ECG Analysis and Interpretation Course

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Course Outline

Lecture Times: Tuesday 5:00pm – 8:00pm
Runs from 1st December 2020 – 9th February 2021
(Thursday 17th of December & Wednesday 27th of December)

Venue:

Allocated Location Name	Scheduled Days	Scheduled Start Time	Scheduled End Time	Activity Dates (Individual)
03-309	Tuesday	5:00 PM	8:00 PM	1/12/2020,8/12/2020,22/12/2020
03-309	Thursday	5:00 PM	8:00 PM	17/12/2020

Allocated Location Name	Scheduled Days	Scheduled Start Time	Scheduled End Time	Activity Dates (Individual)
03-309	Tuesday	5:00 PM	8:30 PM	5/01/2021,12/01/2021,19/01/2021,2/02/2021,9/02/2021
03-309	Wednesday	5:00 PM	8:00 PM	27/01/2021

Course Coordinator: Dr Adam Scott
Email: ecgcourse@gmail.com

Registration: https://www.trybooking.com/events/landing?eid=676303&bof=1
For enquiry, please email: HollyS@uqsport.com.au

Cost: $1090 (incl GST)

Payment may be in one lump sum ($1090) via credit card OR direct transfer, there is also an instalment plan if you require:

Option 1 Full payment ($1090)

Option 2 Instalment plan – 2 Instalments: (1 x $545 and 1 x $545)

Instalment A = $545 payable on registration/enrolment – prior to 24th November 2020
Instalment B = $545 payable 22nd December 2020

Cancellations:

Cancellations received prior to 25th November 2020 will be refunded less $100 admin fee (please note if you have not paid you will still be invoiced for this amount). No registration refunds will be made after this date. Cancellations received after 25th November 2020 will be charged the full fee (even if payment has not already been received). If the course does not

meet minimum numbers required to run the program and is cancelled for the semester, a full refund will be provided to registered participants.

Any students that wish to gain credit towards their degree upon completion of this subject must confirm this is possible with their academic advisor from their institution ***prior*** to enrolling in the course.

Upon successful completion of the course, the participant will be issued with a unit completion certificate that they can present to the Undergraduate Course Coordinator for credit recognition (if they have prior approval).

1. Overview/Rationale

Cardiovascular disease was the leading cause of death in Australia in 2000, accounting for 39% of all deaths. Because much illness and premature death from cardiovascular disease is preventable, it has been a focus of public attention and health policy, and in 1996 was named a National Health Priority Area [1].

Coronary heart disease is the leading cause of death for both men and women in Queensland [2]. Remote areas of QLD have statistically higher rates of mortality from coronary heart disease than the state average, by about 25% [2]. One in Five Australian adults (2.8 million people) reported they had a cardiovascular condition [3].

The health and economic costs of cardiovascular disease are greater than any other disease. In 1993-94, it accounted for $3.7 billion or 12% of total health costs [4].

The prevalence of cardiovascular disease in the population has increased, rising from 8% in 1977-78 to 17% in 1989-09 and to 21% in 1995. Improved techniques for diagnosing cardiovascular disease and better public information have increased the prevention and early detection of cardiovascular disease [5].
Changes in behaviour and lifestyle are associated with the changing rates of death and illness due to cardiovascular disease over the 20th century. Factors such as diet, alcohol and tobacco intake and levels of physical activity all influence body weight, blood pressure levels and blood cholesterol levels, which increase the risk of developing cardiovascular disease [6].

Early detection of both life threatening and abnormal arrhythmias, through accurately performed and analysed ECGs, is vital for treating patients and reporting anomalies/emergencies in a timely manner. This will result in a more efficient and effective health service provided to the patient.

It is of high importance that students entering a clinical role in a hospital setting be required to expand their knowledge and skills in the area of ECG performance and analysis to assure quality health service to the public/private sector.

