



# **General Class Amateur Radio Examinations Syllabus**

May 24<sup>th</sup>, 2007

National Telecommunications Regulatory Commission  
Saint Lucia

## 1. Rationale

Although amateur radio is a hobby to its members, worldwide it is recognised as a powerful form of communication, especially in times of disaster, and so has been afforded many operating privileges. As a result, it is required that amateur radio operators are appropriately trained to prudently use the operating privileges that have been bestowed on the fraternity, and their responsibilities therein.

In Saint Lucia, amateur radio operators are required to be licensed in keeping with the Telecommunications Act 2000 and its Regulation. For persons who are citizens of Saint Lucia, three (3) classes of Amateur Radio Licences can be issued:

- (i) Novice Class Amateur Radio Licences;
- (ii) General Class Amateur Radio Licences;
- (iii) Advanced Class Amateur Radio Licences.

However a key prerequisite for favourable consideration of those licences is that the applicant must pass examinations that have been approved by the National Telecommunications Regulatory Commission, which is mandated to oversee the telecommunications in Saint Lucia.

## 2. General Objectives

The General Class Amateur Radio Examination is a development of that used at the Novice Class, but the technical theories and concepts that persons will need to master have increased in both scope and depth. As a result, it is expected that examination candidates for a General Class Amateur Radio Licence would attain proficiency that would permit worldwide recognition of the licence issued in Saint Lucia.

It must be noted that the General Class Amateur Radio Examination Syllabus requires candidates to be knowledgeable of operating rules and standards, especially those specific to the General Class level. Additionally, it is expected that they would have developed their practical skills, as they pertain to establishing and maintaining an amateur radio station. As a result, the primary objective of General Class Amateur Radio Examination is to ensure that persons have *begun* to gain the needed acumen and awareness to operate responsibly in that class of operation.

## 3. Established Content

Presented in Appendix A are **the possible areas of assessment in a Novice Class Amateur Radio Examination only**. It does not preclude persons (or tutors) from more in-depth study, which is encouraged.

#### 4. Assessment Methods

The syllabus has been designed to assess both theoretical knowledge and practical skills of candidates. The assessment will comprise two (2) parts:

- (i) a written examination<sup>1</sup>, comprising multiple choice and short answer questions, and
- (ii) the assessment of practical skill, which could be measured by a final examination and/or through continuous assessment by a recognised tutor or examiner.

#### 5. Recommended Texts

To appreciate the amateur radio operations in Saint Lucia and to secure information pertinent to the General Class, persons are advised to refer to

- *Framework for Amateur Radio Operations in Saint Lucia*, prepared by the National Telecommunications Regulatory Commission, and
- *The Amateur Radio Handbook*, by the Ministry of Communications, Works, Transport & Public Utilities.

With regard to studying technical theories and concepts used in amateur radio operations, a diverse number of texts and documents are available, some of which are free on the Internet.

---

<sup>1</sup> For persons with special requirements, or other needs or circumstances that might affect their ability to sit a written examination, these will be addressed on a case-by-case basis, and should be presented upon registration for the examination.



# APPENDIX A

	<i>Syllabus</i>	<i>Assessment Objectives</i>
<b>1.</b>	<b>Amateur Radio in Saint Lucia</b>	
		(a) Recall the types of amateur radio licences that can be issued in Saint Lucia. (b) Recall the amateur radio code.
<b>2.</b>	<b>General Class Amateur Radio Licence</b>	
2 (i)	National Operating Rules and Standards	(a) Recall operating privileges associated with the General Class Amateur Radio Licence, including the approved frequency bands, modes of operation and power limits. (b) Recall the popular modulation methods used in band segments. (c) Recall general rules and guidelines for amateur radio operations in Saint Lucia, which should include: <ul style="list-style-type: none"> <li>- The permitted users;</li> <li>- The authorised transmissions;</li> <li>- The prohibited traffic;</li> <li>- Station identification requirements;</li> <li>- Third party transmissions;</li> <li>- Recorded and re-transmitted messages;</li> <li>- Transmitting equipment</li> <li>- Unwanted emissions;</li> <li>- Required contents of the Logbook.</li> </ul> (d) Recall basic rules for passing emergency traffic. (e) Recall the concept of harmful interference as defined in the Telecommunications (Spectrum Management) Regulations.
2 (ii)	Call signs	(a) Recall the national identifier (or country prefix) for Saint Lucia and the general format of call signs as has been adopted in Saint Lucia, especially for the amateur radio operators in the Novice Class, General Class and

