Cairo University, Faculty of Engineering															
Mapping Course ILOs to NARS															
Course Title :	**Application of PLC in Automatic Control Systems**														
Course Code :	**MEP 4023**														
Instructor Name :	**A.Prof.Mohsen S.Soliman**														
Program(s) that offer the course :	**Mechanical Power Engineering**														
	Competencies for Engineering Graduates										**Competencies for Engineering Specializations (MECHNICAL**				
Course ILOs **On successful completion of the course, students will be able to**	1-Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	2-Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	3-Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical & other aspects as appropriate to the discipline & within the principles & contexts of sustainable design & development.	4-Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	5-Practice research techniques and methods of investigation as an inherent part of learning.	6-Plan, supervise and monitor implementation of engineering projects.	7- Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	8. Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	9. Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	10. Appreciate the ongoing need to acquire and apply new knowledge and to practice self. lifelong and other learning strategies.	**2.1 Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.**	**2.2 Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field.**	**2.3 Select conventional mechanical equipment according to the required performance.**	**2.4 Adopt suitable national and international standards and codes; and integrate legal, economic and financial aspects to: design, build, operate, inspect and maintain mechanical equipment and systems.**
1	**Recognize differences between continuous control systems or conventional DCS and the contemporary discrete/digital control systems which are computer-based programmable controllers (PLCs).**				**1**						**1**			**1**	
2	**Comprehend the basics and essentials of discrete control systems using common PLC control systems.**			**1**							**1**		**1**		
3	**Identify major components of industrial PLC systems and describe their control functions and objectives.**				**1**						**1**		**1**		
4	**Identify types of discrete/analog inputs/outputs and describe operation method of timers and counters.**										**1**		**1**	**1**	
5	**Read, understand and write types of basic ladder logic, statement list and Function Block diagrams.**										**1**			**1**	
6	**Identify operational and technical differences between various types of PLC devices and models.**										**1**			**1**	
7	**Identify proper technical manual to refer to for PLC installation, programming and implementation.**													**1**	
8	**Exchange knowledge with engineering community.**											**1**		**1**	**1**
9	**Exchange knowledge with engineering community.**	**1**										**1**			**1**
10	**Communicate effectively, Effectively manage tasks and resources, Refer to relevant literature**											**1**			**1**