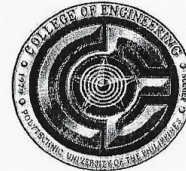




POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
COLLEGE OF ENGINEERING
COMPUTER ENGINEERING DEPARTMENT



Republic of the Philippines
Polytechnic University of the Philippines
COLLEGE OF ENGINEERING
Sta. Mesa, Manila
Tel. No. 716-78-32 to 45



CE VISION

The College of Engineering envisions itself to be a center of excellence in engineering education.

MISSION

The College of Engineering is committed to produce competitive engineers who will serve as catalyst for sustainable growth and development in national and international levels.

CE GOALS

1. Provide Quality education through instruction, advance research and extension services;
2. Produce worldclass professionals as potential industry leaders and job providers
3. Develop and improve facilities through the use of adapted technology and indigenous materials and;
4. Maintain, upgrade and improve facilities through the adaptation of engineering techniques.

OBJECTIVES

1. Strengthen the CE program consistent with global trends;
2. Develop faculty as competent mentors and quality researchers, through advanced studies and other facets of continuing Professional education;
3. Develop the critical thinking and Communication skills of students, giving emphasis to research and extension services;
4. Equip graduates with appropriate knowledge and technical skills imbued with desirable work attitudes and moral values, through enhanced teaching/learning process by using multimedia facilities on top of traditional methods;
5. Create a conducive teaching and learning atmosphere with emphasis to faculty and students' growth and academic freedom;
6. Establish network with educational institutions, Industries, GO's and NGO's, local and international, which could serve as:
 - a. Funding sources and/or partners of researches,
 - b. Sources of new technology,
 - c. Centers for faculty and students' exchange programs and on-the-job trainings, and
 - d. Grantees of scholarships/ additional facilities and;
7. Continuously conduct action researches on the Needs of laboratory and other facilities that could Be locally produced or innovated using local Materials and adapted technology

Engr. Engr. Noli Sibayan
CE Chair
Engr. Pedrito Tenerife Jr.
COE Chair
Engr. Ana Liza Publico
ECE Chair
Engr. Faustino Rural
EE Chair
Prof. Joselinda Golpeo
IE Chair
Engr. Jesus Callanta
ME Chair
Engr. Mariano Gallego Jr.
RnD Coordinator
Engr. Carmelita Durias
ES Chair
Engr. Guillermo Bernabe
College Dean

**COURSE SYLLABUS
LOGIC CIRCUITS AND SWITCHING THEORY**

Revised AY 2011-2012
1st Semester, AY 2012-2013

- I. **COURSE CODE:** COEN 3134
- II. **COURSE TITLE:** Logic Circuits and Switching Theory
- III. **PRE-REQUISITE:** Electronics Devices and Circuits
- IV. **CREDIT UNITS:** 4
- V. **COURSE DESCRIPTION:**

The course includes design and analysis of digital circuits. This course covers both combinational (synchronous and asynchronous) logic circuits with emphasis on solving digital problems using hardwired structures of the complexity of medium and large-scale integration.

- VI. **OBJECTIVES:** At the end of the course the students are expected to:
 - 1.) define the operation of the basic combinational circuits including decoders, encoders, multiplexers, demultiplexers, ALUs, and memory circuits.
 - 2.) study and learn the basic concepts and theories of switching and logic circuits.
 - 3.) develop digital design methodology based on theory, and design realizations, which are straightforward.
 - 4.) acquire skills in the analysis and design of combinational circuits.
 - 5.) understand the work and applications of MSI and LSI devices.



