**Unit Outline, Clinical Biochemistry 335**

### Administrative Details

<table>
<thead>
<tr>
<th>Unit Index No:</th>
<th>311412</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit points:</td>
<td>50 (upon passing).</td>
</tr>
<tr>
<td>Study Package No:</td>
<td>173299</td>
</tr>
<tr>
<td>Responsible School</td>
<td>Biomedical Sciences</td>
</tr>
<tr>
<td>Pre-requisites:</td>
<td>Successful completion of 2nd year of course</td>
</tr>
<tr>
<td>Anti-requisites:</td>
<td>None</td>
</tr>
<tr>
<td>Study Mode</td>
<td>On campus</td>
</tr>
<tr>
<td>Unit Significance</td>
<td>Core</td>
</tr>
<tr>
<td>Result type</td>
<td>Grade/Mark</td>
</tr>
<tr>
<td>Ancillary charges</td>
<td>None</td>
</tr>
<tr>
<td>Web site Unit materials</td>
<td>For on-line materials: Blackboard LMS</td>
</tr>
<tr>
<td>Student consultation</td>
<td>Contact the Unit Coordinator (see below)</td>
</tr>
<tr>
<td>Unit Coordinator</td>
<td>Dr Cyril Mamotte</td>
</tr>
<tr>
<td></td>
<td>School of Biomedical Sciences</td>
</tr>
<tr>
<td></td>
<td>Curtin University of Technology</td>
</tr>
<tr>
<td></td>
<td>GPO Box U1987</td>
</tr>
<tr>
<td></td>
<td>PERTH  WA  6845</td>
</tr>
<tr>
<td></td>
<td>Email: <a href="mailto:C.Mamotte@curtin.edu.au">C.Mamotte@curtin.edu.au</a></td>
</tr>
<tr>
<td></td>
<td>Ph: (08) 9266 7517; Fax: (08) 9266 2342</td>
</tr>
</tbody>
</table>

### Syllabus:

This unit covers the biochemical investigation of abnormalities in electrolyte, carbohydrate, cholesterol, calcium, haem, and porphyrin metabolism; biochemical markers of cardiac, pancreatic and liver function and/or damage. In the specific context of analytical techniques, lectures and practicals cover quality control, use of radio-isotopes, and the physico-chemical principles underlying clinical biochemistry tests/techniques such as chromatography, enzymology, fluorimetry, nephelometry and turbidimetry, and ligand binding assays.

### Important Dates

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Percentage of total mark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Practicals</strong></td>
<td>20%</td>
</tr>
<tr>
<td>o Includes 10 min tests (7 tests, from 3rd week)</td>
<td></td>
</tr>
<tr>
<td><strong>1 h written test on theory</strong></td>
<td>25%</td>
</tr>
<tr>
<td>o Date: 7th week of tuition</td>
<td></td>
</tr>
<tr>
<td><strong>Assignment</strong></td>
<td>15%</td>
</tr>
<tr>
<td>o Date: 9th week of tuition</td>
<td></td>
</tr>
<tr>
<td>o Final Examination</td>
<td>40%</td>
</tr>
<tr>
<td>o Curtin University Exam Period</td>
<td></td>
</tr>
</tbody>
</table>
Please read this outline fully before commencing your study in this unit.

The Unit Outline is an important reference point for your study programme. It contains important information about the general aims of the unit, texts and references, and details about the assessment process, including allocation of marks, grading criteria and submission dates.
Introduction

Welcome to Clinical Biochemistry 335 (CB335). This unit is designed for those graduates seeking a career in a diagnostic clinical biochemistry laboratory or for those wishing to progress to higher qualifications in the field including postgraduate or professional qualifications. Clinical Biochemistry is that area of pathology which is concerned with the analysis of various fluids (e.g. blood, plasma or serum, urine, CSF) or tissues and cells using chemical or biochemical techniques. Clinical biochemistry tests account for the majority of tests carried out by diagnostic laboratories. The tests are used in numerous different contexts including: diagnosis of disease, risk assessment (of disease), prognosis, disease management (e.g monitoring of response to therapy).

