Ham Class Notes:

OBJECTIVES:

Learn the basics of HAM radio

Learn how to use the Baufeng UV5R-8W radio

Know how to use the Baufeng during a disaster

Introduction

Like any technology we use in modern life, we must learn some basics on how to use it. We do not put firearms in the hands of kids, or cars in the hands of untrained drivers. They are not equipped to use them properly. With proper training people can learn firearms or how to drive. The same with HAM radio. A ham radio will not kill you if you do something wrong. It will just sit there. It is not dangerous, but with proper training it can give you the skills to save your life or the lives of your family.

Disaster Readiness:

Requires you purchase a radio, have it ready and Carged at all times.

Requires you practice using the radio so in a disaster you know what to do.

Know how to listen and get a license to Transmit. (more Later)

If you buy a radio, take this class and never use the radio you will not be ready for stressful situations.

Basics

We live in a world of electronics and radio waves. Radio waves can be natural, from the Sun or man-made, from Radios or other electrical devices. Anytime you put electrical current through a wire it emanates an electromagnetic field. This is how electric motors and generators work.

The invention of radio is attributed to multiple inventors, primarily Nikola Tesla and Guglielmo Marconi. Tesla developed key technologies and filed patents for radio in the late 1890s, while Marconi is known for successfully transmitting the first radio signals and obtaining the first patent for wireless telegraphy in 1896. What these men did was invent a way for these electromagnetic waves to carry information. That process is called modulation. Modulation allows radio waves to carry many types of information. For our discussion we will limit ourselves to voice communications.

Bands

To make some order out of the wild west of radio signals, countries have agreed to use specific frequencies that are divided into bands. Think of a band as a street and a frequency as an address on that street. The bands have names and are usually

referred to by the antenna length. Just like the US mail, if you do not address your letter properly, it may not get delivered, you must select the right frequency to use the radio.

Radio Waves

There are two basic types of radio waves AM and FM. AM stands for Amplitude Modulation and FM stands for Frequency Modulation. Amplitude Modulation varies the size of the wave to input information where FM varies the frequency of the wave to carry the information. HF radio waves are AM, and VHF/UHF radio waves are FM. We will be using FM modulation and VHF/UHF Frequencies.

Frequencies

HF 6 M to 160 M bands 1.8 – 148 MHz Used for Long Distance Communications (can be thousands of miles under right conditions) and requires a General License. (AM signals)
VHF 2 Meters band 144-148 MHz Used for local under 10 miles simplex and duplex communications through repeaters. Repeaters allow further distance communication, limited to terrain restrictions and line of sight communication. (FM signals)
UHF 70 cm band 420 –450.0 MHz Used for local under 10 miles simplex and duplex communications through repeaters. Repeaters allow further distance communication, limited to terrain restrictions and line of sight communication. UHF will penetrate buildings better than VHF but does not have as much range for the same power level. (FM signals)

Ham Radio Types

Handheld - often called HT or "Handy Talkies." Baufeng UV-5r is this type of radio. Usually dual band (VHF/UHF) 5 to 10 watts

Mobile – often a more powerful version of the HT, may be HF but most are VHF/UHF dual band 15-50 watts

Base – A more powerful radio not designed to be put in a car. However, a mobile radio may be used with a power supply as a base station. Power levels range from 20 to 1500 watts.

Licensing

We strongly encourage you to get at least a Technician License**. It is against the law to talk on HAM radio without it**. We had an 11-year-old pass his test. It is easy enough with the right help.
GMRS is limited to GMRS networks and frequencies, no FCC test required but must have one license per family. $35. The test here is being smart enough to know where to buy the License on the FCC website. For your convience I have included a website with easy instructions :
https://baofengtech.com/step-by-step-getting-a-gmrs-license/?gad_source=1&gad_campaignid=21277508311&gbraid=0AAAADooDKPZExb9jmsL8twDOH8fNZd4G
Ham Technician first level license, from FCC requires FRN number and passing FCC test. $15.00 testing fee and $35.00 license fee to FCC. It provides privileges on VHF/UHF and some

very limited HF bands.
Ham General second level license, requires Technician License and passing General Test. Provides all privileges on VHF/UHF and most HF bands.
Ham Amateur Extra requires General License and passing Amateur Extra Exam. Gives the rest of HF bands.