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VII. COURSE OUTLINE:

| TOPICS | NO. OF HOURS | REFERENCE(S) NO. |
|---|--------------|------------------|
| I. Classroom Orientation <ul style="list-style-type: none"> • PUP VMGO • CE VMGO • Classroom Policies | 3 | 1,2,3,4,5 |
| II. Introduction to Digital System <ul style="list-style-type: none"> • Digital Systems • Analog Systems • Advantages and Disadvantages of Digital Systems • Review of Computer Numbering Systems and Arithmetic Operations | 6 | |
| III. Introduction to Digital Circuits <ul style="list-style-type: none"> • Types of Logic Circuits <ul style="list-style-type: none"> Combinational Logic Circuits Sequential logic circuits • Building Blocks of Logic Circuits • Logic gates • Constructing Truth table | 6 | |
| IV. Boolean Functions and Simplification Process <ul style="list-style-type: none"> • Boolean function? • Methods of representing Boolean Functions <ul style="list-style-type: none"> -Logic Diagram -Truth table -Logic Equations -Waveform diagram • Boolean Algebra Laws and Postulates • Boolean Function Simplifications using Boolean Algebra • Canonical Form of Boolean Functions <ul style="list-style-type: none"> - SOP form (Sum-of-product) - POS form (Product-of-sum) • NAND and NOR Implementation • Boolean Function Simplification using K-mapping approach • Use of Don't Care conditions | 10 | |
| V. Analysis of Combinational Logic Circuits <ul style="list-style-type: none"> • Steps in analysis a combinational logic circuits based on the type of given: <ul style="list-style-type: none"> - Logic Diagram - Truth Table - Boolean function | 3 | |
| VI. Design of Combination Logic Circuits <ul style="list-style-type: none"> • Steps in designing a combinational logic circuits | 3 | |
| MIDTERM EXAMINATION | 3 | |



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| | | |
|---|---|-----------|
| VII. MSI Devices and Circuits <ul style="list-style-type: none"> • Adders and Subtractors • Decoders • Encoders • Multiplexers • Demultiplexers • Arithmetic Logic Unit (ALU) | 9 | 1,2,3,4,5 |
| VIII. Introduction to Sequential Logic Circuits <ul style="list-style-type: none"> • Types of Sequential Logic Circuits • Clocking and its types • Building blocks of Sequential logic circuits • Latches and Flip-flops • Output wave-forming • Derivation of Excitation table | 2 | |
| | 6 | |
| FINAL EXAMINATION | 3 | |

VIII. ACTIVITIES

- Lecture
- Group Workshops/ Discussions
- Laboratory Experiments
- Seatwork
- Practical Examination
- Written Examinations

IX. REFERENCES

1. Tocci, R. J. (2010). Digital Systems: Principles and Applications (11th Ed.). Prentice Hall
3. Floyd, Thomas (2008). Digital Fundamentals (10th Ed.). Prentice Hall, NJ
4. Mano. M. & Ciletti, M. (2007) Digital Design (4th Ed.). Prentice Hall, NJ
5. Wakerly, J. F. (2005). Digital Design: Principles and Practices (4th Ed.). Prentice Hall.
6. Brown, J. A. & Malvino, A. P. (1992). Digital Computer Electronics (3rd Ed.). McGraw-Hill Companies

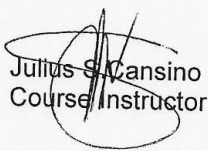


POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
COLLEGE OF ENGINEERING
COMPUTER ENGINEERING DEPARTMENT


X. GRADING SYSTEM

| GRADES | PERCENTAGE | /EQUIVALENT |
|--------|------------|--------------|
| 1.0 | 100-97 | Excellent |
| 1.25 | 96-94 | Excellent |
| 1.5 | 93-91 | Very Good |
| 1.75 | 90-88 | Very Good |
| 2.0 | 87-85 | Good |
| 2.25 | 84-82 | Good |
| 2.5 | 81-79 | Satisfactory |
| 2.75 | 78-76 | Satisfactory |
| 3 | 75 | Passing |
| 4.0 | 74-65 | Conditional |
| 5.0 | | Failure |
| Inc | | Incomplete |
| W | | Withdrawn |


Prepared by:


Julius S. Cansino
Course Instructor

Noted by:


Remedios G. Ado
Chairperson

Approved by:


Guillermo O. Bernabe
College Dean



POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
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COMPUTER ENGINEERING DEPARTMENT



POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

College of Engineering

Computer Engineering Department

Tel No: 713-5968



School Year 2010-2011

COURSE CODE: COEN 3174
COURSE TITLE: Advanced Logic Circuit
COURSE CREDIT: 4 units
PRE-REQUISITE: Logic Circuits Switching Theory

I. COURSE DESCRIPTION:

This course on digital design focuses on different methodologies and styles in hardware modeling with emphasis on the use of hardware description languages (HDLs). It covers very high speed integrated circuit hardware description language (VHDL) fundamental language concepts and elements and the different levels of descriptions such as behavioral and structural.