Aim

The aim of this unit is to develop competencies in the conduct and interpretation of tests, interpretation of the scientific literature pertaining to the more common laboratory investigations tests and procedures carried out in a clinical biochemistry laboratory.

The unit is one of a pair of complementary units designed for those graduates seeking a career in a diagnostic clinical biochemistry laboratory or for those wishing to progress to higher qualifications in the field including postgraduate or professional qualifications.

Unit Learning Outcomes

Upon successful completion the student will be able to:

1. Justify the selection of common clinical biochemistry tests based on an assessment of patient history and presentation.
2. Inspect and analyze patient samples using appropriate technologies and validate the results.
3. Compile, integrate and evaluate patient data to produce patient reports.
4. Analyze and interpret the scientific literature to justify the diagnostic utility of common clinical biochemistry tests and the selection of analytical methods used for analysis. Prepare scientific reports and documents conforming to laboratory standards or other relevant guidelines.

Measuring achievement of ULO

Through assessment by lecturer/tutor of:

- Laboratory technique (by observation and accuracy of results) and validity of result analysis and interpretation from practical exercises (ULO 2).
- Major assignment and practical reports (ULO4).
- Work produced by students on case examples from practicals and tests/exams (ULO 1).
- Interpretation by the student of patient data from practicals and in tests and exams (ULO 3)
Learning Activities

Lectures

Suggested approach

- Before the lecture: skim-read the recommended text-books or the on-line material prior to coming to the lectures
- After the lecture: revise the material again following the lecture & make notes for future revision.

Practicals

These provide numerous learning opportunities.

- Applying knowledge; thinking critically – e.g are the methodologies used the most appropriate;
- Accessing, evaluating and synthesis of information, from patient and laboratory data, and content/concepts covered in the lectures;
- Developing communication skills, by demonstration of an ability to prepare practical reports conforming to particular standards and by participation in discussion; and finally the
- Development of technical skills.
- 10 minute tests

The practical also serves as a forum to foster an ability to work collaboratively, to develop peer to peer learning, to develop organizational skills, and as a model for real world activity (both intended and unintended consequences).

Assignment

This provides a similar learning opportunity but with a greater emphasis on individual effort and information literacy skills. It also and gives opportunities to demonstrate deeper understanding of a topic and critical thinking skills.

Tuition Pattern

Up to 5 hours per week allocated as follows:

<table>
<thead>
<tr>
<th></th>
<th>Lectures:</th>
<th>Practical:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 x 1 hour</td>
<td>3 hours</td>
</tr>
</tbody>
</table>
**Recommended Textbooks**

**Comment:** There is no fixed text for Clinical Biochemistry 335. The following are recommended as useful starting points. While it is not essential for you to purchase a textbook, it is EXTREMELY useful to have a personal copy, even if it is not the most recent edition. You can waste a lot of time searching the web.

- **Clinical aspects only**
    - See page 5 of the file labeled “Front Matter” for the content of each chapter. If the link doesn’t work, go the library’s website>E-Reserve collection> and then perform a search.
    - This is an excellent book on the rudiments of clinical chemistry. However, it contains very little on methodologies. (ISBN 0443 072698).

- **Clinical and Technical aspects**
    - This is an excellent textbook and will serve you well if you are intent on a career in Clinical Biochemistry. It covers physiological, clinical and methodological aspects. It is relatively expensive. (ordering information: ISBN 0-7216-8634-6)
    - This book deals mainly with clinical aspects, but also has reasonable coverage of methodologies. It also contains numerous case presentations. (Ordering information: ISBN 978-0-7817-9045-1)

- **Technical aspects Only**
    - This book focuses on methodological aspects. A copy is available in the library.

