In Just 30 Days...I Can Make You A Ham!

or, How to teach a 4-week Basic licence course

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Tired of being the only ham for miles around? Looking for ways to boost your club's membership? Why not bring some newcomers into the hobby, by teaching a ham radio course? It's easier than you think!

Why a Four-Week Course?

The Georgian Bay Amateur Radio Club has offered amateur radio courses annually for the past several years. In late 1995, I took over the job of running the course, which had taken 12 or 13 evenings. I decided this was too long, for these reasons:

1. The course was too expensive, because we were paying by the day for the classroom;

2. Students asked for a shorter course, because they forgot the "early" material by the end of the course;

3. Weekday evening classes ran too late for younger students;

4. Some of our students and instructors travel 60 km or more to the class, and 13 nights of winter driving was too much to ask!

So I shrunk the course, to four Saturdays (plus a fifth Saturday for the exam). We've now taught one Advanced and two Basic courses using this format, with a pass rate of over 80% -- 100% for the Advanced course!

The Material We Cover

The secret to a short course is to teach *just the material needed to pass the exam.* I went over the entire Basic Question Bank, and created a course outline covering just those questions. You don't have to repeat this work -- you can download our outline from the Internet at <http://www.greynet.net/gbarc/course>. Figure 1 is an overview of our last course; it changes from year to year. (We should have taught transmitters and receivers in week 3, but we had to rearrange the schedule to accommodate the available instructors.)

Figure 1. Four-week overview

Week 1
morning: introduction, electricity, resistors, Ohm's law
afternoon: series & parallel, inductors, transformers
Week 2
morning: capacitors, resonance, diodes, transistors
afternoon: radio waves & propagation
Week 3
morning: transmission lines, SWR, antennas
afternoon: HF station, digital station, RFI & TVI
Week 4
morning: modulation, transmitters
afternoon: receivers, repeaters

Previous students asked us to add some "practical" information, so we also teach: understanding the 2m rig, understanding the HF rig, and safety. We demonstrate 2m operation, HF operation (phone and CW), packet radio, and how to use an SWR meter. But we *don't* overload the students with solid-state theory or RF design. There are plenty of opportunities to learn those *after* getting a licence!

What about regulations? The regs are dull, and they're largely memorization, so we teach them a little bit each session. We try to liven them up a bit, by describing them in plain language and giving concrete examples... like, can you use the phone patch to order pizza?

Preparation

Enlist Instructors and Assistants. Once you have an outline (a lesson plan), you can enlist from one to eight instructors for the eight "sessions." I've taught the course solo, and it's a lot of fun, but it's a lot of work. Ask some local hams what they are willing to teach. Remember, you don't need to be a Ph.D. or a great public speaker! Almost any ham can teach what he knows.

You'll also want assistants to set up the room, to make coffee and bring donuts, to help with demonstrations, and -- most importantly -- to talk to the students and answer questions during breaks. It's easier to find volunteers to make coffee than to find instructors. Enlist as many as you can -- it makes a good impression!

Find a Location. We've used a local airport, school, library, church, and yacht club -- whatever is convenient and centrally located. Use your contacts, call in favors, wheel and deal: we got a break on the church because we offered a discount to local Scouts! It doesn't need to be a classroom, but you'll need chairs and tables for all the students -- we typically have 15 to 20 students per Basic class. You'll also need electricity and space for demonstrations, a projector, and a coffee pot.

Prepare a Budget. Really! That's how we decide what to charge. For our last course, we charged $75 for adults, and $55 for full-time (high school or college) students. We aim to break even with ten students. If we have more than ten, the club shows a small profit.

Figure 2. Typical Budget

Expense	
Room Rental	$100
10 books @ $30	$300
Advertising (flyers)	$ 20
Handouts	$ 20
Disks & tapes	$ 20
Transparencies	$ 40
Coffee & donuts	$ 50
TOTAL	$550

Order Materials. We include the BDX study guide in the cost of the course. In order to hand it out on the first day, you need to order it a few weeks in advance. BDX lets you return unused manuals for a full refund, so we order 20 manuals and then return (or sell) the extras.

