

NEW YORK CITY COLLEGE OF TECHNOLOGY
The City University of New York

DEPARTMENT: Electrical Engineering Technology

SUBJECT CODE AND TITLE: EET2220/ET 432
ELECTRONIC CONTROLS

COURSE DESCRIPTION: The course introduces discrete & continuous control systems. Open & closed loop systems are analyzed. The use of semi-conductors, operational amplifiers programmable logic controllers and other topics are discussed.

PREREQUISITES: EET2120/ET 342 and MAT 1475/MA 475

TEXTBOOK: MODERN INDUSTRIAL ELECTRONICS, 5TH EDITION
by: TIMOTHY J. MALONEY, PRENTICE HALL, 2001

COURSE OBJECTIVES/ COURSE OUTCOMES: Upon completion of this course students will be able to
1. Understand how control of the rapid expansion of modern industrial manufacturing is met by electronic devices. (ABET Criteria: 2a, 2f, 2g, 2h, 2k)
2. A Knowledge of How Modern Industrial Controls use these devices to provide more precise control over machines and processes. (ABET Criteria: 2a, 2f, 2g, 2k)

TOPICS: Principles of Open & Closed Loop Systems.
Principles of Transistors, SCRs, TRIACs, and Relays in their use in Industrial Control Systems.
Operational Amplifiers and Their Use In Control Systems
Develop Relay Ladder Networks & Conversion to Programmable Logic Control Equations / Symbols In The Control Process.

CLASS HOURS: 3

CREDITS: 3

Prepared by: PROFESSOR D. HERSHOWITZ /November 2006
Course Coordinator: Professor E. Markowitz
718 – 260 - 5310
E-mail: KMarkowitz@citytech.cuny.edu

ET 432 - ELECTRONIC CONTROLS

EVALUATION

EXAM # 1 20 %
EXAM # 2 20 %
EXAM # 3 20 %
FINAL 20 %
HW & 20 %
CLASS PRESENTATION
OF PROBLEMS

<u>LETTER</u> <u>GRADE</u>	<u>NUMERICAL GRADE</u> <u>RANGES</u>	<u>QUALITY</u>
A	93 – 100	4.0
A-	90 – 92.9	3.7
B+	87 – 89.9	3.3
B	83 – 86.9	3.0
B-	80 – 82.9	2.7
C+	77 – 79.9	2.3
C	70 – 76.9	2.0
D	60 – 69	1.0
F	59.9 and below	0.0

WEEK	LECTURE TOPIC (S)	READING ASSIGNMENT	PROBLEMS
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1	INTRODUCTION	Chapter 9: P. 347 – 353 Sec. 9-1 & 9-2	Homework Problems are to be presented by the students to the class.
2	Open Loop Vs Closed Loop Control Systems, Concept of Feedback, Identification of Functional Blocks in Closed Systems.	Chapter 9: P. 353 – 361 Sec. 9-3, 9-4 & 9-5	CH 9 P. 394 # 1 - 13
3	Introduction To Modes Of Control In Closed Loop Systems; On-Off And Proportional With Examples Of On-Off And Proportional Control	Chapter 9: P. 361 – 371 Sec. 9-6	CH 9 p. 395 # 14 - 30
4	Characteristics of On-Off Systems, Differential Gap. Concept of Offset and Proportional Plus Derivative Mode-Effect On Response.	Chapter 9: P. 381 – 384 Sec. 9-7 thru 9-10	CH 9 P. 396 # 31 - 44
5	Proportional Plus Integral Effect On Offset; Proportional Plus Derivative Mode-Effect On Response	Chapter 8: P.295 – 302 Sec. 8-1 & 8-2	CH 9 P. 396 # 45 – 64 * Correct # 56 – From Fig. 9-18 to Fig. 9-19
6	Operational Amplifiers, Basic Inverting Amplifier	QUIZ # 1 – CH 9 Chapter 8: P. 302 – 310 Sec. 8-3, thru 8-6	CH 8 P. 342 # 1 – 6 In # 5, Change Fig. 8-6(a) to 8-5(a)
7	QUIZ # 1 Non-Inverting Amplifier, OP-AMP Summing Circuit, Voltage Comparator	Chapter 8 P. 310 – 313, 331 & 332 Sec. 8-7, 8-8, 8-9 & 8-13	CH 8 P. 342 # 7, 8, 13 – 18
8	OP AMP Differential Amplifier, AMP Voltage-To-Current Converter, OP AMP Integrators & Differentiators	Chapter 16 P. 753 – 765 Section 16-8 Thru 16-9-3	CH 8 P. 343/344 # 19 – 21, 36 - 40
9	Pulse Width Modulated Control, Timer Oscillator	QUIZ # 2 – CH 8 Chapter 4: P.161 – 170, 172, 173 Sect. 4.1 Thru 4.5, & 4.7	CH 16 P. 799 # 28, 30 - 34 # 34, Correct – Change Fig. 16- 8 to Fig. 16-18
10	QUIZ # 2 SCR Characteristics, SCR's In DC Circuits	Chapter 6: P.219 – 223 Sect. 6-1,thru 6-3	CH 4 P. 181 # 1- 18
11	Triacs Basic Operation, Triggering Triac Circuits	QUIZ # 3 – CH 16, & CH4 Chapter 1: P. 1 –11, 19 –22 Sec. 1-1, THRU 1-5, 1-8 & 1-9	CH 6 P. 245 # 1- 9
12	QUIZ # 3 Transistors & Electro Mechanical Switches As Decision Makers, Introduction To Software controlled Systems. THE PLC	CH 3: P 78-89, 95-102 SEC. 3-1-2 TO 3-3	CH 1 P. 31 # 1 – 13
13	Basic Design of PLCs, Functions & Function Blocks		CH 3 # 3 – 15, 23 - 27
14	CH 3 HOMEWORK FINAL EXAM REVIEW	Prepare For Final CH 6, 1 & 3,	
15	Final Exam		