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FACULTY OF HEALTH SCIENCES SCHOOL OF PROFESSIONAL DEVELOPMENT (CERTIFICATE IN REFRACTION TECHNIQUES)



# (THIS DOCUMENT WAS USED TO GENERATE THE CERTIFICATE IN REFRACTION TECHNIQUES CURRENTLY BEING TAUGHT AT THE UNIVERSITY OF GUYANA)

Arvel Grant, C.Sw, B.Sc Sw (Hons), DPA, MPH, C.E.O, C.C.B-Eye Care Caribbean arvel.grant@eyecarecaribbean.com; Office Tel: 1-268-462-6369 "Preventing blindness and visual impairment; while restoring sight and creating opportunities for persons whose sight cannot be restored"

# Introduction

Consistent with the global standards of practice, promulgated by the World Council Of Optometry, this refraction technician training has been developed as one of the strategic directions stated by Vision 2020 Caribbean which include:

- 1. Improved access to Cataract surgery,
- 2. Improved management of Glaucoma.
- 3. Prevention and Treatment of Diabetic Retinopathy.
- 4. Prevention and treatment of conditions that cause childhood blindness.
- 5. Treatment of refractive errors.
- 6. Low vision and inclusive services for children and adults who are blind.

The programme is a joint effort of:

- The Ministry of Health Guyana;
- Georgetown Public Hospital Corporation;
- The School Of Professional Development (University Of Guyana) &
- CCB-Eye Care Caribbean (The Caribbean Council For The Blind and the Foundation For Eye Care In The Caribbean).

This course is one of several regional initiatives to make the Caribbean Vision 2020 compliant and consistent with global expectations in the diagnosis and treatment of eye diseases.

It is estimated that (in The Caribbean) Refractive Errors affect approximately twenty percent (20%) of persons under twenty years and almost one hundred percent (100%) of persons over forty years. The results of a series of Affordability, Accessibility and Availability studies, undertaken by Help The World See, in collaboration with CCB-Eye Care Caribbean, confirmed that: More than eighty percent (80%) of persons with refractive errors and living in most Caribbean countries, have significant financial difficulties in purchasing commercially available Refractive Services. Therefore, the Regional Strategy is being developed based on the results of those studies.

The programme envisages: Implementation of university-level programmes of studies in: Refraction Techniques (at the certificate level) and Optometry (starting with the B.Sc in Optometry). Both complemented by the establishment of a series of Spectacle Labs and associated Refractive Services in Government-based Eye Departments and Not-for-Profit Organizations.

It is anticipated that as Community Ophthalmology and Optometry expands (across Guyana and the Caribbean) including strong school-based Vision Screening Programs coming on stream, the network of Spectacle Labs will serve to provide

needy children and adults with: spectacles and low vision appliances at cost.

The Refraction Technician programme was first established at the School Of Professional Development (University of Guyana) with the Georgetown Public Hospital Corporation (GPHC), serving as one of a number of associated centers for vocational and other aspects of the course. An Optometrist and Orthoptist have been recruited to implement the training. Nursing specialists, experts in Public Health and inclusive services as well as Ophthalmologists and Optometrists (within Guyana and across the Caribbean) have been recruited to teach relevant modules of the program.

Training opportunities are open to candidates nominated from across the Caribbean. Refraction technicians will be trained to work in Eye Departments and Optometry Units in Government-based and Not-for-Profit institutions-organizations.

In the first instance, the training is being offered to Government-based Eye Departments, as well as Not-for-Profit Eye Care Providers across CARICOM.

The training will run for 12 months. 26 weeks of theory and practical exposure at the Georgetown Public Hospital Corporation, (as well as other practice centers) and 20 weeks (30 hours per week) of supervised practice at the refraction technicians' home Eye Department or clinic. A total of six weeks are scheduled for holidays and vacation leave. This is divided in a period of two weeks between the semesters, a period of two weeks after the 26 weeks of theory and a period of two weeks during the supervised clinical experience. Upon successful completion of all stages of the training; students will be certified to practice as refraction technician in Government and Not-for-Profit based Ophthalmology or Optometry Departments, Units or divisions. They will only be allowed to work under supervision of an ophthalmologist, optometrist or medical doctor.