Also, a month or two before the class, we ask BDX and Radio Amateurs of Canada for any promotional material we can hand out. If you have a local ham equipment dealer, ask them for flyers too. *We want our students to know that this is a live and vibrant hobby, with many places to get help and information.*

Equipment

Teaching Equipment. I like to teach with an overhead projector and screen: I prepare my illustrations in advance, and I face the audience while I draw. Chances are, you can borrow a projector and screen (and anything else you may need). Ask around at your local club meeting. Or perhaps your classroom has a blackboard. You can even build an easel out of 2x2 lumber, and use a whiteboard or a flip chart. Most office supply stores sell flip chart pads.

Props. Drawings alone make a dull lecture, so we try to use lots of "props." During our last course we brought a 2m mobile rig, a power supply, 2m handhelds, an HF rig, a computer, a packet TNC, a multimeter (for teaching about current and voltage), various electronic components, coax and twin-lead cable, a 2m beam, a 2m vertical, an HF dipole, an antenna tuner, an SWR meter, an antenna analyzer, and a dummy load. Your outline should tell which props are needed each week.

Handouts. We like handouts! Handouts are a great way to give supplementary information, to keep the students "on track," and to fill in the gaps in the study guide. The students also feel they're getting their money's worth!

Figure 3. Typical Handouts

"Top level" course outline
List of study questions for each week
Summary of RIC-25 (amateur regs)
List of formulas (as used for exam)
Chart of amateur frequency bands
Morse code cassette or floppy disk
Instructions for Morse tape/disk
Guide to buying radio equipment
A copy of On The Air
A copy of The Canadian Amateur
Radio Amateurs of Canada brochure
Flyers for local ham radio dealers

The BDX study guide assumes you have a copy of RIC-25, and so skimps on the regs. But RIC-25 is dull, and expensive to photocopy, so we've distilled it down to a two-page handout (also available at <http://www.greynet.net/gbarc/course>).

Sometimes we teach Morse code, and sometimes we don't. Either way, we give our students a Morse code study tape (our own creation) or a "freeware" Morse code PC program -- their choice. With a tape or diskette, they can continue studying after the course is over. Some students have shortwave receivers; we give them the schedule and frequencies of ARRL code practice.

Code Practice Oscillators. With the surplus from our 1997 course, we bought fifteen code practice oscillators. These are *loaned,* not given, to the students. We use the combination oscillator-and-key described in ARRL's *Now You're Talking*. Circuit boards from FAR Circuits (<http://www.cl.ais.net/farcir/>, telephone 847-836-9148) and parts from Jameco Electronics (<http://www.jameco.com>, or 650-592-8097) cost a total of only $15 per oscillator. Club members built them.

Figure 4. Guidelines For Instructors

1. The course has been divided into eight 3-hour sessions. Each session is divided into roughly twelve "topics" (including the Morse lessons and the break). Plan to spend about 15 minutes on each topic.

2. The outline contains the essential material that you should cover. You can embellish or elaborate as you see fit. If the class is having difficulty with a subject, try a different explanation or a different presentation; or perhaps have someone else explain it.

3. At the end of each topic, there are practice questions. Ask the class to give the answers. For the math-type questions, work one example first for the class (these are given in the outline). Then have the class solve the problem. If any students fail to solve the problem in a reasonable time, or get the wrong answer, work the problem for the class.

4. Watch for students who are having trouble or who take the longest time to solve a problem. Approach them with encouragement or help during the break.

5. We do not exactly follow the sequence of the study guide. You will have a copy of the study guide pages which cover your material; refer to this text on occasion. But REMEMBER that some students have reading difficulties, so present the material verbally when possible. (Don't read the entire list of Q signals.)

