



Tech License Class Agenda



Week 1 – September 21, 2017

- 1 Welcome to Amateur Radio / James
- 18 Safety and Amateur Radio / James
- 2 Radio Wave and Signals / James
- 3 Modulation & Bandwidth / James
- 15 License Regulations and License Privileges / Chris

Week 2 – September 28, 2017

- 4 Electricity / Bob
- 5 Ohm's Law, Power, and the Metric System / Bob
- 6 Electronic Components / Bob

Week 3 – October 5, 2017

- 7 Types of Radio Circuits / Steve
- 8 Propagation / Steve
- 9 Antennas and Feed Lines / Steve

Week 4 – October 12, 2017

- 10 Practical Antenna Systems / Tom
- 11 Basic Amateur Radio Station Equipment / Tom
- 12 Power Sources and Interference / Tom

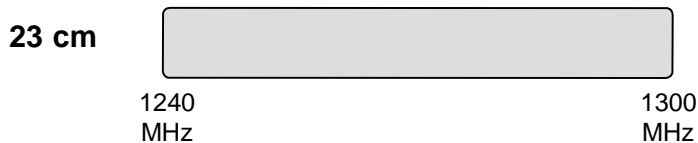
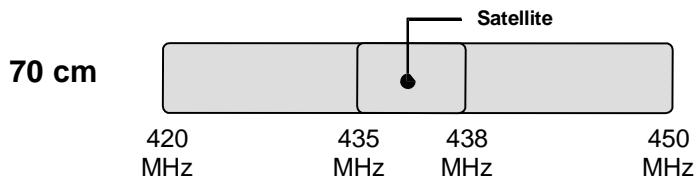
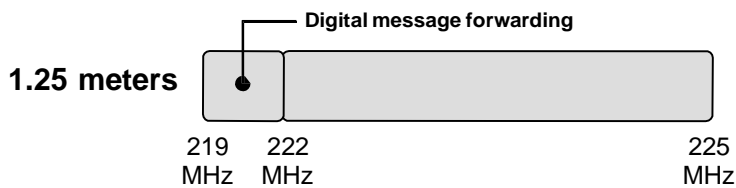
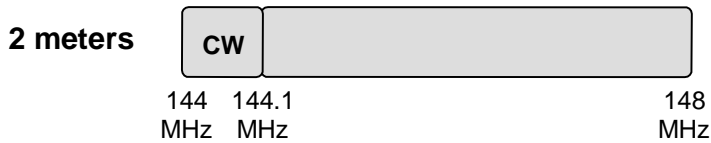
Week 5 – October 19, 2017

- 13 Communicating with Other Hams – Part 1 / Pete
- 14 Communicating with Other Hams – Part 2 / Pete
- 16 Call Signs and Operating Regulations – Part 1 / Chris
- 17 Call Signs and Operating Regulations – Part 2 / Chris

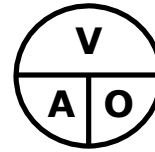
Week 6 – October 26, 2017

- Review and Test

Technician License Memory Aid

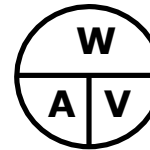


OHM'S LAW



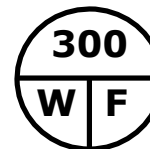
V = Voltage in **Volts**
 A = Current in **Amperes**
 O = Resistance in **Ohms**

POWER



W = Power in **Watts**
 A = Current in **Amperes**
 V = Voltage in **Volts**

WAVELENGTH



W = **Wavelength** in Meters
 F = **Frequency** in Megahertz

1. Always use the lowest power that will provide reliable communications.
2. Always identify using your callsign
 - At the end of every exchange
 - Every 10 minutes
3. In case of interference (to you or others), first be sure your station equipment is operating correctly.
4. The FCC makes and enforces the rules, and issues licenses for the Amateur Radio Service.
5. Once your name and callsign are in the FCC ULS database, you can operate a ham radio.
6. US Amateur callsigns begin with A, K, N and W (*Alaska is in the Northwest: AK NW*)
7. Always listen before transmitting.
8. Use a dummy load when testing your transmitter to minimize interference.

