

South Bristol Amateur Radio Club

Lesson 0 – Introduction

Introduction

Welcome to the Intermediate Amateur Radio Course run by South Bristol Amateur Radio Club. This course builds on the content of the Foundation Course adding additional knowledge and capabilities.

The Intermediate Licence conveys greater privileges than the Foundation in respect of allowable frequencies, allowable powers and removal of the restrictions concerning the construction of equipment.

As previously, the clubs lead instructor is Steven Nash (G0UQT). Tuition is also provided by Andy Jenner (G7KNA), Ken Rook (G4XCB) and Henryk Banasiak (M0HTB) with general support given by other members of the club particularly Peter Hill (G0DRX).

Club instructors give their time freely and voluntarily. We are quite prepared to answer queries between lessons, but would ask that you respect the fact that we have both jobs and other family functions to attend to. Therefore we prefer that any contact with us is made by e-mail. We will give out e-mail contact details in the lessons or you can look us up on the clubs website:

<http://www.sbarc.co.uk>

The Exam

OK, so lets get the bad news over with first. The exam that you will sit at the end of this course is similar to the one you sat to pass the Foundation Exam. In this case however there are 45 questions each having four possible answers of which only one will be correct. The time allowed is 1 hour 15 minutes. The pass mark is 27/45.

The cost for the exam is £32.50 which goes to the RSGB. We prefer all our students to become members of the club as this provides a level of pastoral support which is especially useful once you have passed your Intermediate Exam. Club membership is currently £5 per annum plus £4 per annum to the Novers Park Community Centre who kindly act as our hosts. There is a weekly charge of £1 to defray room rental costs.

Reference Material

Throughout the course we will make reference to the RSGB publication “Intermediate Licence – Building on the Foundation”. This is available from the RSGB book store and on-line retailers such as Amazon. If you are a member of the RSGB there is a small discount. If you are not a member, we can take advantage of members discount.

Special Needs

If you require, or feel you require, special arrangements for the exam it is important that you identify these issues to us at an early stage so that we can, if necessary, discuss them with the RCE and RSGB to identify what provisions can be made to facilitate your progress through the course and examination. It is usually necessary for you to provide some form of evidence through a statement of special needs or other medical representation.

The onus to provide any evidence of need is on you as the candidate not us as the Course organiser. We appreciate that this can be a sensitive subject so if you wish to speak to us confidentially outside of the main lessons please feel free to approach us.

Although all cases are individual and will be assessed on an individual basis the following guidance will be applied by the RCE and RSGB:

- Candidates who can read and write should take the examination in the normal way.
- Candidates who cannot read or write may have a reader/writer to read the questions to them and mark their given answer.

Candidates needing special examination requirements are catered for according to their individual needs; for example:

- an examination paper without diagrams is produced for the registered blind
- examination papers printed onto coloured paper for candidates with dyslexia
- reasonable extra examination time is allocated when a reader/writer is required

Practicals

Like the Foundation course there are a number of practical exercises to undertake during the course. In order to complete the practical exercises you will need to have the following items:

- Soldering Iron
- Soldering Iron Stand
- Solder
- Side Cutters
- Wire Strippers
- Sharp Modelling Knife
- Flat Bladed Screwdriver (2mm – 3mm)
- Cross Point Screwdriver (2mm – 3mm)
- Small Pair of Pliers
- Multi Meter – digital or analogue to suit personal taste
- Clear Rule or Tape Measure
- Magnifying Glass

In addition the following consumable items will be used at various times throughout the course:

- 13Amp Three Pin Mains Plug
- Short length of 3 Core domestic flex
- PL259 or BNC Plug
- Short length of Coaxial cable

Construction Project

There is a requirement for students on the Intermediate Course to complete a construction project. This can be a kit or a project built from scratch.

Possible kits include:

- A crystal calibrator
- A dip oscillator
- An ATU with built in SWR
- A Morse practice oscillator
- An audio amplifier
- A QRP transmitter or transceiver

Course Duration

Course duration is likely to be in the region of 25 sessions, depending on how the pace settles down. We will intersperse the practicals around the lessons for variety, and also to allow things to progress whilst some of us are away.

If you intend to be away please let us know as we can reschedule activities so as not to lose course time.