6. Morse lessons - teach five or six characters each lesson. Begin by reviewing the characters from the previous lesson. Send each character ten times & have the students copy it. Then send them in sequence. Then send simple words with two or three different letters. If a student has difficulty distinguishing dots and dashes, adjust the "weight" of your keying. Ask the Delegated Examiner if he can similarly adjust the Morse exam.

Instructor's Kits. We prepare eight three-ring binders, one for each three-hour "session." Each contains a copy of the outline for that session, prepared viewgraphs, a copy of the relevant pages from the study guide, a list of sample question bank questions, and useful props (such as

a variable capacitor, or pieces of different kinds of transmission line). We distribute these a few weeks in advance and collect them after each instructor completes his session. Supplementary material can be included -- for example, our “propagation” binder contains extra explanations and illustrations from some ARRL books. Just don’t overload the instructor with too much reading!

We also give our instructors a “briefing” (see Figure 4). Caution your instructors to review the material in advance. Especially the practice questions -- instructors have been caught by the “trick” questions! Most of all, tell your instructors to *interact* with the class. Make eye contact. Get the class involved. Ask questions every few minutes. Check with the class to make sure they’re following what you’re saying. Illustrate points with personal stories. Show them props and pass them around. Long monotonous lectures are boring!

Promotion

You can’t have a course without students! All through the year, our club receives inquiries about ham radio classes. We also put “Radio Course” sign-up sheets out when we have a swapmeet, and at any other event where we have a booth or display. We keep a file of all these inquiries. We answer each immediately, and call them back when we’re ready to put on a course.

A few months before the course, make a flyer and post it around the local communities. Supermarkets, banks, post offices, and libraries usually have “community” bulletin boards. Be sure to visit your local ham dealers (if any) and your local Radio Shack stores. If you’re lucky, your local radio station may announce the upcoming event. You might try running an ad in the local newspaper (we never have; they’re expensive). Contact your local high schools, community college, local Boy Scouts and Girl Guides groups, even the local emergency organizations. If there’s a local CB group, let them know -- many CBers would like to become hams!

And of course, talk it up to your friends. Don’t overlook home -- lately, almost one fourth of our students have been spouses or other family of existing hams!

The First Day

Arrive early the first day, and make sure the room is set up. Put a student’s “package” (study guide and handouts) at each seat. Enlist a couple of hams as “greeters” to meet each new student, introduce the other hams, and give the student a name tag. (We like to print name tags in advance, but you can write them on the spot.)

We always begin by telling the students how the course is organized, and what the exam will be like (100 multiple choice questions, 60% pass). We describe the amateur qualifications (Basic, 5 wpm, 12 wpm, and Advanced) and tell them which they will learn in this class, and how to pursue the rest. Then we give a short Morse code lesson: the letters ETANIM. Many students find this easy, and lose their fear of the Morse code. We reassure those who are still intimidated that the Morse code is optional for a Basic licence.

All Saturdays follow the same plan (Figure 5). We have a morning and an afternoon “session” -- eight three-hour sessions in all. Each session is divided into twelve 15-minute “topics,” each short enough to be explained with one or two viewgraphs. After each topic is presented, we pose three or four related questions from the Question Bank, and get the students to answer them. This way, by the end of the course, they’ve reviewed more than 200 questions! We especially like to review “trick” questions, so the students won’t be caught on the actual exam.

After week 1, we start each day by answering questions about the previous week's material. We try to break up the theory with Morse lessons and regulations. After an hour and a half, we take a break. After lunch, when everyone is drowsy, we have interesting stuff: a live demonstration and a "practical" topic. These also help bring the students back promptly from their lunch break. *Don't* wait for stragglers to return from lunch -- stay on schedule!