¼ WAVE ANTENNA

$$\text{Length (feet)} = \frac{234}{\text{Frequency (MHz)}}$$

Multiply the length in feet by 12 to get the length in inches

A DIPOLE is twice as long, (1/2 wave) so double the length.

9. Emergency communications take priority over all others.
 - "Mayday" on voice (phone)
 - "SOS" using Morse Code (CW)
10. Kilo = One Thousand
 Mega = One Million
 Milli = One one-thousandth (.001)
 Micro = One one-millionth (.000001)

Amateur Radio Technician License Pre-Study

Name _____

TECHNICIAN CLASS PRIVILEGES

Please bring your completed pre-study to the first class session.

1. Frequency range for HF? _____
2. Frequency range for VHF? _____
3. Frequency range for UHF? _____
4. You have voice privileges on this worldwide HF worldwide band. _____
5. CW – only privileges on these three bands? _____
6. Technician privileges include _____ bands for HF operation?
7. Voice band for Technician HF sky waves? _____
8. Four worldwide bands for Technician Class Morse code? _____

A LITTLE HAM HISTORY

1. How many grades of ham radio licenses? _____
2. How many examiners to give you the Element 2 exam? _____
3. Can you jump over the entry level Tech test and go direct to the General Class test? _____

GETTING READY FOR THE EXAM

1. How many test questions for Technician? _____
2. May the test wording be changed or modified? _____
3. Passing score? _____%
4. How many questions could you miss and still pass? _____
5. You receive this paper when you pass? _____
6. How many exam questions on Rules? _____
7. How many exam questions on math? _____
8. How many exam questions on antennas and feedlines? _____
9. Can exam questions be reworded? _____
10. May numerical values in questions be changed on your test? _____

ABOUT HAM RADIO & CALL SIGNS

1. Minimum age for a ham radio license? _____
2. Who regulates and enforces the ham service? _____
3. Licenses are issued for _____ years.
4. Grace period for an expired license? _____

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5. Give your call sign every _____ minutes.
6. Which language to identify your call sign? _____
7. Which ITU region are we in? _____
8. May you continue to transmit on an expired license? _____
9. Call signs in the United States begin with one of these 4 letters? _____
10. Maximum power allowed to radio control a “quad-copter”? _____
11. Call sign type with a single letter in prefix and suffix? (K7A) _____
12. Required club members for a club station license? _____
13. Which call sign area for a license in Florida? _____
14. A call sign type when identifying as “Race Headquarters”? _____
15. Who regulates ham radios aboard a US documented vessel on the high seas? _____

CONTROL

1. Every transmitting station needs a _____ operator.
2. What type of control when using a handheld radio? _____
3. Mountaintop repeaters normally operate _____ control.
4. May a Technician control op transmit on General Class frequencies? _____
5. When may a control operator be “on the clock” while transmitting? _____
6. May a non-ham be designated as a control operator? _____
7. What type of control when operating your handheld radio? _____
8. What type of control for APRS? _____

MIND THE RULES

1. What part of the Rules covers ham radio? _____
2. Prohibited transmissions? _____
3. How much power should you transmit? _____
4. May intentional SECRET code be transmitted over ham radio? _____
5. Normally, music is _____?
6. When may the FCC inspect your station? _____
7. What might result if the FCC can’t reach you by mail? _____
8. How much power SHOULD a ham operator use? _____
9. This radio service is protected from ham radio interference under all circumstances?