Session Schedule (Syllabus Issue 5a - 10 November 2008 for Examinations held after the 1 June 2009)

<http://www.commsfoundation.org/rce/pdf/intermediatesyllabus.pdf>

Session Number	Topics Covered	Syllabus Elements
1 2	Amateur Radio & Licence Conditions	1a.1, 2a.1, 2b.1, 2b.2, 2c.1, 2c.2, 2c.3, 2c.4 2d.1, 2e.1, 2f.1, 2f.2, 2f.3, 2g.1, 2h.1, 2h.2
3 4	Operating Practices & Procedures	8a.1, 8b.1, 8c.1, 8d.1, 8e.1, 8e.2 8f.1, 8f.2, 8f.3, 8f.4, 8g.1, 8g.2, 8g.3, 8g.4
5	PRACTICAL: Wiring a 13Amp Plug	10d.8 Requires: UK 13 Amp three pin mains plug with fuse, short length of 3 core flex, straight blade electrical screwdriver (2mm – 3mm), and optionally a cross head screwdriver.
6 7 8 9 10 11 12	Technical Basics	3a.1, 3c.1, 3d.1, 3d.2, 3d.3, 3e.1 3j.1, 3j.2, 3j.3, 3j.4, 3j.5 3b.1 3f.1, 3f.2, 3f.3, 3f.4 3g.1, 3g.2, 3g.3, 3h.1, 3h.2 3i.1, 3i.2, 3i.3, 3i.4 3i.5, 3i.6, 3i.7, 3i.8
13	Construction	10a.1, 10b.1, 10b.2, 10b.3, 10b.4, 10b.5, 10c.1
14	PRACTICAL: Components & Meters	10d.1, 10d.4, 10d.5, 10d.6 Requires: Multi-Meter
15 16 17	Transmitters & Receivers	4a.1, 4a.2, 4b.1, 4b.2, 4b.3, 4b.4, 4c.1 4d.1, 4d.2, 4d.3, 4d.4, 4d.5, 4e.1, 4e.2, 4e.3, 4e.4, 4e.5 4f.1, 4f.2, 4g.1, 4h.1, 4i.1, 4i.2, 4j.1
18 19 20	Feeder & Antenna	5a.1, 5a.2, 5a.3, 5a.4, 5a.5, 5a.6, 5b.1, 5b.2 5c.1, 5d.1, 5e.1 5f.1, 5f.2, 5f.3, 5f.4, 5f.5, 5g.1
21	PRACTICAL: Wiring a BNC/PL259 Plug	10d.7 Requires: PL259 or BNC plug, short length of coaxial cable, soldering iron, solder stand and solder.
22	Propagation	6a.1, 6a.2, 6a.3, 6a.4, 6a.5, 6a.6, 6a.7, 6a.8
23 24	EMC	7a.1, 7a.2, 7a.3, 7b.1, 7b.2, 7b.3, 7b.4, 7b.5 7c.1, 7c.2, 7c.3, 7c.4, 7c.5, 7c.6, 7d.1, 7d.2, 7d.3
25	Safety	9a.1, 9b.1, 9b.2, 9b.3, 9b.4, 9b.6, 9c.1, 9c.2, 9c.3, 9d.1, 9d.2, 9d.3, 9d.4, 9e.1, 9e.2, 9e.3
26	PRACTICAL: VFO Calibration	10f.1

Handouts and Printed Material

The following pages contain some reference material used during the course and in some cases available in the exam:

Circuit Symbols


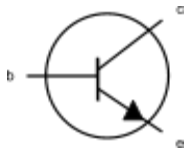
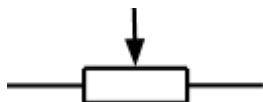

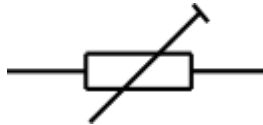

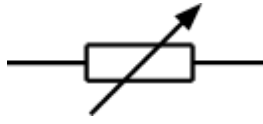
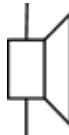

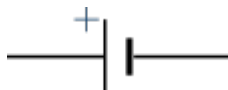

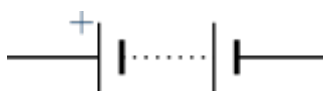






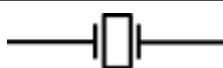
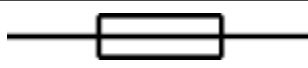
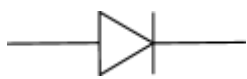