Figure 5. Typical Day Plan

Morning
15 minutes introduction/questions
15 minutes Morse lesson
60 minutes theory
15 minutes break (coffee & donuts)
15 minutes regulations
45 minutes theory
15 minutes Morse review

Afternoon
15 minutes demonstration
15 minutes "practical"
15 minutes Morse lesson
45 minutes theory
15 minutes break (soft drinks)
15 minutes regulations
45 minutes theory
15 minutes Morse review

We teach the Morse code five or six characters at a time. The first five sessions cover the alphabet, the next two are the numbers, and the last is punctuation marks.

Students are required to do "homework": read the study guide, and answer questions from the question bank. We tell them which questions to study each week. We encourage them to do the questions the night or the day after class -- while the material is still fresh in their minds -- and to read the study guide for questions they miss. We also suggest they re-read the study guide a day before the next class, as a refresher. Usually two or three hours is enough for the questions, and an hour or so for the reading. Sometimes the students form "study groups" to meet outside of class -- especially if they have difficulty with math.

The Final Day

On week 5 our local Delegated Examiner comes to administer the Basic and 5 wpm Morse exams to the class. Some students may elect to take the exam later -- we make sure they know how to contact the Examiner for a private exam.

The Examiner arrives about one hour after class starts -- this gives us time for one last review session. Usually a few questions in the study guide have caused several students difficulty, so we have a chance to go over them before the exam.

Our Examiner usually grades the exams "on the spot," and the students wait for their results. The exam scores are confidential, of course, but those who pass get congratulations and handshakes from all the hams present! Those few who fail get extra attention: right away, we ask what parts of the exam gave them the most difficulty. It may be that it was a "near miss" (like a score of 58%), and the student just needs a few weeks of private study before attempting the exam again. Or there may be large areas of confusion, and the student needs individual help. We try to arrange this.

We have a "consolation prize" of sorts for the students who don't pass. Our policy is: *if a student does not pass the exam, he can attend our next Basic radio course free.* As long as he keeps his study guide, he can sit in as many times as it takes to pass the exam. Several students have come back and passed on the second course! (No one has attended three courses yet.)

All students are asked to fill out a questionnaire evaluating the course and the instructors. This provides us with very useful feedback -- we improve the course each year!

The Eight-Week Course

We have designed the course so that it can be taught on eight weekday evenings. Each three-hour "session" stands alone. As an evening course, we could offer it through our local

Continuing Education program. Eight weeks is the longest course they'll allow; fortunately, it's just enough time.

For this format I would make one change: spread the four demonstrations and the four "practical" topics out so that one is covered each week. This might require "tweaking" the rest of the schedule, but we're constantly doing that anyway.

Etc.

We're experimenting with videotaping the classes. This would be great for those who miss a session, and also for those who fail the exam and wish to review the material in more detail than provided by the study guide. Our biggest problem so far is that overhead projections don't show up well on the videotape. Perhaps someday we'll be able to afford a video projector, and use a computer to make the "slides."

We've occasionally had a problem with hams dropping in to visit, or to help with, the course -- and then talking in the back of the room, or worse yet, interrupting the instructor. You may want to appoint a "sergeant at arms" to enforce silence. Remember, the whole purpose of the course is to help the students, and if they're being distracted or they can't hear, they're not being helped!

Credit where credit is due: Nelson Gain of Plane Fun Inc. (an ultralight flying school in Owen Sound, Ontario) was the original inspiration for the four-week course format -- long before I'd ever seen a BDX study guide -- and also the policy of repeating the course for free. Tom St. Amand, VE3TSA, suggested the "instructors' kits" and lots of other good ideas. And many, many hams from the Georgian Bay ARC have donated their time to make these courses happen. Thanks, guys!

Helping new hams enter the hobby may be the single most satisfying thing I've done as a radio amateur. I hope this article inspires some of you to go out and organize a ham radio course. If it does, or if you need more information, please write me at ve3rhj@rac.ca (via Internet) or VE3RHJ@VE3IJD.#CON.ON.CAN.NOAM (via packet radio). Remember: teaching tech, like all other ham radio activities, should be fun! So relax, don't worry, have fun, and spread the word!