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10. May we broadcast local city general news to the general public? _____
11. May we buy and sell ham radio gear on the air? _____

TECH FREQUENCIES

1. What two letters stand for a radio emission? _____
2. Radio waves are considered _____.
3. Velocity of radio waves through free space? _____
4. Unit of radio frequency? _____
5. The abbreviation kHz stands for _____.
6. Frequency bands are usually called out in a _____.
7. 52 megahertz is located in which meter band? _____
8. 28.4 MHz is located in which meter band? _____
9. 146.52 MHz is located on which meter band? _____
10. 223.5 MHz is located on which meter band? _____
11. 432 MHz is located on which meter band? _____
12. To go from METERS to MEGAHERTZ, or MEGAHERTZ to METERS the magic division number is _____.
13. 28.5 MHz is how many kilohertz? _____
14. Ten meter worldwide voice privileges extend from 28._____ to 28._____ MHz.
15. Cycles per second? _____
16. Radio wave distance? _____
17. Frequency limits of the HF spectrum? _____
18. Frequency limits of the VHF spectrum? _____
19. UHF 70 cm national calling frequency? _____
20. Are band plans voluntary or FCC enforced? _____

YOUR FIRST RADIO

1. Get your radio pre _____ by your local ham dealer or club.
2. Store favorite frequencies in your radio's _____.
3. Don't use a rubber duck inside your _____.
4. What type of modulation do we use for 2 meters and the 440 MHz band? _____

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5. What is the advantage of SSB over FM when working satellites? _____
6. What device takes output on one band and produces output on another band? _____
7. The www for ham equipment reviews? _____
8. Abbreviation for mic transmit button? _____
9. Do rubber duck antennas all have the same connector? _____
10. Common emission for VHF Packet radio? _____
11. Common emission for VHF repeaters? _____
12. Bandwidth of a VHF repeater FM phone signal? _____

GOING SOLO

1. Transmitting on the same frequency is called _____.
2. We use duplex when transmitting when transmitting through a _____.
3. When you test over the air, always give this. _____
4. What does CQ mean? _____
5. Interference from another station on frequency is called by which Q code? _____
6. This Q code means change frequency. _____
7. Someone asks "What is your QTH?" _____
8. Your friend is going QRT. This means _____
9. The locator system based on 1 degree latitude by 2 degrees longitude? _____
10. UHF signals on 440 MHz sometimes take a _____ off nearby buildings.
11. Squelch does this to background noise? _____
12. Abbreviation for tone controlled squelch system? _____
13. Always give your _____ when transmitting a test?
14. Before transmitting, always _____
15. Term for rapid fluttering signal from a mobile station? _____
16. Term for contacting as many stations as possible? _____

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REPEATERS

1. Repeaters transmit on their output and listen on their _____.
2. What is the term to describe transmitting on a repeater channel? _____plex.
3. What is the usual repeater offset for the 2 meter band? _____
4. What is the usual repeater offset for the 70 cm band? _____
5. Most repeaters also require CTCSS. What's this? _____
6. What else do you need to program in your handheld to access a local repeater? _____
7. The difference between repeater transmit and receive frequencies is called _____
8. Common difference between receive and transmit for repeaters on 2 meters? _____ MHz
9. Common repeater offset for 70 cm band? _____MHz
10. Say *this*, instead of CQ, on repeaters to announce that you are monitoring? _____?
11. Repeaters usually give their call sign in? _____

EMERGENCY!

1. Which communications have the highest priority? _____
2. What does RACES stand for? _____
3. What does ARES stand for? _____
4. What does the term "check" mean? _____
5. What words do we use to indicate an emergency on the 2 meter band? _____
6. What Morse Code characters are sent in an emergency? _____
7. Do this before transmitting on an emergency net? _____
8. When passing emergency traffic, pass the message exactly as? _____
9. Use this alphabet when spelling unusual words? _____

WEAK SIGNAL PROPAGATION

1. What do we call radio signals that travel through space? _____
2. Use "Knife-edge" propagation to transmit over _____.
3. A warm air inversion creates this type of propagation. _____

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4. Catch a falling star and try this? _____
5. How many layers of the Ionosphere during the day? _____
6. What layer disappears at night? _____
7. When can you get 10 meter propagation? Day or night? _____
8. Skip is not reflections, but rather, _____
9. Signals that hug the Earth are called _____ waves.
10. The ionosphere will regularly skip frequencies, during the day, on these bands? _____
11. Does sunspot activity influence the ionosphere? _____
12. "Short skip" signals normally refract off which layer of the ionosphere? _____
13. Long range skip is refracted by this layer of the ionosphere, at the peak of the solar cycle? _____
14. Which characteristic of a radio wave describes its polarization? _____

TALK TO OUTER SPACE!