- **Metabolic and Physiological Aspects**
    - This is an excellent book on metabolism and physiological chemistry. However it contains little on clinical or methodological aspects. (Ordering Information: ISBN 0-12-095440-0).
  - Call numbers for books (including some from the above list) from the library
**Web-Based Resources Learning Resources**

**Blackboard**
For on-line course materials

**Journals on the Web**
Full text versions of many journals can be accessed via Science Direct, ProQuest, Swetswise and Wiley Interscience. These search engines can be accessed via Curtin’s Home Page, then Library, then Access Gecko, then Resource Categories, then Full Text. You will need your username and password for this.

**Useful Journals**
Useful journals are Clinical Chemistry, Clinical Biochemistry, Clinica Chimica Acta, and the American, Australian and British Medical Journals.

**LabTestsOnline** ([http://www.labtestsonline.org.au](http://www.labtestsonline.org.au)). This is a website designed for the Australian healthcare consumer. It should not be used as your primary resource, but it is a useful site which is edited by laboratory professionals. It contains information on most of the common laboratory tests, including Clinical Biochemistry, Haematology, genetics etc.

Other useful sites include:

<table>
<thead>
<tr>
<th>Study</th>
<th>URL</th>
</tr>
</thead>
</table>


<table>
<thead>
<tr>
<th>For writing/reference information and for research</th>
<th>URL</th>
</tr>
</thead>
</table>

**Comment on Communication Technologies**
It is extremely helpful to have access to a computer with an Internet connection, which you can use effectively. This will enable you to access important resource material more easily and also allow access to Blackboard. Also useful is access to Email (preferred) and a telephone. This will enable you to more easily contact the Unit Coordinator, or fellow students studying the same unit, should you have any questions or difficulties. You may use the computing facilities on campus if you do not have suitable facilities at home.
<table>
<thead>
<tr>
<th>Tuition Week</th>
<th>Date for the Monday of that week</th>
<th>Lecture 1</th>
<th>Lecture 2</th>
<th>Lab Class Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27/2</td>
<td>Overview</td>
<td>Separation Techniques</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5/3</td>
<td>Hepatobiliary disease</td>
<td>Hepatobiliary disease</td>
<td>1. Separation Techniques Chromatography</td>
</tr>
<tr>
<td>3</td>
<td>12/3</td>
<td>Enzyme Kinetics. Application of principles &amp; optimization</td>
<td>Non-enzymatic markers Methodological aspects POCT Devices</td>
<td>2. Electrophoresis</td>
</tr>
<tr>
<td>4</td>
<td>19/3</td>
<td>Markers of coronary heart disease risk</td>
<td>Lipids &amp; lipoproteins</td>
<td>3. Enzyme Kinetics</td>
</tr>
<tr>
<td>5</td>
<td>26/3</td>
<td>AMI Heart Failure Risk of CAD</td>
<td>Markers of coronary heart disease risk</td>
<td>4. POCT (GGT)</td>
</tr>
<tr>
<td>6</td>
<td>2/4</td>
<td>Immunoassays</td>
<td>Immunoassays</td>
<td>5. Diabetes &amp; RFT (Wed Group)</td>
</tr>
<tr>
<td></td>
<td>9/4</td>
<td>Easter</td>
<td>Easter</td>
<td>Easter</td>
</tr>
<tr>
<td>7</td>
<td>16/4</td>
<td>Test</td>
<td>Diagnosis &amp; treatment of diabetes</td>
<td>6. Record note submission and correction</td>
</tr>
<tr>
<td>8</td>
<td>23/4</td>
<td>Calcium metabolism</td>
<td>Calcium metabolism</td>
<td>7. Diabetes &amp; RFT (Fri Group)</td>
</tr>
<tr>
<td>9</td>
<td>30/4</td>
<td>U&amp;Es and RFT</td>
<td>U&amp;Es and RFT</td>
<td>8. Immunoassay (PTH)</td>
</tr>
<tr>
<td>10</td>
<td>7/5</td>
<td>Blood Gases</td>
<td>Blood Gases</td>
<td>9. Reference ranges</td>
</tr>
<tr>
<td>11</td>
<td>14/5</td>
<td>Porphyrins</td>
<td>Method evaluation</td>
<td>10. Quality control &amp; Method evaluation</td>
</tr>
<tr>
<td>12</td>
<td>21/5</td>
<td>Review session</td>
<td>Review session</td>
<td>11. Submission of record books</td>
</tr>
</tbody>
</table>
Assessment criteria for practicals. Reports and quizzes pertaining to the practicals will be formally assessed. All reports should also be submitted electronically on Blackboard. This will serve as the “date stamp” for the submission of your laboratory reports.

