

Hello, World!
My name is Luis Furr.

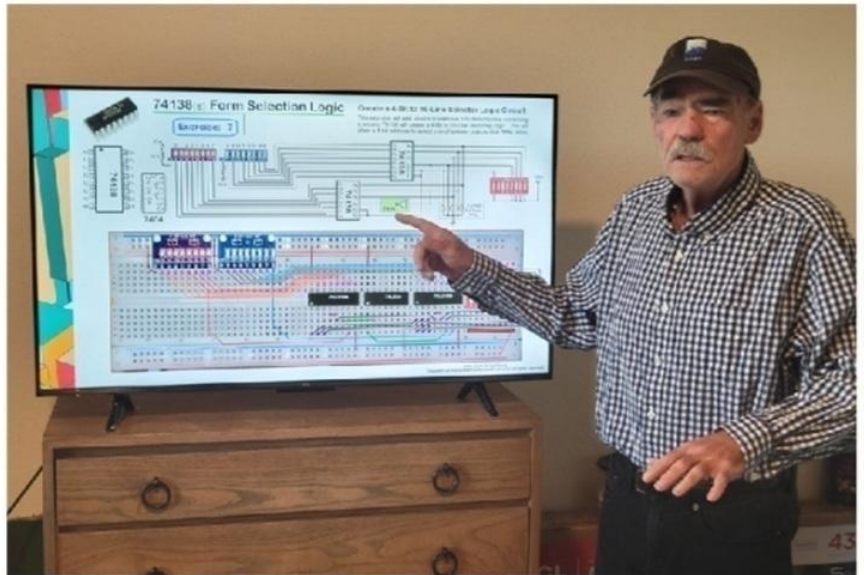
I live here at the
Maudelle Miller Shirek
Community. And...

*I am pleased to announce this
premier modern course for...*

Beginning Digital Electronic Engineering

To Enroll: *Contact me at...*

LuisFurr@AutomatedWord.com



- 1 If you can count and add/subtract two numbers together, you are ready...
- 2 Absolutely NO tests or homework and, I don't want you to take notes.
- 3 The astounding opportunity here is that **this course is absolutely FREE!**

Course Plan

Complete these four
3-hour sections at your
own pace and receive
the certificate from -

AutomatedWord

Section 01 – The Electronic Transistor

Covers the fundamentals of electricity, the electronic transistor and solid-state electronic systems to include integrated circuits.

Section 02 – Basics of Chip Based Components

Covers the fundamental concept of bus architecture from small integrated circuit chips to printed circuit boards and how they...

Section 03 – Learning More Advanced Logic

Covers a number of the most used logic circuits. First, starting with concepts of separate internal mechanisms of the computer.

Section 04 – The CPU and Computer System

Covers the computer's CPU. Here, we bring all of the pieces of the course together for an in-depth understanding of exactly...

BDEE Test and Development Starter Kit...



You will receive this test and development kit which includes a digital multimeter for use throughout the course for the hands-on exercise workshops.

**Complete the Course and take the
Development Kit home as your
graduation present!**

See all the details on the home page of...

AutomatedWord.com

Where word becomes deed with a little help from humans



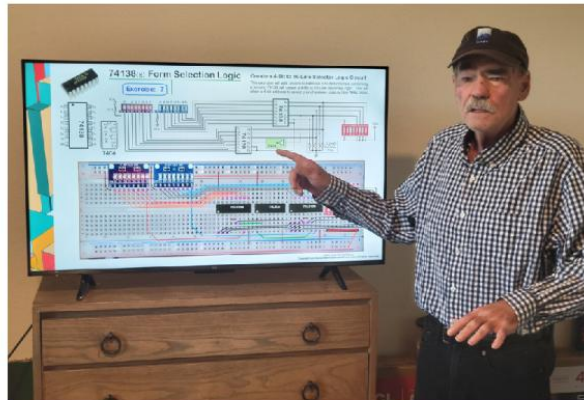
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My name is Luis Furr.