II. COURSE CONTENT (OUTLINE):

1. Introduction
2. Algorithm State Machines
 - 2.1 ASM Chart
 - 2.2 Control implementation
 - 2.3 Design with Multiplexes
3. Overview of Digital Systems
 - 3.1 Evolution of Digital System Design Methodology
 - 3.2 Different Hardware Description Languages (HDLs)
 - 3.3 History of VHDL
 - 3.4 Advantages and Disadvantages of VHDL
4. VHDL-Related Technologies and Fields
 - 4.1 PLDs
5. Hardware Modeling using VHDL
 - 5.1 Levels of Modeling or Abstraction
 - 5.2 VHDL Model Components or Structural Elements
6. VHDL Language
 - 6.1 Lexical Elements
 - 6.2 Scalar Data Types
 - 6.3 Expressions and Operators
 - 6.4 Control Structures
7. VHDL Language
 - 7.1 Composite Data Types
 - 7.2 Access Types
 - 7.3 File Types
8. Basic Modeling Concepts
9. Subprogram and Packages
10. Algorithmic State Machines
 - 10.1 ASM Charts
 - 10.2 Control Implementation
Design with Multiplexers



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III. STRATEGIES AND METHODS OF TEACHING:

1. Lecture/Discussion
2. Assignment

IV. REQUIREMENTS

- Quizzes
- Examinations
- Class Participations (i.e. Assignment, Seatwork, Recitation, Attendance)

V. REFERENCE:

- Peter Ashenden. The Designer's Guide to VHDL Francisco, CA 2nd edition
- James Armstrong and F. Gail Gray. VHDL Representation and Synthesis. 2nd edition.
- Ulrich Heinkel. The VHDL Reference: A Practical Guide Computer Aided Integrated Circuit Design Includes V AMS
- Douglas Perry. VHDL. 3rd edition.
- IEEE Standard VHDL Language Reference Manual Std 1076-1993-USA
- Ben Cohen. VHDL Coding Styles and Methodologists Ed.
- Zainalabedin Navabi. VHDL: Analysis and Modelling Digital Systems. 2nd edition.
- Kevin Shakill. VHDL for Programmable Logic.


VI. GRADING SYSTEM:

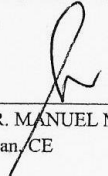
Midterm = $[(Q1+Q2+Q3)/3]$ 30% + CS 20% + (Midterm Exam) 50%

Final = $[(Q1+Q2+Q3)/3]$ 30% + CS 20% + (Final Exam) 50%

General Average = (Midterm) 50% + (Final) 50%

Signed by:


ENGR. REMEDIOS G. ADO
Chairperson, CoE Department


DR. MANUEL M. MUHI
Dean, CE



POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
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COMPUTER ENGINEERING DEPARTMENT



POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

College of Engineering

Computer Engineering Department

Tel No: 713-5968



School Year 2010-2011

COURSE CODE: COEN 3064
COURSE TITLE: Circuits1
COURSE CREDIT: 4 units
PRE-REQUISITE: Physics 2, Integral Calculus

I. COURSE DESCRIPTION:

Fundamental relationships in circuit theory, mesh and node equations; resistive networks, network theorems; solutions of network problems using Laplace transform; transient analysis; methods of circuit analysis.