# APPENDIX A

		<p>Advanced Class.</p> <p>(b) Recall the national identifiers (or country prefix) for countries in the English-speaking Caribbean, the United States of America, Canada and the United Kingdom.</p> <p>(c) Recall rules associated with the assignment of call signs</p>
2 (iii)	International Operating Rules and Standards	<p>(a) Recall the Phonetic Alphabet.</p> <p>(b) Recall basic Q Codes, such as QRL, QRM, QRN, QRP, QRT, QRZ, QSB, QSL, QSO, QSY, QTH.</p> <p>(c) Recall Readability, Signal Strength and Tonal Quality (R-S-T) Codes.</p> <p>(d) Recall common abbreviations associated with amateur radio operations and their uses, such as CQ, DE, DX, R, RST, SIG, UR, WX.</p> <p>(e) Recall and understand the concept of sending and receiving QSL cards.</p> <p>(f) Recall the countries with which there are reciprocal agreements, or mutual recognition, with Saint Lucia.</p> <p>(g) Recall the basic format of the call sign permitted to visiting amateur radio operators</p>
2 (iv)	Satellite Operation	<p>(a) Recall the terms LEO, HEO and GEO satellites and the distances at which they orbit the Earth.</p> <p>(b) Recall the concept of geostationary satellites.</p> <p>(c) Recall the concept of the Doppler Effect.</p>
<b>3.</b>	<b>Technical Theory and Concepts</b>	
3 (i)	Basic Concepts	<p>(a) Recall units of measurement for frequency, voltage, current, length, distance, time, resistance, inductance, capacitance, impedance, power.</p> <p>(b) Recall the metric prefixes and conversion factors.</p> <p>(c) Recall the importance of the Earth, Neutral and Live wires in electrical circuits, and their colour codes.</p> <p>(d) Recall the importance of a fuse in an electrical circuit.</p> <p>(e) Recall the mains voltage and frequency of the electricity supply in Saint</p>

# APPENDIX A

		<p>Lucia.</p> <p>(f) Recall the formula to calculate power in decibels and how to solve basic problems.</p>
3 (ii)	Frequency/Electromagnetic Theory	<p>(a) Recall the frequency bands that comprise the electromagnetic spectrum and be able to provide examples of the types of applications that can be used by those bands.</p> <p>(b) Recall the speed of light, and the importance of the speed of light to electromagnetic theory.</p> <p>(c) Recall the elements of an electromagnetic field and their orientation to each other.</p> <p>(d) Know how to differentiate between wavelength, time and frequency and the relationship between those elements.</p> <p>(e) Recall the basic relationship between wavelength and antenna size.</p> <p>(f) Solve basic problems involving wavelength, time and frequency.</p> <p>(g) Recall the main health effect of electromagnetic radiation on the body.</p>
3 (iii)	Radio Wave Propagation	<p>(a) Recall basic characteristics of radio waves.</p> <p>(b) Recall the basic phenomena associated with radio waves, such as reflection, diffraction, scattering.</p> <p>(c) Recall the concept of line of sight, and its importance in radio wave propagation.</p> <p>(d) Recall the three (3) modes of radio wave propagation and how they can be differentiated.</p> <p>(e) Recall the frequency ranges that permit the use of ground wave propagation, ionospheric propagation and tropospheric propagation.</p> <p>(f) Recall the atmospheric layers that are used in ionospheric propagation.</p> <p>(g) Recall the concept of ionisation and the factors that affect the level of ionisation.</p> <p>(h) Recall the meaning of ground wave, sky wave, skip distance and skip zone (or dead zone).</p> <p>(i) Recall the effects of the elements on signal strength and signal quality.</p>