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**Beginning Digital Electronic
Engineering**

AutomatedWord.com



BDEE Course class sessions are held in the first-floor community room of the Maudelle Miller Shirek Community building...

Maudelle Miller Shirek Community
2925 Adeline St.
Berkeley, CA 94703

For in-person registration...
I will be in the community room from 3pm - 5pm, Monday - Thursday of each week. Sometimes, the schedule may change.

You can always email me to register...
LuisFurr@automatedword.com

I am pleased to announce a premier modern course for Beginning Digital Electronic Engineering...

It is meant for teenagers on up - whether you are looking to explore the future possibilities of a secure career, need to have extra knowledge for high-school or college, change direction in a current job or, just plain curious about what makes our world of computers and cell-phones tick then please, read on...

The astounding opportunity here is that **the course is FREE!** A digital electronic breadboarding kit that is used for hands-on workshops throughout the course is provided at either a very low cost or is provided free of charge to any family or student receiving federal housing assistance. See the details in the following pages.

I will be your instructor. I have nearly 50 years of experience in engineering primarily as a software engineer. I have done my share of designing/inventing digital boards for desktop computers and plenty of teaching technical subjects to both knowledgeable and lay people alike. I am now retired from UC-Berkeley and have much to give back to the community - so, I teach technology.

Here are the basics...

You don't have to know anything about electronics or electricity to begin with or any special knowledge of math or science. If you can count and add/subtract two numbers together, you are ready...

We will gather in the community room where I will present a power-point presentation with excellent graphics during the lecture periods and, we will assemble circuits on the breadboarding kit during our workshops. This is not a formal lecture - it is highly interactive and there are never any "stupid questions". I encourage students to be helpful to each other and work together as a community should.

There are absolutely NO tests or homework involved and, I don't want you to take notes. I will want you to focus your full attention on the lesson presentation - you will receive a PDF hand-out at the end of each session that includes everything in the presentation as well as plenty of extra notes.

The lessons are designed to be in four 2-hour sessions but there is great flexibility in scheduling. You can either attend a class intended for 4 days in a row or for one day a week in four weeks or anything in-between. There are also make-up days available in case you miss a session.

The very first 4-day class (#001) started on Monday (08/12/2025) and a second class will start on Monday the 18th for a total of eight students. A section described in the attached lesson plan will take place on each of the four days between 1pm-3pm and 4pm-6pm. A monthly course starts on weekend days - its schedule is negotiable.

To register and work out a schedule, you can either come to the community room on Monday - Thursday of each week - I will be there generally between 3pm - 6pm on those days setting up and teaching a session which runs between 4pm - 6pm. So, feel free to come by and register in person even if the class is in session you are invited to see it in action. Or we can work this out via email as follows...

Send an email to LuisFurr@automatedword.com and mention "BDEE" in the subject (BDEE stands for Beginning Digital Electronic Engineering). Both registration and general inquiry are welcome. I will return an email with all the info/schedules/answers you need promptly... So, please join us - classes are forming now.

If you have an interest in automation, robotics, communications, computers or any other form of electronics, this is where it all starts. This course will teach you the kind of knowledge that you will carry for the rest of your life.

Luis Furr LuisFurr@AutomatedWord.com

Google: [Maudelle Miller Shirek Community](#)

Bing: [Maudelle Miller Shirek Community](#)

Lessons for Beginning Digital Electronic Engineering

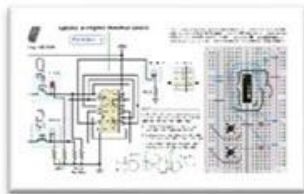
(What is a computer made of and how does it work?)

Section 01 – The Electronic Transistor



Covers the fundamentals of electricity, the electronic transistor and solid-state electronic systems to include integrated circuits. Also, we begin training and using the breadboard testing and development kit to demonstrate the basics of electronic logic including building and testing actual digital logic circuits.