The Curtin startup site provides useful information on writing skills (see http://startup.curtin.edu.au/study/writing/index.cfm).

Assessment criteria for reports/ quizzes pertaining to the practicals will be based on a) to c) below, with an emphasis on interpretation and analysis.

a) The results section: (i.e. how close to what we expect (taking all else in consideration; i.e. things out of your control), graphs well labelled, scientific notation for symbols, units, reactions etc.

b) Interpretation of results/ Answering of questions. Considered and in context (including that of discrepancies between your results and the expected results) and, where applicable, in context of patient histories. Avoid regurgitating or paraphrasing material from other sources. An inability to either explain or argue in your own words shows a lack of understanding.

c) Appropriate referencing/attribution: diversity of references and absence of plagiarism, and with an emphasis on peer reviewed articles and textbooks.

Assessment criteria for laboratory notebooks

You should also have a laboratory notebook for hand written recording of results from all practicals.

The type of information that should be recorded includes laboratory data and notes on procedures, and students or other personnel involved in conducting the practicals.

Examples:
- The role of each group member; who carried out the numerous procedures etc.
- Readings for any instrument outputs.
- Temperature checks on water baths.

You may paste instrument printouts (or photocopied versions) in the notebook. The books should have numbered pages, and include a contents page at the front. They will be inspected on numerous intervals during the course of the practicals. All work should be clearly legible (modify your writing if necessary). Assessment criteria: 50% on the basis of completeness, 50% on presentation.

The assignment

Typically, for the assignment, students are given a series of tasks that are mostly related to Unit Learning Outcome 4, for example involving the analysis and interpretation of scientific data/literature and preparing scientific reports and documents conforming to laboratory standards or other relevant guidelines.

The assignment task for this year is: “Discuss the use of biochemical and other markers in the assessment of liver fibrosis”. This will require you to compare and evaluate traditional and new approaches for the assessment of liver fibrosis. An assignment outline will be suggested to you.

Your submitted assignment will comprise of:
A hard copy version comprised of:
   i) A signed assignment cover page.
   ii) Title page (E.g. Clinical Biochemistry 335 Assignment, Name/Student number)
   iii) Index page for the various exercises/questions.
   iv) The main body of the assignment, e.g. containing answers to questions/exercises.
   v) Appropriate referencing (Chicago, Vancouver, or Harvard style) if referencing is required.

Textbooks and journal articles that are indexed in PubMed are the only references that are permissible in the reference list. Use of Wikipedia or other similar sources will incur an automatic 10% deduction from your mark.

b) Submission of an electronic version of the above, without the cover page, as a MS Word or PDF file. A second file containing the abstracts (where relevant) to all references that have been used for the assignment. The electronic version will be subject to analysis using Turnitin software.
Criteria for successful completion of the unit.
Students should note that it is necessary to pass all components of the unit and that failure of any component may result in an overall failure in this unit regardless of the total marks accrued. That is, a pass in the practical component but failure in the theory component (or vice versa) may lead to a fail grade for the unit, even though the total mark for the unit exceeds 50%.

The components for which a mandatory pass mark is required include:
- Laboratory practicals (including practical reports).
- Final exam.
- Assignment or project.