II. COURSE CONTENT (OUTLINE):

1. Fundamental Relationship in Circuit Theory
2. Resistive Network
3. Mesh and Node Equations
4. Network Theorems
5. Transient Analysis
6. Solution of Network Problems Using Laplace Transform
Methods of Analysis for Special Circuits

III. STRATEGIES AND METHODS OF TEACHING:

1. Lecture/Discussion
2. Assignment

IV. REQUIREMENTS

- Quizzes
- Examinations
- Class Participations (i.e. Assignment, Seatwork, Recitation, Attendance)

V. GRADING SYSTEM:

Midterm = $[(Q1+Q2+Q3)/3]$ 30% + CS 20% + (Midterm Exam) 50%


Final = $[(Q1+Q2+Q3)/3]$ 30% + CS 20% + (Final Exam) 50%

General Average = (Midterm) 50% + (Final) 50%

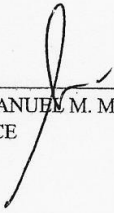


POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
COLLEGE OF ENGINEERING
COMPUTER ENGINEERING DEPARTMENT

Signed by:



ENGR. REMEDIOS G. ADO
Chairperson, CoE Department



DR. MANUEL M. MUHI
Dean, CE



**POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
COLLEGE OF ENGINEERING
COMPUTER ENGINEERING DEPARTMENT**



**Polytechnic University of the Philippines
COLLEGE OF ENGINEERING
DEPARTMENT COMPUTER ENGINEERING**

Vision

Clearing the paths while laying new foundations to transform the Polytechnic University of the Philippines into an epistemic community.

Mission

Reflective of the great emphasis being given by the country's leadership aimed at providing appropriate attention to the alleviation of the plight of the poor, the development of the citizens, and of the national economy to become globally competitive, the University shall commit its academic resources and manpower to achieve its goals through:

- Provision of undergraduate and graduate education which meet international standards of quality and excellence;
- Generation and transmission of knowledge in the broad range of disciplines relevant and responsive to the dynamically changing domestic and international environment;
- Provision of more equitable access to higher education opportunities to deserving and qualified Filipinos; and
- Optimization, through efficiency and effectiveness, of social, institutional, and individual returns and benefits derived from the utilization of higher education resources.

Goals

1. Provide quality education through instruction, advance research and extension services.
2. Produce world-class professionals as potential industry leaders and job providers.
3. Develop and produce facilities through the use of adapted technology and indigenous materials.
4. Maintain, upgrade or improve facilities through the applications of engineering technology.

Objectives

1. Strengthen the Bachelor of Science in Computer Engineering program consistent with global trends;
2. Develop the critical thinking and communication skills of students, giving emphasis to research and extension services;
3. Enhance the competencies of students to evaluate, assess, design and operate safe, effective, economically-efficient and environmental friendly computer-based system;
4. create a conducive teaching and learning atmosphere with emphasis to Bachelor of Science in Computer Engineering faculty and students' growth and academic freedom;
5. establish network with educational institutions, Industries, GO's and NGO's, local and international, which could serve as:
 - a. Funding sources and/or partners of researches;
 - b. Sources of new technology;
 - c. Centers for faculty and students' exchange programs and on-the-job trainings; and
 - d. Grantees of scholarship/additional facilities.
6. conduct continuously action researches on the needs of laboratory and other facilities that could be locally produced or innovated using local materials and adapted technology.
7. equip graduates with appropriate knowledge and technical skills imbued with desirable work attitudes and moral values, through enhanced teaching/learning process by using multimedia facilities on top of traditional methods;
8. develop faculty as competent mentors and quality researchers through advanced studies and other facets of continuing professional education

| | |
|----------------------------|--|
| COURSE TITLE | <i>CpE Technology 1 (Consumer Electronics)</i> |
| COURSE CODE | <i>CMPE 40012</i> |
| CREDIT UNITS | <i>2 UNITS</i> |
| COURSE PREREQUISITE | |
| COURSE DESCRIPTION | <i>Basic theory and practice of electrical circuits. Includes calculations as applied to alternating and direct current.</i> |