Section 02 – Basics of Chip Based Components



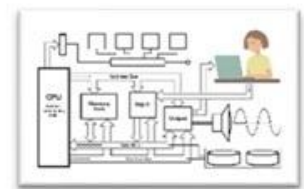
Covers the fundamental concept of bus architecture from small integrated circuit chips to printed circuit boards and how they connect to each other to form a basic computer system. Includes more advanced work on the breadboard kit as well. Also, we cover why digital systems use 1's and 0's instead of base-ten.

Section 03 – Learning More Advanced Logic



Covers a number of the most used logic circuits. First, starting with concepts of separate internal mechanisms of the computer's central processing unit (CPU). This will include arithmetic and logical (ALU) operations and principles of input and output (I/O). Finally, proceeding with more advanced computer memory logic.

Section 04 – The CPU and Computer System



Covers the computer's CPU. Here, we bring all of the pieces of the course together for an in-depth understanding of exactly what the computer is doing in order to run software and applications. We start by exploring the Clock mechanism that is the computer's engine and wind up with a holistic view of a computer's operation.

A Message From The Instructor:

This is a **FREE** course. It is brand new and has been designed in a modern way as to bring real college level material to younger age groups (teenagers and above). Whether you are school-age, college level, seeking a career, changing a career direction or just plain curious, you are invited to attend these four sessions and receive this electronic development kit used during the course for hands-on workshops. The kit is free if you receive federal housing assistance otherwise, there is a small fee.



BDEE Development Starter Kit Specifications...



The BDEE Test and Development Starter Kit

is a combination of a basic electronic breadboard kit and a special digital components add-on package...

The initial kit has plenty of rudimentary parts for experimenting with and learning basic analog electronic concepts. However, it did not include enough components to fulfill the requirements of the BDEE course for digital electronics. Fortunately, a wise benefactor has seen to it to provide the necessary digital components to make this course come alive with a superior hands-on experience!

If you receive federal housing assistance, then you will receive the starter kit (including a multimeter) at no cost. Otherwise, the starter kit cost is \$40. Whether or not you qualify for the FREE starter kit program, you must come to the first session of the course with two 9-Volt batteries. The batteries will be used to provide power to the electronic starter kit and multimeter throughout the course. Although the breadboard power supply can be powered by a 9-Volt wall plug-in or a USB connection, the premises of the BDEE course may not have enough outlets for each student - it is just simpler to run the breadboard included in the electronics kit with a battery.

Here is a quick breakdown of the kit that will provide real world hands-on training experience throughout the BDEE journey of course workshops...

BDEE Electronic Test and Development Starter Kit

Resistors

4-Band-Code

COLOR	1 st BAND	2 nd BAND	3 rd BAND	MULTIPLIER	TOLERANCE
Black	0	0	0	10 ⁰	± 1% (F)
Brown	1	1	0	10 ¹	± 1% (F)
Red	2	2	0	10 ²	± 1% (F)
Orange	3	3	0	10 ³	± 1% (F)
Yellow	4	4	0	10 ⁴	± 5% (D)
Green	5	5	0	10 ⁵	± 0.5% (C)
Blue	6	6	0	10 ⁶	± 0.1% (B)
Violet	7	7	0	10 ⁷	± 0.1% (B)
Grey	8	8	0	10 ⁸	± 0.1% (B)
White	9	9	0	10 ⁹	± 0.1% (B)

5-Band-Code

Orange(3) Orange(3) Black(0) 330 x 1 = 330 330 Ω

Multiplier - Black(1)

Green(5) Brown(1) Black(0) 510 x 10 = 5100 5.1K Ω

Multiplier - Brown(10)

Brown(1) Black(0) Black(0) 100 x 100 = 10000 10K Ω

Multiplier - Red(100)

LED Test Lamps

(Light Emitting Diode)

The short lead of an LED always connects to the ground side of the circuit because diodes only allow current to flow one-way.