# APPENDIX A

		(j) Recall probable causes of interference, and basic ways its occurrence can be minimized.
3 (iv)	Simple Electric Theory	<p>(a) Recall the parts of the atom, and the difference between a neutral atom, a positively-charged ion, and a negatively-charged ion.</p> <p>(b) Recall the importance of electrons to the flow of electricity.</p> <p>(c) Recall the properties of conductors and insulators, how they can be differentiated and how they are affected by electricity.</p> <p>(d) Recall the following basic electrical terms; know how they can be differentiated; and the schematic symbols used for them in basic electric circuits:</p> <ul style="list-style-type: none"> <li>- cell, battery voltage, current, resistance, alternating current, direct current, inductor, inductance, capacitor, capacitance, impedance diode, transistor.</li> </ul> <p>(e) Depict electric circuits using the recognised schematic symbols, as per (d).</p> <p>(f) Recall the meaning of the colour code used on resistors.</p> <p>(g) Recall and understand Ohm's Law and the relationship between voltage (potential difference), current and resistance (impedance).</p> <p>(h) Solve basic problems based on Ohm's Law.</p> <p>(i) Recall and understand the relationship between power, voltage (potential difference) and current.</p> <p>(j) Solve problems based on the equation <math>P = V \times I</math>.</p> <p>(k) Recall and understand series and parallel resistor circuits, and determine the combined resistance in a circuit.</p> <p>(l) Recall what is capacitance, and the purpose of a capacitor, and its basic design.</p> <p>(m) Recall what is an inductor, and the purpose of an inductor, and its basic design.</p> <p>(n) Recall what is a tuned circuit, and the difference in operation of a series-tuned circuit and a parallel-tuned circuit.</p> <p>(o) Recall what the resonant frequency is.</p>

# APPENDIX A

		<p>(p) Recall what is a diode, and its purpose and function.</p> <p>(q) Recall what is a transistor, and its purpose and function.</p> <p>(r) Recall the concept of amplification and how it can be applied.</p>
3 (v)	Transmitters	<p>(a) Recall and understand block diagrams of continuous wave (cw), amplitude modulation (am), single sideband (ssb) and frequency modulation (fm) transmitters.</p> <p>(b) Understand the functions of the microphone amplifier, am/fm modulators, ssb balanced modulator, side band filter, oscillator, power amplifier and low pass filter.</p> <p>(c) Recall the relative advantages and disadvantages of a crystal oscillator and a variable frequency oscillator.</p> <p>(d) Recall the possible effects when two or more frequencies are mixed together.</p> <p>(e) Recall the modulation process and the creation of sidebands.</p> <p>(f) Recall amplitude modulation, its constituents and characteristics.</p> <p>(g) Recall single sideband modulation, and its relationship to amplitude modulation.</p> <p>(h) Recall the relative advantages of single sideband.</p> <p>(i) Recall and understand the bandwidth occupancy of continuous wave (c.w.), amplitude modulation (a.m.), single sideband (s.s.b.) and frequency modulation (f.m.) transmissions.</p> <p>(j) Recall possible causes of transmitter interference.</p> <p>(k) Recall the concept of harmonics, how they are created and how they cause interference.</p> <p>(l) Recall how interference can be minimised.</p> <p>(m) Recall the function and purpose of filters.</p> <p>(n) Recall and understand the effects of low pass, band pass and high pass filters, and be able to represent them diagrammatically.</p>
3 (vi)	Receivers	<p>(a) Recall and understand block diagrams of the crystal diode receiver, tuned radio frequency or straight receiver, and superheterodyne receiver.</p>

# APPENDIX A

		<p>(b) Recall and understand the functions of the radio frequency amplifier, mixer, local oscillator, intermediate frequency oscillator, demodulator (detector), and audio amplifier.</p> <p>(c) Recall the concept of the intermediate frequency and how it created.</p> <p>(d) Recall the purpose of the tuned circuits in radio frequency and intermediate frequency amplifiers.</p>
3 (vii)	Antennas	<p>(a) Recall the purpose of an antenna.</p> <p>(b) Recall and be able to identify popular antenna configurations, such as dipole antennas, quarter wavelength vertical antennas, Yagi-Uda antennas and vertical antennas.</p> <p>(c) Recall the characteristics of the antennas listed in (b).</p> <p>(d) Depict the antennas listed in (b), showing the correct elements and spacings.</p> <p>(e) Solve basic problems on the antennas listed in (b).</p> <p>(f) Recall what the Standing Wave Ratio is, and its purpose.</p> <p>(g) Solve basic problems based on the Standing Wave Ratio.</p> <p>(h) Recall the concept of feed point impedance and how it is determined.</p> <p>(i) Recall the factors that affect the impedance of an antenna.</p> <p>(j) Recall the concept of matched impedance and its implications if feed line and antenna impedances are not matched.</p> <p>(k) Recall the purpose of the antenna tuning unit</p> <p>(l) Recall and understand the concept of antenna polar diagrams, and recognise the directions of maximum and minimum radiation.</p> <p>(m) Recognise the antenna polar diagrams for half-wave dipole and Yagi-Uda antennas.</p> <p>(n) Recall the concept of antenna gain and effective radiated power.</p> <p>(o) Solve problems based on the relationship between the effective radiated power radio frequency power and antenna gain.</p> <p>(p) Recall the use of a dummy load and its construction.</p>