# Vision

The Ministry of Health, Georgetown Public Hospital Corporation and The School Of Professional Development (University Of Guyana) together with - the Caribbean Council for the Blind and The Foundation for Eye Care in the Caribbean - are committed to providing access to optimum eye care and low vision services that is affordable and of acceptable international standard to all Guyanese and people of the Caribbean. In pursuit of this vision we will develop and deliver courses of training that will create a cadre of providers of optimum eye care and low vision services, competent to deliver: Optical Technology Services; Visual Function Services; Ocular Diagnostic Services (with an emphasis on correction of refractive errors, not requiring pharmaceutical interventions; and referrals to all other Ocular Diagnostic Services and Ocular Therapeutic Services.

# **Mission statement**

The Refraction Technician training is aimed at producing a cadre of eye care providers that complements and supports the work of all other categories of eye care providers, thus advancing the creation of capacity to provide the fullest range of eye care in Guyana and the Caribbean.

The refraction technician will be able to perform refractions and prescribe spectacles for common refractive errors and dispense magnifiers for low vision patients. He or she will also be equipped to provide advice and instructions on general eye care and prevention of diseases of the eye. Refraction Technicians will be provided with orientation to services including: Inclusive Education for children with visual impairments & Adjustment to Blindness for adults who are blind.

### **Course content**

#### **OBJECTIVES:**

#### The general objectives of the programme are to

- 1. Train Refraction Technicians in basic knowledge of the anatomy, physiology and pathology of the eye
- 2. Produce skilled refraction technicians able to refract patients, prescribe basic spectacles and dispense simple magnifiers
- 3. Equip Refraction Technicians with basic skills to screen for (external and internal) eye disorders and to refer to eye care professionals
- 4. Train Refraction Technicians to raise public awareness of general eye care and health issues related to the eyes
- 5. Give Refraction Technicians a strong orientation toward the importance of Inclusive Education and Adjustment To Blindness training, for children and adults with (severe) none reversible visual impairments.

These objectives will be accomplished through a didactic educational programme which includes theoretical and practical components, and research activities. For the first 26 weeks (or six hundred and sixty contact hours) theoretical lectures and supervised practice, will be held during each working day at: Appropriate venues, including the Georgetown Public Hospital Corporation. Per week the participants will have a minimum of 30 contact hours comprised of classroom teaching and practical exposure.

The modules of the teaching programme are:

SEMESTER	Module	Hours	of	Credit	SEMESTER	Module	Hours	of	Credit

1		Education	hours	2		Education	hours
Clinical	CRT	135	9	Clinical	CRT	180	6
Techniques	111			optometry	121		
Theory				1B			
				(practicum)			
Ocular	CRT	60	4	Public	122	30	2
Anatomy	112			health and			
and				Community			
Physiology				Optometry			
Clinical	CRT	120	4	Introduction	123	60	4
Optometry 1	113			to Low			
А				Vision			
(Practicum)							
Dispensing	CRT	30	2	Supervised	124	600	20
optics 1A	114			clinical			
				experience			
				(practicum)			
Ophthalmic	CRT	45	3				
optics 1A	115						
Total		390	22			870	32

Subject to available supervisory services, the participants will spend the last 20 weeks in their home Eye Department or clinic and have a minimum of 30 hours per week supervised clinical experience.