1. 2. What does LEO stand for? _____
2. Signals that contain information about an on board satellite computer? _____
3. 4. What causes satellite signals to fade in and out? _____
4. Compensate for this shift when the satellite is approaching. _____
5. In the V/U mode, what band do you transmit on? _____
6. How much power should you use when transmitting to a satellite? _____
7. May a Technician Class operator talk with hams aboard the International Space Station? _____
8. _____ elements are input to a satellite tracking program? (starts with K)
10. Why are ham satellites slowly rotating in space? _____
11. What word describes a satellite's transmission of internal sensors? _____
12. What word describes how specific hams may control a satellite function? _____

YOUR COMPUTER GOES HAM DIGITAL!

1. Is Morse Code a digital mode? _____
2. The device connected between your transceiver and computer? _____

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3. What portion of your computer might decode digital signals? _____
4. What does CW stand for? _____
5. A _____ ham station connects other ham stations into the internet?
6. What does VoIP stand for? _____
7. What do IRLP and Echolink have in common? _____
8. Another name for fast scan television? _____
9. What does ARQ stand for? _____
10. Packet data signals may contain more _____ when traveling over multiple or reflections?
11. What does GPS stand for? _____
12. What does PSK stand for? _____

MULTI-MODE RADIO EXCITEMENT

1. To operate satellite SSB, which emission mode? _____
2. What emission has the narrowest bandwidth? _____
3. How wide is the SSB voice signal? _____
4. What does RIT stand for? _____
5. The ability of a receiver to hear signals close together? _____
6. How wide is fast scan television? _____
7. A fancy name for your new two-way radio? _____
8. The emission type for a handheld VHF/UHF radio? _____
9. For a base or mobile radio to transmit MORE modes than just FM, we call that radio? _____
10. Which popular voice mode is used for long range 10 meter contacts? _____
11. Which has the narrowest bandwidth, FM or SSB? _____
12. What sideband do we use on 10 meters? _____
13. What word describes combining speech with an RF carrier signal? _____
14. An SSB signal is about 3,000 Hertz narrow. How many kHz is 3,000 Hz? _____ kHz
15. Are all mobile and base station mic connectors wired the same way? _____

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16. What word describes the ability of a receiver to detect weak signals? _____
17. What word describes a receiver's ability to discriminate between multiple signals? _____

RUN SOME INTERFERENCE PROTECTION

1. On 10 meters, if your mic gain is too high, it could create this. _____
2. On 2 meters, speaking too softly will create under-_____.
3. A whistle on your handheld tied in to your car's 12 volts is likely from _____
4. What type of filter would you use to minimize harmonic emissions on your high frequency transmitter?

5. What snap on device may minimize interference on audio equipment? _____
6. Using shielded wire will prevent _____ of unwanted signals to and from the wire.
7. A small weather station transmitter falls under which part of the FCC Rules? _____

ELECTRONS – GO WITH THE FLOW!