The unit is suitable for:

- Students who wish to gain knowledge and confidence in interpreting 12 lead ECGs and care for clients who require cardiac monitoring. Suitable for any student entering a position in a hospital setting (Nursing, Cardiac Scientist/Physiologist/Technician, Anaesthetics, Medical, Paramedics, Exercise Physiologists/Scientists, Physiologists, Clinical Measurement Scientists, Sleep Scientists, Respiratory Scientists)

2. Aims of the Unit

The aim of this unit is to provide undergraduate/postgraduate students and external parties with the skills and knowledge necessary to be confident and accurate when undertaking and interpreting a 12 lead ECG and to identify and analyse cardiac arrhythmias. The knowledge and skills developed in this unit will enable students to use critical thinking skills to make informed decisions about assessment of clients who present for ECG or who are undergoing cardiac monitoring. This will enable students to gain confidence in caring for clients who are required to undergo 12 lead ECGs, 24 hr Holter monitoring, Stress Testing and/or cardiac monitoring in a variety of contexts.

The objective of this unit is for students to attain skills, knowledge and problem solving abilities in the use of 12 lead ECGs and when caring for clients who are undergoing cardiac monitoring. All students should be able to fully analyse a 12-lead ECG and determine any abnormalities or arrhythmias that are presented. This unit will provide students with extra knowledge and skills in cardiac monitoring and create better opportunities for employment in relevant contexts.

3. Objectives

The objectives of this unit are for students to be competent in caring for clients who require a 12 lead ECG and/or cardiac telemetry. At the completion of the unit the students will be able to:

- Apply knowledge of cardiac anatomy and physiology to explain how an ECG is created.
- Discuss how the pathophysiology of coronary artery disease impacts on the client's cardiovascular status.
- Explain normal and abnormal physiology of cardiac conduction in relation to each segment of a 12 lead ECG waveform morphology.
- Correctly perform and complete ECG procedure and protocol taking into consideration the client's individual needs.
- Interpret normal and abnormal ECGs.
- Discuss the staff's role in maintaining a safe environment for clients who are to undergo a 12 lead ECG or cardiac telemetry.

4. Content

The unit will cover theoretical and practical aspects, involving the following areas:

- Basic cardiac physiology and anatomy: coronary arteries, cardiac cycle, stroke volume, cardiac output.
- The normal ECG: ECG setup, paper speeds, timing, PQRST intervals and timing,
- Sinus rhythms (bradycardia, tachycardia), sinus arrhythmia, sinus arrest, sinus pause etc.
- Preparing the client for ECG - assessment and interventions
- Supraventricular arrhythmias: Wandering atrial pacemaker, atrial fibrillation, atrial flutter, reentry mechanisms
- Junctional arrhythmias (accelerated, tachycardia)
- Assessment of the client with cardiac arrhythmia
- Conduction disturbances: 1st, 2nd (Mobitz type 1 & II, (2:1), high degree), 3rd degree AV blocks, left & right bundle branch blocks, fascicular blocks.
- Ventricular arrhythmias: Ventricular tachycardia, ventricular fibrillation, torsades de pointes, electromechanical dissociation, ventricular standstill
- The staff's role in cardiac emergencies
- Myocardial ischaemia and infarction: recognising inferior, anterior and lateral myocardial ischaemia and infarctions, pathophysiology of coronary artery disease.
- Care for clients with selected cardiac conditions.
- Interpreting ECGs for clients with electrolyte imbalances: hyperkalemia, hypokalemia, hypercalcemia, hypocalcemia
- Stress testing (procedures, protocols, contraindications, absolute and relative end points)
- Overview of the unit and evaluation.

5. Teaching and Learning Methods

The unit will be run over a 11-week period and will require additional personal study out of designated lectures hours to fully understand and comprehend ECG interpretation.

The standard approach of didactic lecturing with the intention of deep learning by students will be undertaken to conduct this unit. Students will be encouraged to be interactive during these sessions. In order to achieve understanding of information provided a variety of teaching modes will be used:

- Asynchronous learning,
- On-line learning,
- Discovery learning,
- Open discussion,
- Practical session.