Comms Plan

We are using a communications plan that uses preprogrammed channels (or Frequencies) on your radio. We want everyone to start out with the same radio for training and programming purposes. Our radio Baufeng UV-5R 8W is often referred to as a CCR (Cheap Chinese Radio). It provides an affordable entry point for anyone. It has 8 Watts of power, 3-day battery life, a little better antenna and USB charging. We program these radios to hit local repeaters which greatly magnifies their range. The radios have two modes: Simplex (radio to radio communications) and duplex (radio to repeater to radio). Duplex programs require multiple pieces of info in the radio to talk to the repeater, this is why we program the radios with all the information for you,

Our channel line up for Chattanooga:

1	146.52	146.52		Simplex	VHF	FM	2M CALL
2	147.42	147.42		Simplex	VHF	FM	2M WORK
3	147.44	147.44		Simplex	VHF	FM	2M WORK
4	146.79	146.19	600 kHz	Minus	VHF	FM	CHAT79
5	146.61	146.01	600 kHz	Minus	VHF	FM	CHAT61
6	145.39	144.79	600 kHz	Minus	VHF	FM	CHAT39
7	144.92	147.42	2.50 MHz	Plus	VHF	FM	CHAT92
8	147.00	147.60	600 kHz	Plus	VHF	FM	COLLEGE
9	147.38	147.98	600 kHz	Plus	VHF	FM	CLEV375
10	146.93	146.33	600 kHz	Minus	VHF	FM	CLEV925
11	145.35	144.75	600 kHz	Minus	VHF	FM	CHAT 35
12	162.55	162.55		Plus	VHF	FM	NWR 1
14	441.88	446.88	5.00 MHz	Plus	UHF	FM	SPITTS
15	442.15	447.15	5.00 MHz	Plus	UHF	FM	SIGN15
16	442.65	447.65	5.00 MHz	Plus	UHF	FM	LKT MTN
17	443.10	448.10	5.00 MHz	Plus	UHF	FM	JASP10

18	443.15	448.15	5.00 MHz	Plus	UHF	FM	SIGN150
19	443.53	448.53	5.00 MHz	Plus	UHF	FM	RINGGO
20	443.60	448.60	5.00 MHz	Plus	UHF	FM	CHATT60
21	444.10	449.10	5.00 MHz	Plus	UHF	FM	CHATT10
22	444.70	449.70	5.00 MHz	Plus	UHF	FM	SIGN70
23	444.73	449.73	5.00 MHz	Plus	UHF	FM	SIGN725
24	444.90	449.90	5.00 MHz	Plus	UHF	FM	OOLT90

Repeaters are towers that will repeat your signal at a higher power so others at longer distances can hear you. They can cost more than $10,000 to put up and require a lot of time to maintain. They are usually put up by private individuals or clubs. Repeater owners are subject to massive fines for misuse of their repeaters. If you blatantly violate FCC rules, they will shut down the repeaters. This is why it is important to know a few basic rules. Repeaters are often linked via internet to other repeaters and can be state or nationwide.
We use channel names (last Column above) for simplicity. HAM users (and repeater owners) want us to use the frequencies not channel numbers.

Look at your Radio: Turn the left side facing you, you will see:
An Antenna on the Top left, a light and a ON/OFF volume knob.

Never transmit or use the radio without the antenna attached.

Always use the whip antenna, do not bend it or it can break. The little rubber duckie antenna is cute but not effective.
Beginning on the left side of the Radio:
Orange Button: used as a help alarm
PTT Button: used to talk on the radio, if you have a license, you press this and hold it to transmit on the radio.
Mon Button: pressing this turns on the light on top of the radio.
Turn the radio facing you and you will see:
An orange VFO/MR Button. This button toggles between frequency manual mode and the channels we have programmed into your radio. Pressing the button simply changes to the other mode, it does not keep the frequency from one mode to the other.
The light below the VFO/MR Button glows orange when you are transmitting and green when the radio is receiving a transmission.
The Blue A/B Button selects which line of the display is selected and is indicated by a small

caret to the left of the channel name in the display
If you are in Frequency Mode, the black (band) button selects between VHF and UHF modes. We will not use this in our channel mode.
See the chart above for the button explanations.
On the right side of the radio there is a rubber pad covering the SP and MIC connectors. This is where you can plug in an optional microphone, earpiece or a programming cable.
On many radios, there is a small hole in the battery on the back, right top corner of the radio. This is for a USB cable that comes with your radio for USB charging, or to use solar chargers etc. Amazon also sells a USB-C Battery that takes a USB-C cable to charge with. If you do not have this hole, good look at the bottom of the battery for a USB-C charging port. The radio comes with a charging cradle, that it sits in, to charge the battery. Amazon also sells a USB-C Battery that takes a USB-C cable to charge with.