# APPENDIX A

3 (viii)	Feed Lines	<ul style="list-style-type: none"> <li>(a) Recall what a feed line is, and the difference between a balanced feed line and an unbalanced feed line.</li> <li>(b) Recall the main types of feed lines that exist and how they can be differentiated.</li> <li>(c) Recall factors that must be considered when feed lines are employed.</li> <li>(d) Recall the characteristics of coaxial and twin feeders and identify their use.</li> <li>(e) Solve basic problems to measure loss from feed lines.</li> <li>(f) Recall the term characteristic impedance, and the factors that influence it in feed lines</li> </ul>
3 (ix)	Special Stations	<ul style="list-style-type: none"> <li>(a) Recall what an auxiliary station is, how it is created, and when (or for what purpose) it is used.</li> <li>(b) Recall the activities that an auxiliary station would be permitted to undertake.</li> <li>(c) Recall what a beacon station is, how it is created, and for what purpose it is used.</li> <li>(d) Recall the limit on the transmitter power for a beacon station.</li> <li>(e) Recall the frequency bands in which beacon operations are permitted.</li> <li>(f) Recall what repeater station is, how it is created, and for what purpose it is used.</li> <li>(g) Recall the frequency bands in which repeater operations are permitted.</li> <li>(h) Recall what an earth station is, how it is created, and for what purpose it is used.</li> <li>(i) Recall the frequency bands in which earth station operations are permitted.</li> </ul>
<b>4.</b>	<b>Setting Up and Operating an Amateur Radio Station</b>	
4 (i)	Amateur Radio Station	<ul style="list-style-type: none"> <li>(a) Recall the differences between a base station, a handheld radio, a portable radio, a repeater, and other special stations, and their purpose.</li> <li>(b) Recall the main parts of a base station and their purpose.</li> <li>(c) Recall the main parts of a handheld or portable radio and their purpose.</li> </ul>

# APPENDIX A

		<ul style="list-style-type: none"> <li>(d) Demonstrate the proper set up of an amateur radio station. (P).</li> <li>(e) Demonstrate how to wire a three-pin electric plug and how to change a fuse. (P).</li> <li>(f) Recall the basics of soldering and proper soldering technique.</li> <li>(g) Demonstrate the ability to make good soldered joints. (P)</li> <li>(h) Recall and know how to differentiate various coaxial cables and coaxial cable connectors.</li> <li>(i) Demonstrate how to fit a suitable radio frequency connector to a piece of coaxial cable. (P)</li> <li>(j) Demonstrate how to construct a simple amateur-related project. (P)</li> <li>(k) Demonstrate how to tune an antenna to match its receiver. (P)</li> </ul>
4 (ii)	Operating Practices and Procedures	<ul style="list-style-type: none"> <li>(a) Demonstrate the correct operation of a VHF transmitter in simplex and in duplex modes. (P)</li> <li>(b) Demonstrate the correct operation of an HF transmitter in (voice) SSB mode. (P)</li> <li>(c) Demonstrate a CQ call on VHF and HF, making contact and initiating a change of frequency off the calling channel. (P)</li> <li>(d) Demonstrate, based on a CQ call, entry of information into the Logbook. (P)</li> <li>(e) Demonstrate the passing of emergency traffic, and the passing of traffic on a network with a network controller. (P)</li> <li>(f) Demonstrate the relaying of traffic, i.e. when acting as a relay station. (P)</li> </ul>
4 (iii)	Electromagnetic Compatibility	<ul style="list-style-type: none"> <li>(a) Recall the basic concept of electromagnetic compatibility (EMC).</li> <li>(b) Recall the effect of radio transmitters on nearby electronic and radio equipment.</li> <li>(c) Recall the concept of interference, and how an amateur radio station might cause interference and/or might experience interference.</li> <li>(d) Recall good EMC practices which would minimise EMC problems.</li> </ul>
4 (iv)	Safety	<ul style="list-style-type: none"> <li>(a) Recall the importance of proper earthing, and the types of grounds that</li> </ul>

# APPENDIX A

		<p>might be required on or around an amateur radio station.</p> <ul style="list-style-type: none"><li>(b) Recall the importance of RF ground.</li><li>(c) Recall the importance of the fuse in electrical circuits, and how to select an appropriate fuse.</li></ul>
--	--	--