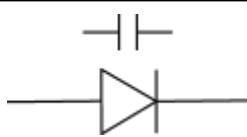

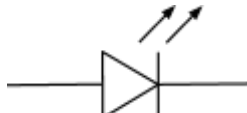
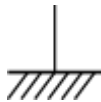
Description	Symbol	Description	Symbol
Resistor: fixed		Transistor: bipolar NPN NOTE: Transistors can be drawn with or without the circle	
Resistor: potentiometer		Transistor: field effect (FET) NOTE: Transistors can be drawn with or without the circle	
Resistor: pre-set		Earphone	
Resistor: variable		Loudspeaker	
Capacitor: fixed		Cell	
Capacitor: variable		Battery	
Inductor: fixed		Bulb (lamp)	
Inductor: with core		Switch: spst	
Transformer		Switch: dpst	
Quartz Crystal		Fuse	
Semi-conductor: diode		Antenna	
Diode: variable capacitance		Earth	
Diode: light emitting		Ground chassis	

Table A - Intermediate Licence Parameters

Frequency Bands (in MHz)	Status of Allocations in UK to the Amateur Service	Status of Allocations in UK to the Amateur Satellite Service	Maximum Peak Envelope Power level in Watts (and dB relative to 1 Watt)
0.1357 - 0.1378	Secondary. Available on the basis of non-interference to other services inside or outside the UK	Not allocated	1W (0dBW) e.r.p.
1.810 - 1.830	Primary. Available on the basis of non-interference to other services outside the UK	Not allocated	50W (17dBW)
1.830 - 1.850	Primary	Not allocated	50W (17dBW)
1.850 - 2.000	Secondary. Available on the basis of non-interference to other services inside or outside the UK	Not allocated	32W (15dBW)
3.500 - 3.800	Primary. Shared with other services	Not allocated	50W (17dBW)
7.000 - 7.100	Primary	Primary	50W (17dBW)
7.100 - 7.200	Secondary. Available on the basis of non-interference to other services inside or outside the UK	Not allocated	50W (17dBW)
10.100 - 10.150	Secondary	Not allocated	50W (17dBW)
14.000 - 14.250	Primary	Primary	50W (17dBW)
14.250 - 14.350	Primary	Not allocated	50W (17dBW)
18.068 - 18.168	Primary	Primary	50W (17dBW)
21.000 - 21.450	Primary	Primary	50W (17dBW)
24.890 - 24.990	Primary	Primary	50W (17dBW)
28.000 - 29.700	Primary	Primary	50W (17dBW)
50.00 - 51.00	Primary. Available on the basis of non-interference to other services outside the UK	Not allocated	50W (17dBW)
51.00 - 52.00	Secondary. Available on the basis of non-interference to other services inside or outside the UK	Not allocated	50W (17dBW)
70.00 - 70.50	Secondary. Available on the basis of non-interference to other services inside or outside the UK	Not allocated	50W (17dBW)
144.0 - 146.0	Primary	Primary	50W (17dBW)
430.0 - 431.0	Secondary	Not allocated	40W (16dBW)e.r.p
431.0 - 432.0	Secondary. Not available for use within 100km radius of Charing Cross, London (51°30'30"N, 00°07'24"W)	Not allocated	40W (16dBW)e.r.p.
432.0 - 435.0	Secondary	Not allocated	50W (17dBW)
435.0 - 438.0	Secondary	Secondary	50W (17dBW)
438.0 - 440.0	Secondary	Not allocated	50W (17dBW)
1240 - 1260	Secondary	Not allocated	50W (17dBW)
1260 - 1270	Secondary	Secondary. Earth to Space only	50W (17dBW)
1270 - 1325	Secondary	Not allocated	50W (17dBW)
2310 - 2400	Secondary	Not allocated	50W (17dBW)
2400 - 2450	Secondary. Users must accept interference from ISM users	Secondary. Users must accept interference from ISM users	50W (17dBW)
3400 - 3475	Secondary	Not allocated	50W (17dBW)
5650 - 5670	Secondary	Secondary. Earth to Space only	50W (17dBW)

