



## Annual Course Report

Program on which this course is given:	Diploma of Applications of Automatic Control of Mech. Power Systems
Department offering the program:	Mechanical Power Engineering Department - ACC control Lab
Department offering the course:	Mechanical Power Engineering Department - ACC control Lab
Academic Level:	Mandatory Course- 2 <sup>nd</sup> Term of the Diploma of Graduate Studies
Date	2 <sup>nd</sup> Term 2014/2015
Semester (based on final exam timing)	<input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring

### A - Basic Information

1. Title:	Using PLC and IT in Automatic Control Systems						Code:	MEP 564	
2. Units/Credit hrs per week:	Lectures	3 Credit hours per week	Tutorial	--	Practical	--	Total	3	

### 3. Names of lecturers contributing to the delivery of the course:

- Associate Professor Dr. Mohsen S. Soliman

4. Course coordinator:	Associate Professor Dr. Mohsen S. Soliman	External evaluator:	NA at this time
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### B- Statistical Information (for 2013/2014)

See the Next Table for all Grades and statistics for the last spring-term 2013/2014

كلية الهندسة - جامعة القاهرة - قسم هندسة القوى الميكانيكية دبلوم تطبيقات التحكم الأوتوماتيكي في نظم القوى الميكانيكية نتيجة الفصل الدراسي الثاني للعام الأكاديمي 2013 /2014 (حسب اللانحة القديمة)											
رقم الطالب	مق 590 انتقال الحرارة والكتلة	مق 579 تطبيقات خطوط الأنابيب الصناعية	مق 566 تطبيقات متقدمة للدوائر الهيدروليكية في نظم التحكم الأوتوماتيكي	مق 564 استخدام PLC وتكنولوجيا المعلومات في نظم التحكم الأتوماتيكي الآلي	مق 563 استخدام المعامل الافتراضية في تحليل نظم التحكم الأتوماتيكي	الدراسية عدد الفصول	إجمالي الساعات المكتسبة	مجموع النقاط الكلية	المعدل التراكمي	التقدير	الحالة
1	C	B+	A	B	B	2	24	72.9	3	B	مستمر
2	C	B	B	B	B-	2	24	61.2	2.6	C+	مستمر
3		A-	A	A-	B+	2	24	86.1	3.6	B+	مستمر
4	----	----	----	----	----	2	12	34.2	----	----	غياب
5		A-	B+	A-	B+	2	24	81.9	3.4	B+	مستمر
6		B+	A-	B	B	2	24	78.9	3.3	B+	مستمر
7	----	----	----	----	----	2	12	39.9	---	----	غياب
8	----	A-	A	B	B	2	24	76.2	3.2	B	مستمر
9	----	B+	B+	B+	B+	2	24	73.2	3	B	مستمر
10	C+	B+	----	B+	B	1	12	35.7	3	B	مستمر
11	A-	A-	----	A-	A-	1	12	44.4	3.7	A-	مستمر
12	C	B	----	B+	B	1	12	33.9	2.8	B-	مستمر
13	----	----	----	A-	A	1	6	23.1	3.9	A-	مستمر

### C- Professional Information

#### 1. Course Teaching:

• Topics actually taught	No. of hrs	Lecture	Tutorial/ Practical	Lecturer
Introduction- Define a PLC system- Differences between continuous control systems or conventional DCS and the contemporary discrete/ digital control systems which are computer-based Programmable Logic	36 hrs	3 hrs/ week for 12	---	Associate Professor Dr.



<p>controllers (PLCs). Types of PLCs- Identifying major and expansion components, functions and applications of industrial PLC system. Basics of electric components in PLC circuits(Sensors,transducers,keys, Relays, Contactors)- Basics and essentials of discrete control systems using common control systems. Types of Analog and Digital Signals-Pneumatic Logical Elements- Types of Memories: ROM, RAM, EPROM and EEPROM -Identify types and describe operation modes of timers &amp; counters. PLC Programming-Read, understand and write types of basic ladder logic, statement list &amp; Function Block diagrams. Identify operational and technical differences between various types PLC devices &amp; models. Identify proper technical manual to refer to for PLC installation, programming &amp; implementation. Expanding of PLCs-Selection &amp;connection for proper expansion modules &amp; various types of PLC analog inputs/outputs.</p>				Mohsen S. Soliman
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<ul style="list-style-type: none"> <li>Topics taught as a percentage of the content specified:</li> </ul>	<input type="checkbox"/> >90% <input checked="" type="checkbox"/> 70-90% <input type="checkbox"/> <70%
<ul style="list-style-type: none"> <li>Reasons in detail for not teaching any topic:</li> </ul>	
<p>- Reducing the number of weeks/ Semester for many social and political reasons - Many mandatory vacations as per requirements of the university management. The term is only 12 weeks.</p>	
<ul style="list-style-type: none"> <li>If any topics were taught which are not specified, give reasons in detail:</li> </ul>	
Non	

<b>2.Teaching and Learning Methods:</b>									
Lectures	Practical/ Training	Seminar/ Workshop	Class Activity	Case Study	Projects	Laboratory	E-learning	Assignments /Homework	Other: Submitting reports
(√)	( )	( )	(√)	(√)	( )	( )	(√)	(√)	
If teaching and learning methods were used other than those specified, list and give reasons: Non									

<b>3. Student Assessment:</b>	
Method of Assessment	Percentage of total
-All in-term works, sheets, and Reports	30%
-Final-term formal, written Examination	70%
-Total	100%

Members of Examination Committee:	Associate Professor Dr. Mohsen S. Soliman & Assistance Professor Dr. Amro Abdel-Raouf
Role of external evaluator:	Review program ILOs
4. Facilities and Teaching Materials:	<input type="checkbox"/> Totally adequate <input checked="" type="checkbox"/> Adequate to some extent <input type="checkbox"/> Inadequate

List any inadequacies:  
Classes are not totally suits the Multi-Media Facilities  
Classroom has no white screen for the data show and it needs more ventilation fans.