1. The name for EMF? _____
2. The flow of electrons _____
3. The opposition to the flow of electrons _____
4. What device stores a chemical charge? _____
5. Most ham radios require _____ volts for mobile operation.
6. Measure current with this _____.
7. _____ is measured in series, and _____ is measured in parallel.
8. A good insulator _____
10. A device that allows current to flow in only one direction _____
11. The unit of resistance _____
12. A variable resistance device _____
13. What device stores energy in a magnetic field? _____
1. 15. Which device stores energy in an electric field? _____
15. The unit of capacitance? _____

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16. A device that turns on or off a circuit? _____
18. FET stands for _____
19. Which battery chemistry is most dangerous with an overcharge? _____
20. What are the two electrodes of a diode? _____
21. How is the cathode lead of a semiconductor diode usually identified? _____
22. Opposition to AC current flow in a circuit is called? _____
23. What component can be used as an electronic switch or amplifier? _____
24. What are the three electrodes of a PNP transistor? _____
25. What are the three electrodes of a field effect transistor? (FET) _____

IT'S THE LAW, PER MR. OHM!

1. Draw 2 different types of Ohm's Law Circles.
2. Power equals _____ X _____.
3. Voltage equals _____ X _____.
4. If you are calculating current, it is Voltage divided by _____.
5. If you are calculating resistance, it is Voltage divided by _____.
6. Could they ever substitute different numbers than what is in the book on your upcoming examination? _____
7. What voltage across a 2 Ohm resistor with 0.5 amps flowing through it? _____
8. What is the current flowing through a 24 Ohm resistor connected across 240 volts? _____
9. What is the resistance with 3 amps current flow through a resistor connected to 90 volts? _____

PICTURE THIS!

1. Draw the symbol for a resistor
2. Draw the symbol for a variable capacitor
3. Draw the symbol for an antenna

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4. Draw a transistor symbol
5. Draw a chassis ground symbol
6. Draw a transformer symbol
7. Draw a diode symbol
8. Draw an LED symbol
9. Doubling your power output results in how much db gain? _____
10. A ten times increase in power will result in how much db gain? _____
11. What does LED stand for? _____
12. How many watts are 500 milliwatts? _____
13. A cold solder joint looks like this _____.
14. What will happen if you measure voltage with your multimeter on the resistance scale?
15. What do the 2 vertical lines represent in a transformer schematic? _____ core
16. Another name for a switch controlled by an electromagnet? _____
17. How many GHz on a dial that reads out 2425 MHz? _____
18. How many MHz is 28,400 kHz? _____
19. How many microfarads are 1,000,000 picofarads? _____

ANTENNAS

1. What type of antenna is half wavelength, parallel to the Earth? _____
2. From tip to tip, how long is a half wave dipole for 10 meters? _____
3. Tip to tip, how long is a half wave dipole for 2 meters? _____
4. The electric field in a vertical antenna is _____ to the Earth.
5. What is the formula for calculating the length of a half wave dipole, if you know the frequency in MHz? _____
6. Which antenna concentrates energy in just one direction? _____

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7. What's a popular sport that uses handheld, directional antennas? _____
8. If your antenna and that of the other station are cross polarized, your signal will get ____?
9. With a dipole, where is the radiation strongest? _____
10. Your new dipole has best lowest SWR just below the band. Do this to the dipole ends? _____
11. Best place to mount a VHF or UHF mobile antenna for uniform radiation patterns? _____
12. Another name for that antenna coil on the base of your 10 meter mobile short whip? _____

FEED ME WITH SOME GOOD COAX!

1. Coax cable is round or flat? _____
2. Impedance of coax cable for ham use? _____ Ohms
3. Common coaxial cable connector for a mobile high frequency radio? _____
4. The larger the diameter of the cable, the lower the signal _____.
5. The ratio of forward power to reflected power is _____.
6. An SWR meter 4:1 means _____.
7. What device prevents signal radiation when testing your transmitter? _____
8. What is the coax connector called for your multimode radio? _____
9. What happens when moisture enters coax cable? _____
10. What does a dummy load consist of? _____

SAFETY FIRST!