Transistors

2N2222A

- 1 Emitter
- 2 Base
- 3 Collector

Switches

Momentary Push-button

8-bit LED panel

8-bit Line DIP Switch

555 Timer

Assorted 7400 Series TTL Logic Chips...

74LS00 74LS04 74LS74 74LS283 74LS85 74LS138 74LS373 DAC08 ADC08

Breadboard and 9-Volt Power Supply

POWER SUPPLY

Snaps into the breadboard and steps voltage down to +5V DC...

MB-102 Breadboard

Partial View

The holes in the surface of the breadboard are connected to each other through metal rails embedded inside the board. The rails run either vertically or horizontally.

The power rails on both the left and right side of the board run vertically to make the 5V power source and ground conveniently available to components plugged into the component holes in the center of the board...

Power: (+) 5V DC otherwise labelled (Vcc)
Ground: (-) otherwise labelled (GND)

Electronic components all have metal leads that are pushed into the holes on the left and right center portion of the board and are connected to each other typically with jumper wires.

Each component hole is connected by a horizontal rail in groups of 5 holes on either the left or right side of the center portion of the board.

BDEE Starter Kit Provided By: www.automatedword.com

Watch this video for a complete explanation of the breadboard: [YouTube - How to Use a Breadboard](#)

Breadboarding Projects... (The BDEE course is packed with links to explore and learn - here are some...)

ElectroViz - www.electroviz.com/essential-tools/mastering-breadboard-projects-a-guide-for-absolute-beginners

Build Electronic Circuits: Beginner's Guide - www.build-electronic-circuits.com/breadboard

Open Circuit Shop - www.opencircuit.shop/blog/breadboards-beginners-tips-tricks

CircuitBread - www.circuitbread.com/ee-faq/what-is-a-breadboard

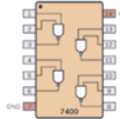
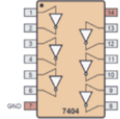
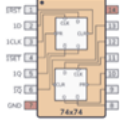
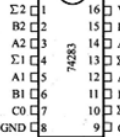
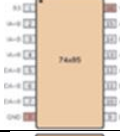
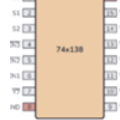
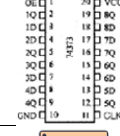
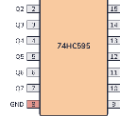
AUTODESK Instructables - www.instructables.com/3-EASY-TRANSISTOR-PROJECTS-FOR-BEGINNERS

AUTODESK (Breadboard Robotics) - www.instructables.com/Simple-Robotics-Breadboard

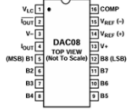

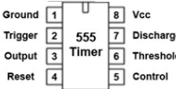



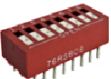


Robotics - <https://www.electronicsforu.com/electronics-projects/hardware-diy/25-robotics-project-ideas>

Digital Components Add-on Package (Click to drill down to specifications)

7400 Series TTL Logic Chips...

Component	Qty			LS Datasheet	F Datasheet
TTL 74x00	(2)		<i>Quad 2-input NAND gate:</i> An IC with four standard NAND gates.	74LS00	74F00
TTL 74x04	(1)		<i>Hex inverter/NOT-gate:</i> An IC with six inverters (or NOT-gates)	74LS04	74F04
TTL 74x74	(2)		<i>Dual D flip-flop:</i> An IC containing two D flip-flops with set and reset	74LS74	74F74
TTL 74x283	(2)		<i>4-bit full adder:</i> An IC with a 4-bit binary full adder	74LS283	74F283
TTL 74x85	(2)		<i>4-bit magnitude comparator:</i> An IC that can compare two 4-bit numbers	74LS85	74F85
TTL 74x138	(2)		<i>3-to-8 decoder:</i> An IC with 3-to-8 inverting decoder/demultiplexer	74LS138	74F138
TTL 74x373	(1)		<i>Octal D Transparent Latch:</i> D-Type Flip-Flops (Tri-State output)	74LS373	74F373
TTL 74x595	(1)		<i>8-Bit Shift Register (with output latch)</i>	74LS595	74F595

Miscellaneous Components...