Lecture Times: Tuesday evenings 5pm – 8pm (unless advised otherwise – there is a Thursday and a Wednesday in the Summer Course, please see schedule)

6. Assessment Procedures

The overall grade for this unit will be in the form of Pass/Fail unless requested by the Faculty.

A pass grade for the course is 55%.

Summative Assessment will be undertaken in the form of Mid and End Semester exams which will be comprised of both theory and practice.

A. Mid Semester Exam 30% weighting.

This examination is comprised of two components:

1. Short answer questions based on theory application (weighting roughly 80 marks)
2. Written Examination based on ECG Interpretation (weighting roughly 80 marks)

Duration: 3 hours

B. End Semester Exam 70% weighting

1. Short answer and essay format based on theory application (weighting roughly 80 marks)
2. Written examination based on ECG Interpretation (weighting roughly 80 marks)

Duration: 3 hours

7. Resources/mode of delivery

Recommended Text:
Keith Wesley (2017). *Huszar's ECG and 12-Lead Interpretation – Fifth Edition*

Can be purchased at:

- QUT bookshop
- UQ Medical Library, Herston
- Online

Websites:
http://www.skillstat.com/Flash/ECG_Sim_022505.html

ECG Analysis and Interpretation App: 'My ECG' on the App Store

Workbooks:
Each lecture the students will be provided with a workbook containing examples of 12 lead ECGs (5 – 10 ECGs) that they will be studying in that lecture. These workbooks are to be attempted/completed before the next lecture (roughly 5 minutes/ECG). Any queries or questions regarding the ECGs from the workbooks will then be discussed during that lecture.

Attendance:
Attendance at all scheduled lectures are required in order to achieve the desired outcomes. Please speak to the unit coordinator if medical or personal circumstances exist that prevent you from attending.

Outline of Summer Semester 2020/21 Course Dates

1st December 2020

- *Orientation, Anatomy and Physiology Lecture*
    - Basic Dysrhythmias: Chapter 1, 2

8th December 2020

- *Normal ECG and sinus rhythms*
    - Basic Dysrhythmias: Chapter 3, 4, 5, 12

15th December 2020

- *Supraventricular arrhythmias*
    - Basic Dysrhythmias: Chapter 6, 7

17th December 2020 – NOTE: Thursday

- *Ventricular arrhythmias*
    - Basic Dysrhythmias: Chapter 8

29th December 2020 – Mid SEM Break

5th January 2021

- *Atrioventricular Conduction Disturbances, Bundle Branch and Fascicular Blocks*
    - Basic Dysrhythmias: Chapter 9, 13

12th January 2021

- ***MID-SEM Exam***

19th January 2021

- *Myocardial Ischaemia and Infarction*
    - Basic Dysrhythmias: Chapter 15, 16, 17,

27th January 2021 – NOTE: Wednesday

- *Miscellaneous (electrolyte disturbances, WPW, paediatric ECGs)*
    - Basic Dysrhythmias: Chapter 14

2nd February 2021

- Overview: Exercise Stress Testing, Pacing, Echo, + Exam Preparation/tutorial
    - Notes provided

9th February 2021

- ***END-SEM Exam***

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[1] Australian Institute of Health and Welfare (AIHW) 2000, First Report on National Health Priority Areas 1996, AIHW Cat. No. PHE1, AIHW, Canberra.
[2] Coronary heart disease in QLD, Coory M, QLD government Information Circular, 2001.
[3] National Health Survey: Cardiovascular and related conditions, Australia, 1995.
[4] Australian Institute of Health and Welfare (AIHW) 2000, Australia's Health 2000, AIHW Cat. No. 19, AIHW, Canberra.
[5] Australian Bureau of Statistics 2002, Australian Social Trends 2002: Health – Mortality and Morbidity: Cardiovascular disease: 20th century trends, Canberra.
[6] Australian Institute of Health and Welfare (AIHW) 2000, Australia's Health 2000, AIHW Cat. No. 19, AIHW, Canberra.