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| Institutional Learning Outcomes | Program Outcomes | Course Outcomes |
|--|--|--|
| <p>1. Creative and Critical Thinking Graduates use their imaginative as well as a rational thinking ability to life situations in order push boundaries, realize possibilities, and deepen their interdisciplinary and general understanding of the world.</p> <p>2. Effective Communication Graduates are proficient in the four macro skills in communication (reading, writing, listening, and speaking) and are able to use these skills in solving problems. Making decisions, and articulating thoughts when engaging with people in various circumstances.</p> <p>3. Strong Service Orientation Graduates exemplify the potentialities of an efficient, well-rounded and responsible professional deeply committed to service excellence.</p> <p>4. Community Engagement Graduates take an active role in the promotion and fulfillment of various advocacies (educational, social and environmental) for the advancement of community welfare.</p> <p>5. Adeptness in the Responsible Use of Technology Graduates demonstrate optimized use of digital learning abilities, including technical and numerical skills.</p> <p>6. Passion to Lifelong Learning Graduates are enabled to perform and function in the society by taking responsibility in their quest to know more about the world through lifelong learning.</p> <p>7. High Level of Leadership and Organizational Skills Graduates are developed to become the best professionals in their respective disciplines by manifesting the appropriate skills and leaderships qualities.</p> <p>8. Sense of Personal and Professional Ethics Graduates show desirable attitudes and behavior either in their personal and professional circumstances.</p> <p>9. Sense of National and Global Responsiveness Graduates' deep sense of national compliments the need to live in a global village where one's culture and other people culture are respected.</p> | <p>By the time of graduation, the students of the program shall have the ability to:</p> <p>a) Apply knowledge of mathematics and science to solve complex engineering problems;</p> <p>b) Design and conduct experiments, as well as to analyze and interpret data;</p> <p>c) Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability, in accordance with standards;</p> <p>d) Function on multidisciplinary teams;</p> <p>e) Identify, formulate, and solve complex engineering problems;</p> <p>f) Understanding of professional and ethical responsibility;</p> <p>g) Communicate effectively;</p> <p>h) Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;</p> <p>i) Recognition of the need for, and an ability to engage in life-long learning;</p> <p>j) Knowledge of contemporary issues;</p> <p>k) Use techniques, skills, and modern engineering tools necessary for engineering practice and</p> <p>l) Knowledge and understanding of engineering and management principles as a member and leader in a team, to manage projects and in multidisciplinary environments.</p> | <p>After completing the course, the student must be able to:</p> <ul style="list-style-type: none"> ▪ Identify electrical symbols and measuring instruments. ▪ Explain how to find resistor values with a meter and color code. ▪ Use an electrical meter to measure voltage, amperage, diodes, continuity, farads, and ohms. ▪ Use Ohm's law to find unknown values and calculate voltage drop. ▪ Define a series circuit and their properties. ▪ Define a parallel circuit and their properties. ▪ Solve a combination circuit using the laws of series and parallel. ▪ Explain how capacitance and inductance influence voltage and current relationships |

Course Plan

| Week | Topic | Learning Outcomes | Methodology | Resources | Assessment |
|-------------|--------------|--------------------------|--------------------|------------------|-------------------|
|-------------|--------------|--------------------------|--------------------|------------------|-------------------|



POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
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|---|---|---|--|--|--|
| | <p>Class orientation with Vision, Mission, Goal and Objective</p> <p>Discussion of course goals, expected outcomes, course policies and grading system</p> <p>Assigning of Groups and Officers</p> | <p>Familiarize student on Outcome-Based Education</p> <p>Orient the student on the course syllabus, grading system and classroom rules</p> | <p>Orientation</p> <p>Review of the syllabus, learning activities and assessment</p> <p>Getting to know activity</p> <p>Ice breaker activity</p> | <p>Course Syllabus</p> <p>https://coelms.com</p> | <p>None</p> |
| 1 | <p>Learning the ABC's of Electronics, and Electricity</p> <ul style="list-style-type: none"> Types of Electric charge particles Basic Structure of the atom Conductor, insulators and semiconductors Potential Difference and voltage Difference with voltage and current | <p>Identify electrical symbols and measuring instruments.</p> <p>Sketch and use electrical schematics in class.</p> <p>Identify and define electrical Symbols used on electrical measuring instruments.</p> | <p>Lecture/Discussion</p> <p>Recitation</p> <p>Board Works</p> | <p>Ugley's Electrical Safety and NFPA 70E, 2015 Edition 3rd Edition</p> <p>https://www.electronicstutorials.ws/</p> <p>Grob's Basic Electronics, Mitchell E. Schultz, McGrawHill, 2016</p> <p>https://coelms.com</p> | <p>Lecture Exam</p> <p>Problem Sets</p> <p>Board works</p> <p>Homework</p> |
| 2 | <p>Learning the ABC's of Electronics, and Electricity</p> <ul style="list-style-type: none"> Types of Electric charge particles Basic Structure of the atom Conductor, insulators and semiconductors Potential Difference and voltage | <p>Explain how to find resistor values with a meter and color code</p> | <p>Lecture/Discussion</p> <p>Recitation</p> <p>Board Works</p> | <p>Ugley's Electrical Safety and NFPA 70E, 2015 Edition 3rd Edition</p> <p>https://www.electronicstutorials.ws/</p> <p>Grob's Basic Electronics, Mitchell E. Schultz, McGrawHill, 2016</p> <p>https://coelms.com</p> | <p>Quiz</p> <p>Lecture Exam</p> <p>Problem Sets</p> <p>Board works</p> <p>Homework</p> |