**5. Exams/ILOs Matrix**  
• ILOs/Evaluation Source Matrix

ILOs	Source of Evaluation									
	Assignments	Quizzes	Experiments	Lab Exam	Midterm Exam	Projects Term	Papers/Repors	Final Exam	Others 1	Others 2
<ul style="list-style-type: none"> <li>Knowledge and Understanding</li> <li>Intellectual Skills</li> <li>Professional and Practical Skills</li> <li>General and Transferable Skills</li> </ul>										



<p><b>a) Knowledge and Understanding:</b></p> <ul style="list-style-type: none"> <li>-Basics of process sequential control &amp; examples of practical applications of industrial PLC Systems.</li> <li>-Major functions &amp; various components &amp; expansion modules of different types of PLC systems.</li> <li>-Types of PLC discrete or analog inputs/outputs signals and operation of PLC timers and counters.</li> <li>- Structure of PLC languages for the Ladder logic, statement list, and function block diagrams.</li> <li>-Basics of programming, running, simulation, diagnostics &amp; troubleshooting of various PLCs.</li> </ul>	√	√	-	-	-	-	√	√	-	-
<p><b>b) Intellectual Skills:</b></p> <ul style="list-style-type: none"> <li>-Select and apply appropriate technical and optimum method in doing engineering design and analysis of automatic control problems.</li> <li>-Searching for the scientific and technical information and adopting PLC automatic control capabilities.</li> <li>-Analyze and compare various PLC components, performance, and the technical specifications of different PLC systems.</li> <li>-Apply the concept of Ladder logic simulation, PLC diagnostics and the operation of PLC systems.</li> <li>-Compare between practical measurement devices, transducers &amp; methods for signal conditioning, data acquisition and different output displaying /processing systems of PLC systems.</li> <li>-Solve practical examples on using PLCs for automatic control problems.</li> <li>-Study, describe and compare between different PLC types, models and programming languages.</li> </ul>	√	√	-	-	-	-	√	√	-	-
<p><b>c) Professional and Practical Skills:</b></p> <ul style="list-style-type: none"> <li>-Identify various types of field devices (sensors, actuators and final control elements) which are essential for PLC automatic control systems.</li> <li>-Suggest possible alternative sensors, actuators &amp; final control elements for PLC systems.</li> <li>-Diagnose operation modes, configuration &amp; diagnostics of PLC systems.</li> <li>- Design, select, apply and implement various examples of PLC automatic control systems.</li> <li>- Diagnose failure and automatic control problems of industrial PLC automatic control systems.</li> <li>- Monitor &amp; evaluate performance of different parts &amp; components of PLC control systems.</li> <li>- Formulate &amp; analyze heat transfer, energy and flow problems related to PLC control systems.</li> </ul>	√	√	-	-	-	-	√	√	-	-
<p><b>d) General and Transferable Skills:</b></p> <ul style="list-style-type: none"> <li>-Transfer knowledge, Work in group, and Communicate in written &amp; oral forms, in English.</li> <li>- Use IT &amp; evolutionary technological tools &amp; PC applications (Excel, Matlab, Virtual labs, etc).</li> <li>-Prepare, write technical reports, Manipulate, sort data, Think logically, and continuous self-E-learning.</li> <li>- Identify practical problems; compare between different technologies for PLC control systems.</li> <li>-Organise &amp; manage time &amp; resources effectively; for short-term and longer-term commitments.</li> </ul>	√	√	-	-	-	-	√	√	-	-



- **Midterm Exam: No Midterm Exam for graduate studies programs**

Question	ILOs									
	1	2	3	4	5	6	7	8	9	10
1. (problem 1)										
2. (problem 2)										

- **Final Exam:**

Different parts of the ILOs are evaluated adequately through-out various part of the final exam

Question	ILOs									
	1	2	3	4	5	6	7	8	9	10
1. (problem 1)	√	√	√							
2. (problem 2)			√	√	√					
3. (problem 3)					√	√	√	√		
4. (problem 4)							√	√	√	√
5. (problem 5)								√	√	√

#### 6. Administrative Constraints: Reducing the number of the weeks per semester

- List any difficulties encountered:

- Reducing the number of weeks/ Semester for many social and political reasons

- Many mandatory vacations as per requirements of the university management. The term is only 12 weeks.

7. Comments from external evaluator(s):	Response of Course Team	
Not available in writing for instructors to respond to	None	
8. Comments from Students:	Response of Course Team	
Done but not available in writing for instructors to respond to	None	
9. Course Enhancement:		
Progress on actions identified in the previous year's action plan:		
Action	State whether or not completed and give reasons for any non-completion	
Upgrading Teaching facilities Supply visual aids for the classrooms Maintenance of classrooms	Not completed due to administrative problems	
10. Action Plan for Academic Year 2014 – 2015		
Actions Required	Completion Date	Person Responsible
Upgrading Teaching facilities Supply visual aids Maintenance of classrooms Incorporate more practical materials & measurement experimental labs in the course Make a Mat lab programs to illustrate the basic ideas of each topic with graphs	End of 2015	Administration and Members of The Examination Committee
Course Coordinator:	Associate Professor Dr. Mohsen S. Soliman	
Signature:		