Talking on the Radio

Requires an FCC License – Only exception is to save a life

However, you can use your radio in the presence of a licensed operator with his/her permission for training.
There are two ways to talk on the radio, one on one, and as a part of a net.
One on one: You must begin and end your transmission with your FCC call sign, and end with it also. If it is a long conversation, every 5 minutes during the conversation repeat your call sign.
When speaking to someone, you would wait to see if the frequency is clear. If it is, say "CQ, CQ, is this frequency clear," wait for a response.
Then say this is (your call Sign), calling (the other person's call sign) are you there?" Wait for a response.
They should reply with their call sign, calling your call sign, and answer you as needed. When done talking you end the call with your call sign and say "clear" if you are turning the radio off, or if you continue to listen say "monitoring."
You can say almost anything on the air except religion, politics or foul language. Commercial use is also forbidden.
When you announce your call sign, use IPU phonetic alphabet, i.e. mine (KM4SHH) is "Kilo Mike Four Sierra Hotel Hotel". Say your call sign slowly, Radios are noisy and sometimes hard to hear.
Nets are a more organized way of allowing multiple people to talk on the radio on the same frequency in a more organized fashion. There is a Net Controller and often a Backup Net Controller who will announce the net and direct the discussion. Typically, you wait for the Net Controller to ask for call ins, and you simply announce your call sign and whether or not you want to say something. The term used is "traffic" and you say your call sign with "traffic" or "no traffic." When the Net Controller is ready to hear your traffic, he will call your call sign and then it is your turn to speak. Always listen and follow the Net Controller's instructions.
There are many types of Nets from buy/sell to Emergency Relief Nets. Many are scheduled, and Emergency Nets are set up as conditions require.
Our current plan for the Tnl Net is 3:05 PM the First Sunday of each Month. The schedule is as follows:
3:05 Channel 4 Chat 79 Freq 146.79
3:10 Channel 5 Chat 61 Freq 146.61
3:15 Channel 6 Chat 39 Freq 145.39

3:20 Channel 7 Chat 92 Freq 144.92
3:25 Channel 8 College Freq 147.00
Any changes to this schedule will be posted on the TNL channel in the Signal App.
Please consider joining the CARC net at 8:00 on the Chat 39. Also there is a Skywarn net on Chat 79 Tuesday Night at 7PM.
If there is an emergency, we will follow a modified 3-3-3 Plan. Every three hours beginning at 12:00 noon, at five minutes after the hour, we will go through the channels above in that order. This plan allows you to preserve your radio battery. In case of a disaster, we will be going through a roster to be sure you are ok. You must check in with your Comms Leader or he/she will be looking for you. If you do not participate in our Checkin nets you will not be on the list to be checked on on in time of a disaster.
We are encouraging your local group Comms Leader to hold his/her own Net.
A good rule of thumbs is, if someone is talking, let them talk. Only interrupt if you have an emergency.

IN SUMMARY:

Learn to use the Baufeng Radio , then plan to get another more powerful radio when you have learned a bit more.
Remember : You can legally listen to any frequencies, but talking on the radio requires the appropriate license. Learn to listen to others and how they talk on the radio. Joins a comms group with a licensed HAM to help you practice and practice regularly.

Listen, Listen and Learn

To study for your test, go to hamstudy.org and go to the study mode for the level of the exam you need. If you prefer a book, the series by Craig Buck K4IA is helpful to many.
The TNL Website is https://tnneighborsforliberty.com/ham-radio. Send anyone who wants to learn HAM radio there. There is a link where they can Email me for more information.
The Chattanooga Area Radio Club website has free workshops related to HAM Radio, you can register for and take. **https://www.w4am.net/workshop-registration/**

If you do not have a Radio, you can buy two at https**://a.co/d/03cLywiO**
This model is the Baufeng UV5R 8 watt radio with the whip antenna and an extended USB -C charging battery