1. Good way to guard against shock? _____
2. The green wire in an AC power cord provides what? _____
3. An intentional weak link in a wiring circuit _____
4. Should you replace a blown 10 amp fuse with a 40 amp fuse? _____
5. Wear this when climbing an antenna tower _____
6. Make sure your antenna is well away from these _____
7. If on the ground looking up, always wear these to protect your eyes _____
8. Never climb a tower that has not been cranked _____

Amateur Radio Technician License Pre-Study

9. Use this for good RF grounding, not round wires _____
10. What is the device to help erect an antenna tower top section? _____
11. What frequency has the lowest MPE limit? _____ meters.
12. A good place for a magnetic mobile antenna on your car _____
13. If you touch a transmitting antenna you could get _____
14. Make sure your volt meter test leads are rated when measuring this type of voltage? _____
15. What might happen if you short out a 12 volt storage battery? _____
16. If time exposure to RF is measured at 6 minutes, what happens to RF exposure if the signal is only transmitting for half that time? _____
17. To minimize over-exposure to RF transmit radio waves, always run _____ amounts of transmit power.

HOLD HARMLESS
AGREEMENT

I, _____, hereinafter referred to as participant, fully understand that due to the nature of the program, Amateur Radio Eules, there is a chance of physical injury. I agree to assume all risk described and not described herein. I agree to release and discharge the City of Eules, it's Officers, employees and agents, from any and all claims, demands, causes of action and suits, or liabilities which might arise from such participation, including acts or omissions constituting negligence

Executed this ____ day of _____, 20 ____

Signature

Address: _____

Phone #: _____

Doctor's Name: _____

Doctor's Phone #: _____

Call Sign if appropriate: _____

Class of license: _____



Affiliated Club

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Who We Are

Amateur Radio Euless is an association of members who have a common interest in the avocation of Amateur Radio. Our members have diverse interests. You will find among our ranks those who enjoy building their own radios and those who enjoy contacting other Amateurs around the world, those who perform community service and those who simply enjoy the chance to meet new people over the air. Amateur Radio is a worldwide service that can be an enriching, educational, lifelong activity. The club is affiliated with the American Radio Relay League (ARRL). ARRL affiliation gives the club additional benefits through the ARRL.

What We Do

Our club holds monthly meetings on the second Wednesday of each month in the Euless Police Department's Emergency Operations Center (EOC). These meetings are an opportunity for us to learn about the latest developments in Amateur Radio, plan and organize club events, and to share information. We have an informative presentation at each meeting on a wide variety of topics related to Amateur Radio communications.

Amateur Radio is a licensed radio service. To earn a license requires passing examinations regulated by the Federal Communications Commission. The club is not just for people who are already licensed. The members and officers of Amateur Radio Euless are excited to share our enjoyable and interesting avocation with anyone who is curious about Amateur Radio and communications. We're also interested in helping people earn their own Amateur Radio license.

Club Meetings

ARE meetings are on the 2nd Wednesday of each month at 7:00 pm. The meetings are held at the Euless Police Department EOC office at 1102 W. Euless Blvd., Euless, TX. For more information please send an e-mail to info@w5eul.com

The relationship of the ARE Radio club to the EOC is a volunteer effort. The EOC operates during emergencies where one agency (fire or police, for example) is not able to handle the disaster alone, and it is a place where city planners and heads of police, fire, and other agencies get together in one location to deal with it. Amateur Radio Operators from the club have a location in the EOC to handle emergency communications should the standard systems go down, and to provide backup communication services when needed.

The R.A.C.E.S. members of the club also provide trained communications personnel (amateur radio operators) to assist the National Weather Service, and other similar community agencies, in providing communications support for sporting events and a variety of public service events. During disaster events ARE and RACES radio operators assist local, county, and state public service organizations by providing vital additional emergency communications capacity.

APPLICATION

Name: _____

Date of Birth: _____

Address: _____

Home Phone#: _____

Cell Number: _____

E-mail: _____

Who to contact in an Emergency:

Name: _____

Phone #: _____

Relationship: _____

APPLICATION Part 2

Name: _____

Date of Birth: _____

Social Security #: _____

TX DL #: _____

I consent to the checking of my criminal history and warrant record for the purpose of my participation in Amateur Radio Club

Signature: _____

Date: _____