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|---|---|---|---|--|---|
| | <ul style="list-style-type: none"> • Difference with voltage and current | | | s.com | |
| 3 | Learning the ABC's of Electronics, and Electricity <ul style="list-style-type: none"> • Difference between conductance and resistance • Difference between electron flow and conventional current • Difference between Direct Current and Alternating Current | <i>Use an electrical meter to measure voltage, current, continuity, farads, diodes, and ohms.</i> | Lecture/Discussion Recitation Board Works | <i>Ugley's Electrical Safety and NFPA 70E, 2015 Edition 3rd Edition</i> https://www.electronicstutorials.ws/ <i>Grob's Basic Electronics, Mitchell E. Schultz, McGraw-Hill, 2016</i> https://coelms.com | Quiz Lecture Exam Problem Sets Board works Homework |
| 4 | Resistors and its uses <ul style="list-style-type: none"> • Types of Resistors • Resistor Color Coding • Variable Resistors • Rheostats and Potentiometers • Power Rating of Resistors and resistors troubles | <i>Explain how capacitance and inductance influence voltage and current relationships.</i> | Lecture/Discussion Recitation Board Works | <i>Ugley's Electrical Safety and NFPA 70E, 2015 Edition 3rd Edition</i> https://www.electronicstutorials.ws/ <i>Grob's Basic Electronics, Mitchell E. Schultz, McGraw-Hill, 2016</i> https://coelms.com | Quiz Lecture Exam Problem Sets Board works Homework |



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|-------|--|---|--|---|---|
| 5 - 6 | Ohm's Law: Series Circuits <ul style="list-style-type: none"> • Circuit Symbols and Circuit Diagrams • Two Types of Connections • Series Circuits • Combination Circuits | <i>Use Ohm's law to find unknown values and calculate voltage drop.</i> | Lecture/Discussion Recitation Board Works | <i>Ugley's Electrical Safety and NFPA 70E, 2015 Edition 3rd Edition</i> https://www.electronics-tutorials.ws/ <i>Grob's Basic Electronics, Mitchell E. Schultz, McGrawHill, 2016</i> https://coelms.com | Quiz Lecture Exam Problem Sets Board works Homework |
| 7 - 8 | Ohm's Law: Parallel Circuits <ul style="list-style-type: none"> • The Applied Voltage VA Is the Same across Parallel Branches • Each Branch I Equals V/R 5 Kirchhoff's Current Law (KCL) • Resistances in Parallel 5-5 Conductance in Parallel • Total Power in Parallel Circuits • Analyzing Parallel Circuits with Random Unknowns • Troubleshooting: Opens and Shorts in Parallel Circuits | <i>Define a parallel circuit and their properties</i> | Lecture/Discussion Recitation Reporting Board Works | <i>Ugley's Electrical Safety and NFPA 70E, 2015 Edition 3rd Edition</i> https://www.electronics-tutorials.ws/ <i>Grob's Basic Electronics, Mitchell E. Schultz, McGrawHill, 2016</i> https://coelms.com | Quiz Lecture Exam Problem Sets Board works Homework |
| 9 | M I D T E R M E X A M I N A T I O N | | | | |