DAC08	(1)		<i>8-Bit Digital to Analog Converter</i>	ADC0804	(1)		<i>8-Bit Analog to Digital Converter</i>
555 Timer	(1)	 <p>555 Timer</p>	555 Timer Chip	Sockets	(4)	 <p>Machined DIP Sockets 3- 16 Pin 1- 20 Pin</p>	
LED Panel	(2)	 <p>8-Line LED Panel 1- Red Light (common anode) 1- Blue Light (common cathode)</p>	Resistor-Array	(2)	 <p>8-Line Resistor Network (1K Ω)</p>		
Switches	(2)	 <p>8-Line DIP Switch (SPST)</p>	Pliers	(1)	 <p>6-Inch Needle-nose Pliers</p>		
Multimeter	(1)	 <p>ANENG Digital SZ308 multimeter</p>	<i>Digital Multimeter</i> Measures: Resistance, Continuity Voltage and Amperes		View Detailed Multimeter Page		

Digital Multimeter Included in the Development Kit

ANENG®

SZ308 Digital multimeter



High precision | Electrician maintenance



Basic Usage (BDEE Course)...

When measuring resistance, set the dial to 20K Ω (see image below) - unless you are expecting to measure more than 20K Ω or less than 2K Ω . If you are measuring simple continuity from point A to point B in a circuit, you should set the dial to 2K Ω .



Image – Measuring a 2K Ω resistor

When measuring voltage, set the dial to 20V DC (see image below) - unless you are expecting to measure in the milli-volt range.

IMPORTANT NOTE: We will never measure anything more than 20-volts (DC). It can be dangerous to measure more than 50-volts DC or AC without proper training.

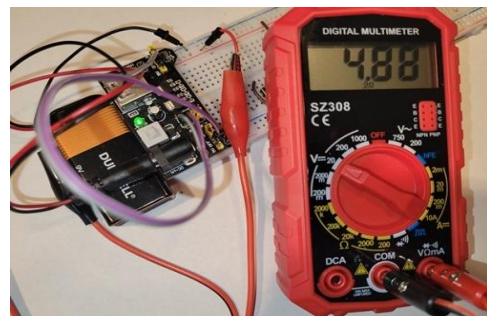


Image – Measuring the 5-Volt Power

Video Instructions:

[Aneng SZ308 Multimeter - YouTube](#)

[Basics: Voltage, Resistance and Continuity](#)

[How To Use a Multimeter \(For Beginners\)](#)

Package Information:

SAFETY INFORMATION

This multimeter has been designed according to IEC-1010 concerning electronic measuring instruments with an overvoltage category (CAT II) and pollution 2. Follow all safety and operating instructions to ensure that the meter is used safely and is kept in good operating condition. Full compliance with safety standards can be guaranteed only with test leads supplied in necessary, they must be replaced with the type specified in this manual.

SAFETY SYMBOLS

- ⚠ Important safety information, refer to the operating manual.
- ⚠ Dangerous voltage may be presented
- ⚡ Earth ground
- ⚡ Double insulation (Protection class II).

MAINTENANCE

Before opening the case, always disconnect test leads from all energized circuits. Never use the meter unless the back cover is in place and fastened completely. Do not use abrasives or solvents on the meter. To clean it using a damp cloth and mild detergent only.

DURING USE

1. Never exceed the protection limit values indicated in specifications for each range of measurement.
2. When the meter is linked to measurement circuit, do not touch unused terminals.
3. Never use the meter to measure voltages that might exceed 1000V DC or 750V AC above earth ground in category II installations.
4. When the value scale to be measured is unknown beforehand, set the range selector at the highest position.
5. Before rotating the range selector to change functions, disconnect test leads from the circuit under test.
6. When carrying out measurements on TV or switching power circuits always remember that there may be high amplitude voltage pulses at test points, which can damage the meter.
7. Always be careful when working with voltages above 60V DC or 30V AC rms. Keep fingers behind the probe barriers while measuring.
8. Before attempting to insert transistors for testing, always be sure that test leads have been disconnected from any measurement circuits.
9. Components should not be connected to the hFE socket when making voltage measurements with test leads.
10. Never perform resistance measurements on live circuits.

