

GAU, Faculty of Engineering

Course Unit Title	Electrical Measurements And Instrumentations	
Course Unit Code	EEN305	
Type of Course Unit	Compulsory	
Level of Course Unit	3 rd Year BSc	
National Credits	3	
Number of ECTS Credits Allocated	6 ECTS	
Theoretical (hour/week)	2	
Practice (hour/week)	-	
Laboratory (hour/week)	2	
Year of Study	3	
Semester when the course unit is delivered	5	
Mode of Delivery	Face to Face, Laboratory Experiments, E-learning activities	
Language of Instruction	English	
Prerequisites and co-requisites	ENG301	
Recommended Optional Programme Components	Basic background Physics and Electronics	
Objectives of the Course:		
<ul style="list-style-type: none"> ➤ Conceptual fundamentals of electrical measurement theory and application. ➤ Analysis different types of the errors and the error correcting methods. ➤ Teaching different measurement circuits, instrumentations ➤ Teaching digital electronic meters for measuring of physical and electric parameters. 		
Learning Outcomes		
When this course has been completed the student should be able to		Assesment.
1	Analyze methods of measurement of different physical and electrical parameters	1
2	Apply analog-to-digital and digital-to-analog converters to the measurement technologies	1
3	Apply digital electronic meters for measuring of physical and electric parameters	1
4	Apply principles of the power and energy measurement	1
5	Conduct experiments and interpret obtained data	3,5
Assesment Methods: 1. Written Exam, 2. Assignment 3. Project/Report, 4.Presentation, 5 Lab. Work		
Course's Contribution to Program		
		CL
1	Ability to understand and apply knowledge of mathematics, science, and engineering	4
2	Ability to design and conduct experiments as well as to analyze and interpret data	5
3	Ability to work in multidisciplinary teams while exhibiting professional responsibility and ethical conduct	2
4	Ability to apply systems thinking in problem solving and system design	4
5	Knowledge of contemporary issues while continuing to engage in lifelong learning	
6	Ability to use the techniques, skills and modern engineering tools necessary for engineering practice	3
7	Ability to express their ideas and findings, in written and oral form	4
8	Ability to design and integrate systems, components or processes to meet desired needs within realistic constraints	1
9	Ability to approach engineering problems and effects of their possible solutions within a well structured, ethically responsible and professional manner	3
10	Strong foundation on the fundamentals of Electrical and Electronics Engineering such as Circuit Theory, Signals, Systems, Control and Communications, which are necessary for successful practice in the field	5
11	Awareness on the contemporary requirements, methods and applications of the Electrical and Electronics Engineering	3
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate 4: High, 5:Very High)		

Course Contents			
Week			Exams
1		Introduction	
2	Chapter 1	Classification of measurement errors.	
3	Chapter 2	Statistical Evaluation of Measurement Results	
4	Chapter 3	Analog DC Meters.	
5	Chapter 4	Analog AC Meters.	Quiz 1
6		Digital Electronic Meters. D/A Converters .	
7		A/D Converters : Staircase Ramp ADC	
8			Midterm
9		Successive Approximation, Dual-Slope ADC _s	
10		Voltage to Frequency and Flash types ADC _s .	
11		Measurement of the RMS value of the voltage and current	E-Quiz 2
12	Chapter 6	Electrical sensors and transducers	
13	Chapter 7	Power and Energy Measurements	
14			Lab. Exam
15			Final
Recommended Sources			
<p>Textbook: 1. Electrical Measurements And Measuring Instruments. by J. B. Gupta. Publisher: S. K. Kataria & Sons (2010). 2. Stanley Wolf, Richard F.M. Smith. Student Reference Manual for Electronic Instrumentation laboratories. Prentice Hall,1990.</p> <p>Supplementary Material (s): Electrical And Electronics Measuring Instruments. U.A.Bakshi, A.V.Bakshi , Technical Publications, 2009.</p>			
Assessment			
Attendance& E-learning	5%		
Laboratory	10%	Lab Grade= (Lab exam grade×Lab Attendance)	
Quiz 1	10%		
Midterm Exam	25%	Written	
Quiz 2	10%		
Final Exam	40%	Written	
Total	100%		
ECTS Allocated Based on the Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including the Exam week)	15	2	30
Labs and Tutorials	8	2	16
Assignments	-	-	-
Project/Presentation/Report Writing	8	2	16
E-learning Activities	7	6	42
Quizzes	2	6	12
Midterm Examination	1	12	12
Final Examination	1	12	12
Self Study	14	2	28
Total Workload			168
Total Workload/30 (h)			5.60
ECTS Credit of the Course			6