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5670 - 5680	Secondary	Not allocated	50W (17dBW)
5755 - 5765	Secondary. Users must accept interference from ISM users	Not allocated	50W (17dBW)
5820 - 5830	Secondary. Users must accept interference from ISM users	Not allocated	50W (17dBW)
5830 - 5850	Secondary. Users must accept interference from ISM users	Secondary. Users must accept interference from ISM users	50W (17dBW)
10000 - 10125	Secondary	Not allocated	50W (17dBW)
10225 - 10450	Secondary	Not allocated	50W (17dBW)
10450 - 10475	Secondary	Secondary	50W (17dBW)
10475 - 10500	Not Allocated	Secondary	50W (17dBW)
24000 - 24050	Primary. Users must accept interference from ISM users	Primary. Users must accept interference from ISM users	50W (17dBW)
24050 - 24150	Secondary. May only be used with the written consent of Ofcom. Users must accept interference from ISM users	Not allocated	50W (17dBW)
24150 - 24250	Secondary	Not allocated	50W (17dBW)
47000 - 47200	Primary	Primary	50W (17dBW)
75500 - 75875	Secondary	Secondary	50W (17dBW)
75875 - 76000	Primary	Primary	50W (17dBW)
76000 - 77500	Secondary	Secondary	50W (17dBW)
77500 - 78000	Primary	Primary	50W (17dBW)
78000 - 79000	Secondary	Secondary	50W (17dBW)
79000 - 81000	Secondary	Secondary	50W (17dBW)
122250 - 123000	Secondary	Not allocated	50W (17dBW)
134000 - 136000	Primary	Primary	50W (17dBW)
136000 - 141000	Secondary	Secondary	50W (17dBW)
241000 - 248000	Secondary	Secondary	50W (17dBW)
248000 - 250000	Primary	Primary	50W (17dBW)

Assessment Schedule

Question Number	Syllabus Section Number	Number of Questions	Percentage of Total Exam
1	1a.1	1	
2	2a.1, 2b.1, 2b.2	1	
3	2c.1, 2c.2	1	
4	2c.3, 2c.4	1	
5	2d.1, 2e.1	1	
6	2f.1, 2f.2, 2f.3	1	
7	2g.1	1	
8	2h.1	1	
9	2h.2	1	
Sub-Total	Licensing Conditions	9	20%
10	3a.1, 3c.1	1	
11	3b.1	1	
12	3d.1, 3d.2, 3d.3, 3e.1	1	
13	3f.1, 3f.2, 3f.3, 3f.4	1	
14	3g.1, 3g.2, 3g.3	1	
15	3h.1, 3h.2, 3i.1, 3i.2, 3i.3, 3i.4	1	
16	3i.5, 3i.6, 3i.7, 3i.8	1	
17	3j.1, 3j.2, 3j.3, 3j.4, 3j.5	1	
Sub-Total	Technical Basics	8	18%
18	4a.1, 4a.2, 4b.1, 4b.2, 4b.3, 4b.4, 4c.1	1	
19	4d.1, 4d.2, 4d.3, 4d.4, 4d.5	1	
20	4e.1, 4e.2	1	
21	4e.3, 4e.4	1	
22	4f.1, 4f.2	1	
23	4g.1, 4h.1	1	
24	4i.1, 4i.2, 4j.1	1	
Sub-Total	Transmitters and Receivers	7	16%
25	5a.1, 5a.2, 5a.3, 5a.4, 5a.5, 5b.1	1	
26	5c.1, 5d.1, 5e.1	1	
27	5f.1, 5f.2, 5f.3, 5f.4, 5f.5, 5g.1	1	
Sub-Total	Feeder and Antenna	3	7%
28	6a.1, 6a.2, 6a.3, 6a.4	1	
29	6a.5, 6a.6, 6a.7	1	
30	6a.8	1	

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Sub-Total	Propagation	3	7%
31	7a.1, 7a.2, 7a.3	1	
32	7b.1, 7b.2, 7b.3, 7b.4, 7b.5	1	
33	7c.1, 7c.2, 7c.3	1	
34	7c.4, 7c.5, 7c.6	1	
35	7d.1, 7d.2, 7d.3	1	
Sub-Total	EMC	5	11%
36	8a.1, 8b.1, 8c.1	1	
37	8d.1, 8e.1, 8e.2	1	
38	8f.1, 8f.2, 8f.3, 8f.4	1	
39	8g.1, 8g.2, 8g.3, 8g.4	1	
Sub-Total	Operating Practices & Procedures	4	9%
40	9a.1	1	
41	9b.1, 9b.2, 9b.3, 9b.4, 9b.5, 9b.6	1	
42	9c.1, 9c.2, 9c.3, 9c.4	1	
43	9d.1, 9d.2, 9d.3, 9d.4, 9e.1, 9e.2, 9e.3	1	
Sub-Total	Safety	4	9%
44	10a.1, 10b.1, 10b.2, 10b.3, 10b.4, 10b.5	1	
45	10c.1	1	
Sub-Total	Construction	2	4%
Total		45	100%