GENERAL DESCRIPTION

The meter is hand held 3 1/2 digital multimeter for measuring DC and AC voltage, DC and AC current, Resistance, Diode, Transistor, Temperature, Capacitance and Continuity Test with battery operated.

SPECIFICATIONS

Accuracy is specified for a period of one year after calibration and at 18°C to 28°C (64°F to 82°F) with relative humidity to 75%.

GENERAL

Maximum voltage between terminals and earth ground: 1000V DC or 750V AC Power: 9V 6F22 Display: LCD 1999 counts, updates 2-3/sec Measuring method: Dual-slope integration A/D converter Overrange Indication: Only figure '1' on the display Polarity indication: '-' display for negative polarity Operating Environment: 0°C to 40°C Storage temperature: -10°C to 50°C Low battery indication: 'batt' appears on the display Size: 31x66x121mm Weight: 210g

DC VOLTAGE

Range	Resolution	Accuracy
200mV	0.1mV	$\pm(1.0\%+5)$
2V	0.001V	
20V	0.01V	
200V	0.1V	$\pm(1.0\%+10)$
1000V	1V	

Overload Protection: 250V rms for 200mV range and 1000V DC or AC Rms for other ranges.

AC VOLTAGE

Range	Resolution	Accuracy
200V	0.1V	$\pm(1.0\%+15)$
600V	1V	

Overload Protection: 750V DC or AC rms

DC CURRENT

Range	Resolution	Accuracy
20mA	0.01mA	$\pm(1.5\%+5)$
200mA	0.1mA	
10A	0.01A	

Overload Protection: 250V DC or AC rms.

RESISTANCE

RESISTANCE MEASUREMENT

1. Connect the red test lead to the "V. Ω .mA" jack and the black lead to the "COM" jack.
2. Set the rotary switch at desired range position.
3. Connect test leads across the resistor to be measured and read LCD display.
4. If the Resistance being measured is connected to a circuit, turn off power and discharge all capacitors before applying test probes.

DIODE TEST

1. Connect the red test lead to the "V. Ω .mA" jack and the black lead to the "COM" jack.
2. Set the rotary switch at "hFE" position.
3. Connect the red lead to the anode of the diode to be tested and the black test lead to the cathode of the diode. The approximate voltage drop of the diode will be displayed. If the connection is reversed, only "1" will be shown.

TRANSISTOR TEST

1. Set the rotary switch at "hFE" position.
2. Determine whether the transistor under testing is NPN or PNP and locate the emitter base and collector leads. Insert the leads into proper holes of the hFE socket on the front of panel.
3. Read the approximate hFE value at the test condition of base current 10uA and V_{ce} 3V.

NOTE: To avoid electrical shock, remove test leads from measurement circuits before test a transistor.

CONTINUITY TEST

1. Connect the red test lead to the "V. Ω .mA" jack and the black lead to the "COM" jack.
2. Set the rotary switch at "hFE" position.
3. Connect test leads to two points of circuit to be tested. If continuity exists, built-in buzzer will beep.

WARNING

TO avoid electrical shock, be sure the test leads has been removed before changing to another function measurement.

BATTERY REPLACEMENT

If 'batt' appeared on LCD display, it indicates that the battery need to be replaced.

WARNING

Before open the case, always be sure that test leads have been removed from measurement circuits. Close case and tighten screws completely before using the meter to avoid electrical shock hazard.

The parameters of this manual are subject to change without notice. The company is not responsible for accidents and hazards caused by user error.