### **Course outline**

All initiating and replacement modules, lecturers / resource persons must be approved by the University of Guyana

Lecturers:	Dr. G. Henry, Consultant Ophthalmologist				
	Dr. H.M. Shillingford-Ricketts, Consultant Ophthalmologist				
	Ms. P.M. van Es, Orthoptist (course coordinator)				
	Ms. A. Reading, Optometrist				
	Mrs. D. Godin, Low Vision specialist				
	Mr. A. Grant, Public Health Specialist				
	Contracted: Optometrist / Ophthalmologists,				

Duration:	12 months
	<ul> <li>26 weeks theory and practical exposure</li> <li>20 weeks supervised clinical experience with a required out put of five hundred refractions</li> <li>6 weeks allocated to holidays and vacation leave</li> </ul>
Contact hours:	At least 30 hours per week during the first 26 weeks comprised of 360 hours theory and 300 hours practical exposure.
	600 hours supervised clinical experience
Credits:	24 theory and 10 practicum during the first 26 weeks
	20 practical supervised work during the 20 weeks of supervised clinical experience

# **Clinical Techniques Theory**

In this module, the students will develop skills and clinical knowledge in operational procedures, methods of refraction and diagnosis related to ocular health and vision assessment. The student will have an understanding of individual clinical tests, know their purpose and be able to perform them with reasonable skill.

The module will cover:

- 1. Basic Principles of Optometry
- 2. Case History Taking
- 3. Preliminary Assessment and Vision Screening
- 4. Objective Refraction (Retinoscopy)
- 5. Subjective Refraction techniques
- 6. Correction of spherical ametropia
- 7. Cross cylinder method for astigmatism
- 8. Direct Ophthalmoscopy
- 9. Refractive Instruments
  - Choice of test charts
  - Trial case lenses best forms
  - Refractor (phoropter) head units
  - Optical considerations of refractor units
- 10. Difficulties in subjective tests and their avoidance
- 11. Intra-ocular pressure and visual field assessment
- 12. Cover test and motility

Contact hours:135Credits:9Assessment:written exam and practical examLecturers:optometrist/orthoptist

### Ocular anatomy and physiology

The module will develop an understanding of the structure, function, physiological properties and limitations of the eye, the ocular adnexa and relevant aspects of the head, neck and face. The gross and fine structures of the anterior eye and adnexa together with the physiological processes are covered, as noted in the syllabus. The module will cover:

- 1. Embryology of the eye
- 2. External Features
- 3. Eyelids and accessory glands
- 4. The orbital structure and its components
- 5. Extraocular muscles Anatomy, functions & controls
- 6. Lacrimal apparatus
- 7. Cornea, Conjunctiva and Sclera
- 8. The Uveal Tract
- 9. Intra-ocular Lens and Vitreous
- 10. Retina
- 11. Optic nerve head
- 12. Introduction to Visual Pathways
- 13. Para sympathetic and sympathetic nerves in relation to the eye
- 14. Sensory aspects of Vision
- 15. Metabolic activity and physiological functions

Contact hours:	60
Credits:	4
Assessment:	written exam
Lecturers:	Ophthalmologist and optometrist/orthoptist

# **Clinical Optometry 1A**

In this module, the student will apply the skills and knowledge acquired in the Clinical Techniques theory and gain experience in ocular assessments and examination of patients. This subject prepares the students to practice and communicate effectively in the clinical settings. The students will develop fundamental clinical skills in operational procedures related to preliminary procedures and clinical refraction.

Credits: 4 Assessment: practical exam Lecturers: Optometrist/orthoptist

# **Dispensing optics 1**

This module describes the fundamental principles of ophthalmic lens design, frame types and materials, and frame fitting. Students will develop the skill of practical optical dispensing and the ability to understand properties of new ophthalmic products. The module will cover:

Spectacle Lenses

- 1. Introduction to lens manufacture
- 2. Ophthalmic Blanks, surfacing, glazing
- 3. Lens materials and quality control
- 4. Frame types and parts
- 5. Tinted and protective lenses

Contact hours:	30
Credits:	2
Assessment:	written exam
Lecturers:	optometrist/orthoptist