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|---------|---|--|---|--|---|
| 10 - 11 | Series-Parallel Circuits <ul style="list-style-type: none"> • Finding R_T for Series-Parallel Resistances • Resistance Strings in Parallel • Resistance Banks in Series • Resistance Banks and Strings in Series-Parallel • Analyzing Series-Parallel Circuits with Random Unknowns • The Wheatstone Bridge • Troubleshooting: Opens and Shorts in Series-Parallel Circuit | <i>Solve a combination circuit using the laws of series and parallel.</i> | Lecture/Discussion Recitation Board Works | <i>Ugly's Electrical Safety and NFPA 70E, 2015 Edition 3rd Edition</i> https://www.electronicstutorials.ws/ <i>Grob's Basic Electronics, Mitchell E. Schultz, McGrawHill, 2016</i> https://coelms.com | Quiz Lecture Exam Problem Sets Board works Homework |
| 12 – 13 | Voltage Dividers and Current Dividers <ul style="list-style-type: none"> • Series Voltage Dividers • Current Divider with Two Parallel Resistances • Current Division by Parallel Conductance • Series Voltage Divider with Parallel Load Current • Design of a Loaded Voltage Divider | <i>Explain how inductance changes an AC waveform.</i> <i>Explain how capacitance changes an AC waveform</i> | Lecture/Discussion Recitation Board Works | <i>Ugly's Electrical Safety and NFPA 70E, 2015 Edition 3rd Edition</i> https://www.electronicstutorials.ws/ <i>Grob's Basic Electronics, Mitchell E. Schultz, McGrawHill, 2016</i> https://coelms.com | Quiz Lecture Exam Problem Sets Board works Homework |



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|----|--|---|---|---|---|
| | | | | 2016 https://coelms.com | |
| 17 | Conductors and Insulators <ul style="list-style-type: none"> • Fuses • Wire Resistance • Temperature Coefficient of Resistance • Ion Current in Liquids and Gases • Insulators • Troubleshooting Hints for Wires and Connectors | Describe the differences between the functions of Conductors and Insulators | Lecture/Discussion Recitation Board Works | Ugly's <i>Electrical Safety and NFPA 70E, 2015 Edition 3rd Edition</i> https://www.electronicstutorials.ws/ <i>Grob's Basic Electronics, Mitchel E. Schultz, McGrawHill, 2016</i> https://coelms.com | Lecture Exam Problem Sets Board works Homework |

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| 18 | F I N A L E X A M I N A T I O N |
| Course Requirement | |
| <p>Besides the Quizzes, Assignments, Recitation, Major Examinations and Lab Activities, Before the end of the semester, the students are required to present an application project in groups of four to five members dealing with the application of Computer Engineering Technology 1</p> | |
| Reading and References | |
| <p>Ugly's <i>Electrical Safety and NFPA 70E, 2015 Edition 3rd Edition</i> <i>Grob's Basic Electronics, Mitchel E. Schultz, McGrawHill, 2016</i> <i>Schaum's Outline of Electric Circuits, Seventh Edition, 2017</i> <i>Principles of Electric Circuits: Pearson New International Edition: Conventional Current Version</i> <i>Charles Alexander, Fundamentals of Electric Circuits 2016</i> <i>Cathleen Shamieh, Getting Started with Electronics: Build Electronic Circuits!</i> <i>James Kang, Electric Circuits, CL Engineering, 2017</i> <i>James W. Nilsson, Electric Circuits, Global Edition Pearson Education Limited, 2019</i></p> | |
| Online References: | |
| <p>https://coelms.com https://www.electronicshub.org/tutorials/ https://www.electronics-tutorials.ws/ https://www.makerspaces.com/basic-electronics/ http://electronics-tutorial.net/ https://circuitdigest.com/tutorials https://www.open.edu/openlearn/science-maths-technology/introduction-electronics/</p> | |
| Course Grading System | |