering", CRC Press, 2001.</li> </ol>																						
<b>Course objectives:</b>	<p><i>On successful completion of this, course the student will be able to...</i></p> <ol style="list-style-type: none"> <li>1) Know the duties of supervisors the in industrial field.</li> <li>2) Determine the faults in electrical systems and how can this situation.</li> <li>3) Introduce the SCADA system.</li> <li>4) Program and verify programmable controller systems.</li> </ol>																						
<b>Topics covered and Calendar:</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Topics</th> <th style="text-align: center;">Weeks</th> </tr> </thead> <tbody> <tr> <td><b>1. Introduction to Machinery Condition Monitoring, Fault Prognosis and Future Needs.</b></td> <td style="text-align: center;">1</td> </tr> <tr> <td><b>2. Principles of Maintenance.</b></td> <td style="text-align: center;">1</td> </tr> <tr> <td><b>3. Analysis, diagnosis, fault finding, and repair of electrical systems and equipment-guided planning analysis.</b></td> <td style="text-align: center;">2</td> </tr> <tr> <td><b>4. Digital Signal Processing: Time Domain Analysis, Frequency Domain Analysis, Non-Stationary Signal Analysis, Signal Processing using <u>MATLAB</u> and <u>Numerical</u> in Signal Processing and Data Acquisition.</b></td> <td style="text-align: center;">3</td> </tr> <tr> <td><b>5. Introduction to Supervisory Control and Data Acquisition.</b></td> <td style="text-align: center;">4</td> </tr> <tr> <td><b>6. <u>SCADA</u> Functional Requirements and Components.</b></td> <td style="text-align: center;">5</td> </tr> <tr> <td><b>7. Configurations of <u>SCADA</u>, <u>RTU</u> (Remote Terminal Units) Connections.</b></td> <td style="text-align: center;">6</td> </tr> <tr> <td><b>8. Supervisory Control and Data Acquisition (<u>SCADA</u>).</b></td> <td style="text-align: center;">7</td> </tr> <tr> <td><b>9. <u>SCADA</u> Comm. protocols: Past Present and Future.</b></td> <td style="text-align: center;">8</td> </tr> </tbody> </table>			Topics	Weeks	<b>1. Introduction to Machinery Condition Monitoring, Fault Prognosis and Future Needs.</b>	1	<b>2. Principles of Maintenance.</b>	1	<b>3. Analysis, diagnosis, fault finding, and repair of electrical systems and equipment-guided planning analysis.</b>	2	<b>4. Digital Signal Processing: Time Domain Analysis, Frequency Domain Analysis, Non-Stationary Signal Analysis, Signal Processing using <u>MATLAB</u> and <u>Numerical</u> in Signal Processing and Data Acquisition.</b>	3	<b>5. Introduction to Supervisory Control and Data Acquisition.</b>	4	<b>6. <u>SCADA</u> Functional Requirements and Components.</b>	5	<b>7. Configurations of <u>SCADA</u>, <u>RTU</u> (Remote Terminal Units) Connections.</b>	6	<b>8. Supervisory Control and Data Acquisition (<u>SCADA</u>).</b>	7	<b>9. <u>SCADA</u> Comm. protocols: Past Present and Future.</b>	8
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	<b>10. Structure of a SCADA Communications Protocol.</b>	8
	<b>11. Power Systems SCADA and SCADA in Power System Automation.</b>	8

<b>Grading Plan:</b>	Mid Exam (35 Points) Homework (20 Points) Final Exam (45 Points)
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<b>General Notes: Class Policies</b>	1-University Regulations Regarding absentees will be Applied 2-Names will be read at the beginning of the class and anyone coming after that will be marked absent 3- All mobiles must be switched off during class
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**Course contribution:** State the contribution of the course to meeting the professional component

Professional Component	Course Contribution
General Education	None
Basic Science and Mathematics	Boolean algebra
Engineering Science	Digital logic, programming, sensors, and actuators, protection, DSP
Engineering Design	Design of PLC systems; design of SCADA systems.

**Relationship to program outcomes:** State the relationship of course to program outcomes

ABE T (a-k)		Electrical Eng-Industrial Automation Program Outcomes		
a	√√	ability to apply knowledge of math engineering and science		
b	√√	ability to design and conduct experiments and the ability to analyze and interpret data		
c	√√	ability to design system components or processes to meet a need		
d		ability to function in multi disciplinary teams		
e	√√	ability to identify, formulate and solve engineering problems		
f		understanding professional and ethical responsibility		
g		ability to communicate effectively		
h		Broad education to understand the impact of engineering solution in a global and societal context		
I		recognition of need and ability to engage in lifelong learning		
j		knowledge of contemporary issues		
k	√√	ability to use techniques, skills and tools in engineering practice		

**ABET EC2000 Program Criteria for Me hatronics Engineering Achieved:**  
MECHATRONICS ENGINEERING PROGRAM CRITERIA

	Programs must demonstrate that graduates have:
	A. Knowledge of chemistry and calculus-based physics with depth in at least one.
√	B. The ability to apply advanced mathematics through multivariate calculus and differential.
	C. Familiarity with statistics and linear algebra.
√	D. The ability to work professionally in mechanical, electrical, computing, and material control systems, including the design, realization, and integration of such systems.