# **Ophthalmic optics 1A**

This module will provide the student with a theoretical understanding and the practical skills necessary to optimise the use of ophthalmic lenses in correcting visual problems. The module will cover:

- 1. Spherical, cylindrical, toric and aspheric lenses
- 2. Transposition of lenses
- 3. Prismatic effect and decentration of spectacle lenses
- 4. Effective power of spectacles; vertex distance effects

Contact hours:	45
Credits:	3
Assessment:	written exam
Lecturers:	optometrist/orthoptist

### **Clinical Optometry 1B**

The purpose of this module is to advance the clinical skills of the student to the level at which he/she may completely carry out all procedures requisite of a Refraction Technician in the routine examination of patients. The students will conduct these optometric examinations in a clinical environment under close supervision of clinical educators.

The module will cover:

- 1. Accommodative convergence relationship in clinical terms
- 2. Clinical facets of visual acuity
- 3. Binocular refraction and balancing techniques
- 4. The amelioration of heterophoria
- 5. Analytical optometry
- 6. Patient Management
- 7. Case studies

Contact hours:	180
Credits:	6
Assessment:	practical exam
Lecturers:	optometrist/orthoptist

### **Public Health and Community Optometry**

The purpose of this module is to equip the student with the necessary skills to understand and interact with the eye care needs of the broader society, and to understand the impact of social, economic and environmental issues on the health of the patient. This module is designed to provide the learner with methods to aid the study of eye health, diseases of the eye and clinic management. The module will cover:

The module will cover:

- 1. Health education and promotion
- 2. The district health system
- 3. Primary care optometry
- 4. Management of department in Regional hospital
- 5. Principles of community eye health including:
  - a. Advocacy
  - b. Planning for District Refractive and Low Vision Services
  - c. School screening strategies
  - d. Training primary level workers in identification and referral of refractive error and low vision

Contact hours:	30
Credits:	2

Assessment: written exam Lecturers: Public Health specialist

# Introduction to Low Vision and Blindness

This module will provide the learner with the basic skills and knowledge to identify and co-manage the visual and associated functional needs of a partially sighted patient, and make appropriate referrals.

The module will cover:

- 1. Definitions and epidemiology of low vision and blindness
- 2. Functional losses, psychological and sociological factors affecting the low vision patient
- 3. Identifying the low vision client
- 4. Low vision- causes, implications and management
- Measures to prevent blindness preventive, promotive, curative and rehabilitative Low vision services

Contact hours:	60
Credits:	4
Assessment:	written exam and practical exam
Lecturers:	Low Vision specialist, Nursing and Inclusive personnel

# Supervised clinical experience

During 20 weeks the student will apply the skills and knowledge learned in the first 26weeks in a clinical setting in their respective department. The student will work underclose supervision of an ophthalmologist or optometrist. The supervisor will be theperson of the Optometry Department or Eye clinic where the student works.Contact hours:600 hoursCredits:20Assessment:case studies, monthly clinical evaluation, logbook assessment<br/>and end of practicum grading

# **Delivery of programme**

The programme would be based at the Georgetown Public Hospital Corporation (G.P.H.C.), and delivered and coordinated by the optometrists at the GPHC Optometry and Low Vision Centre. A contracted Optometrist / Ophthalmologist will participate in lecturing and assessing the Refraction Technicians. One Ophthalmologist of the Ophthalmology Department of G.P.H.C. will participate in lecturing. A Low Vision specialist will provide basic Low Vision Training. Where

appropriate, expertise in Nursing, Special education & adjustment to blindness will be invited to present special modules.

There will be a maximum of ten persons per batch of students and the training can be delivered two times per year.

# Administration

The programme will be administered by the Program Manager of Eye Care Guyana in consultation with the partners: Ministry of Health, GPHC and CCB to be based (primarily) at the Georgetown Public Hospital Corporation as an affiliate programme of the University of Guyana (School of Professional Development). The Institute of Health Sciences will have responsibility for the review of all aspects of The Certificate in Refraction Techniques.

