

# ECG Analysis and Interpretation Course

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## Course Outline

**Lecture Times:** Tuesday 5:00pm – 8:00pm  
Runs from 22<sup>nd</sup> February 2022 – 31<sup>st</sup> May 2022

**Venue:** To be confirmed at UQ Sport – St Lucia campus

**Course Coordinator:** Dr Adam Scott  
Email: [ecgcourse@gmail.com](mailto:ecgcourse@gmail.com)

**Registration:** [https://uqsport.formstack.com/forms/ecg\\_course\\_registration1](https://uqsport.formstack.com/forms/ecg_course_registration1)

**For enquiry, please email:** [pd@uqsport.com.au](mailto:pd@uqsport.com.au)

**Cost:** \$1090 (incl GST)

Payment may be in one lump sum (\$1090) via credit card, 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 14<sup>th</sup> February 2022

Instalment B = \$545 payable 29<sup>th</sup> March 2022

### **Cancellations:**

Cancellations received prior to 15<sup>th</sup> February 2022 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 15<sup>th</sup> February 2022 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.

### **NOTICE**

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 <sup>1</sup>.

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

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 <sup>4</sup>.

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 <sup>5</sup>.

Changes in behaviour and lifestyle are associated with the changing rates of death and illness due to cardiovascular disease over the 20<sup>th</sup> 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 <sup>6</sup>.

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: 1<sup>st</sup>, 2<sup>nd</sup> (Mobitz type 1 & II, (2:1), high degree), 3<sup>rd</sup> 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 13-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

## **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 (roughly 80 marks)
2. Written Examination based on ECG Interpretation (roughly 80 marks)

*Duration: 3 hours*

### ***B. End Semester Exam 70% weighting***

1. Short answer and essay format based on theory application (roughly 80 marks)
2. Written examination based on ECG Interpretation (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](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 Semester 2, 2021 Course Dates

### 22<sup>nd</sup> February 2022

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

### 1<sup>st</sup> March 2022

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

### 8<sup>th</sup> March 2022

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

### 15<sup>th</sup> March 2022

- *Ventricular arrhythmias*
  - Basic Dysrhythmias: Chapter 8

### 22<sup>nd</sup> March 2022

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

### 29<sup>th</sup> March 2022

- Exam preparation/tutorial

### 5<sup>th</sup> April 2022

- **MID-SEM Exam**

### 12<sup>th</sup> April 2022

- **No Lecture**

### 19<sup>th</sup> April 2022

- **Mid SEM break**

### 26<sup>th</sup> April 2022

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

### 3<sup>rd</sup> May 2022

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

### 10<sup>th</sup> May 2022

- Overview of other Cardiac Investigation:
  - Exercise Stress Testing, Cardiac Devices, Echocardiography
    - Notes provided

### 17<sup>th</sup> May 2022

- Exam Preparation/tutorial

### 24<sup>th</sup> May 2022

- **END-SEM Exam**

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<sup>1</sup> Australian Institute of Health and Welfare (AIHW) 2000, First Report on National Health Priority Areas 1996, AIHW Cat. No. PHE1, AIHW, Canberra.

<sup>2</sup> Coronary heart disease in QLD, Coory M, QLD government Information Circular, 2001.

<sup>3</sup> National Health Survey: Cardiovascular and related conditions, Australia, 1995.

<sup>4</sup> Australian Institute of Health and Welfare (AIHW) 2000, Australia's Health 2000, AIHW Cat. No. 19, AIHW, Canberra.

<sup>5</sup> Australian Bureau of Statistics 2002, Australian Social Trends 2002: Health – Mortality and Morbidity: Cardiovascular disease: 20<sup>th</sup> century trends, Canberra.

<sup>6</sup> Australian Institute of Health and Welfare (AIHW) 2000, Australia's Health 2000, AIHW Cat. No. 19, AIHW, Canberra.