# Financing

All materials, equipment, Faculty and associated costs (including registration, examination and other fees due to the University) will be met by Caribbean Council for the Blind / Eye Care Guyana or its partners. Further, Caribbean Council for the Blind / Eye Care Guyana will pay any mutually agreed service fees for selected students, in addition to application fees, examination fees and affiliated fees.

# **Admission requirements**

- A minimum pass of grade 3 CXC or grade C G.C.E in the following subjects English A, Mathematics and any one of the following, Integrated Science, Biology, Physics, Chemistry or Human Biology after 1998.Students with a pass in the one year IDCE level in English A, Mathematics, Integrated Science or Biology, Physics, Chemistry or Human Biology will be considered for admission to the training.
- 2. Mature students, age 26 years and older, with minimum of 2 years experience in a related field must be successful at the U.G entrance examination for admission.
- 3. Any other qualifications deemed equivalent by the Faculty of Health Sciences.
- 4. In addition candidates must be at least 18 years old.

# Assessments and monitoring

There will be a written and / or practical exam at the end of each module, under the supervision of the University of Guyana. The student must successfully pass each

module to complete the training. If a student does not pass the exam for a specific module the student will be required to repeat that module. The written exams comprise of open and multiple choice questions. The practical exams include the performances under simulated circumstances or, if required, on actual patients.

During the supervised clinical experience the student is required to keep a logbook of a minimum of 50 patients, which he or she has examined per month, for a total of five hundred over the duration of the placement. This is to be submitted monthly to the supervisor. A monitoring system is in place to evaluate the work. On a monthly basis clinical evaluations will be held and case studies will be submitted to monitor the student's progress. A standard evaluation form will be used. Logbooks, clinical evaluations and case studies will be submitted monthly to the course coordinator. There will be close contact between the supervisor and course coordinator to standardise the grading of the student. The end of practicum grading form will give the marks for this module.

#### **Grading Scheme**

A:	80	-	100%	distinction
B:	70	-	<80%	good
C:	60	-	<70%	satisfactory
D:	55	-	<60%	minimal pass
F:			<55%	fail

#### Weighting of the modules towards the final mark

The weighting reflects the credit points given to each module. Half weighting of credit points is given to the supervised clinical experience.

Clinical techniques theory	20% of total marks
Ocular anatomy and physiology	9% of total marks
Clinical optometry 1A	9% of total marks
Dispensing optics 1A	4,5% of total marks
Ophthalmic optics 1A	7% of total marks
Clinical optometry 1B	14% of total marks
Public health and community optometry	4,5% of total marks
Introduction to Low Vision	9% of total marks
Supervised clinical experience	23% of total marks

### Certificate

The Refraction Technician will be certified in Refraction Techniques upon successful completion of the training at the end of the 12 months. The Refraction Technician will only be allowed to work under supervision of an Ophthalmologist, Optometrist or Medical Doctor.

#### **Recommended texts**

• Van C Lansingh M.D. and Gerard Buzolic cfc "Eyes"

1st Edition Wirui Press Papua New Guinea ISBN 09 08 545 088 page 2-211

• Jack J Kanski; 2003 "Clinical Ophthalmology, a systematic approach"

5th edition Elsevier signs limited ISBN 0-7506-5541-0

• John Sandford-Smith; 2004, "Eye Diseases in Hot Climates"

4<sup>th</sup> edition Elsevier New Delhi ISBN 81 8147 412 0

page 23-66, 85-99, 353-365, 399-409

• David B Elliot; 2004 "Clinical procedures in primary eye care"

2<sup>nd</sup> edition Carolyn Makepeace London ISBN 0-7506-5527-5

#### **Attachments**

- 1. Case log book
- 2. Clinical evaluation form
- 3. End of practicum grading form
- 4. Application form