Plagiarism monitoring
Some or all of the assessments in this unit may be monitored for plagiarism using the Turnitin plagiarism detection service (http://turnitin.com). Students who do not want their assignments retained in the Turnitin database (e.g. because of intellectual property implications) must lodge a special request prior to the submission date. See www.academicintegrity.curtin.edu.au/studentsturnitin.html for additional information.

Avoid regurgitating or paraphrasing text or other materials by other authors, from any source (including your fellow students). If you use direct quotes, you must acknowledge that source by putting the direct quote in quotation marks and citing the authors name(s) and the relevant reference. All graphs, illustrations, tables or data from other sources must also be acknowledged and referenced. The reference is for these is usually cited below the graphic or table. While cooperation between students is encouraged, collusion is an offence.

Supplementary Information

Study Load
To be successful in completing this unit, it is recommended that you study for ~6-8 hours a week, in addition to the scheduled classes. Being sufficiently organized to set time aside for study, revision, and completion of practical reports and assignments is critical. As already mentioned, if you have any difficulties, it is advisable to ask for help at the earliest possible opportunity. Misunderstandings early in the course can compromise understanding of topics/concepts later in the course.

Attendance of Lectures & Blackboard Content
Not all of the material covered will available via Blackboard. Furthermore, context and emphasis of important areas is important. Therefore attendance at all lectures is strongly recommended.

Practicals
Appropriate clothing is compulsory for the safe conduct of laboratory practicals. Should you be unable to participate in laboratory practicals without an acceptable reason, including inappropriate attire, your marks for this component may suffer. A scientific calculator is required for many of the practicals.

Late submission penalties
There are penalties for late submission of assessable components. Students will have 10% of the total assessment mark deducted for each day (Including weekends) the assessment is late without prior negotiation with the Unit Coordinator. Assessments will not be marked (nor feedback given) if work is submitted more than 10 days after the due date. See the Division of Health Sciences Web site for further details.

Legitimate grounds for extensions include:
- Health Issues (detailed medical certificate required).
- Psychological grounds (medical certificate from a registered health professional or University Counselling).
- Equity considerations (as requested by a University Disability Counsellor)
- Compassionate grounds.
A Student’s Short Guide to Turnitin at Curtin University of Technology

This handout provides information to help students understand the use of Turnitin at Curtin University.

What is Turnitin?
Turnitin (www.turnitin.com) is an electronic text matching system that compares text in a student assignment against electronic text on the Internet, in published works, on commercial databases, and in assignments previously submitted to Turnitin by students in universities all over the world, including assignments obtained from ‘paper mills’ (Internet sites which sell papers). The Turnitin system operates through a web site and is accessed using standard web browsers.

Turnitin supports the implementation of the University’s mission and values (strategic.curtin.edu.au/vmv.html) and its policy on plagiarism (http://www.policies.curtin.edu.au/documents/plagiarism.pdf). It is one of many resources that can assist in ensuring academic integrity is maintained. For FULL details on Student guidelines for avoiding plagiarism please go to: http://academicintegrity.curtin.edu.au/studentbook.html

Why is Turnitin being used at Curtin?
Currently, Curtin degrees have prestige with employers and the wider community but this can be threatened by breaches of academic integrity (including plagiarism). Academic integrity is essential to the operation and reputation of Curtin University courses. Turnitin has been designed to assist lecturers to identify instances of plagiarism and thus support the maintenance of fair assessment standards for all students. Turnitin has great benefits as a teaching and learning tool. Your lecturer may allow you to submit a number of ‘draft’ assignments to identify instances of poor writing or possible plagiarism BEFORE you have to submit the final assignment for marking.

Will my work be submitted to Turnitin?
All academic staff have access to Turnitin, so there is a good chance that an assignment in one of your units will be submitted. Your lecturer will inform you if they are using Turnitin.

What do I need to know to use Turnitin?
- Your lecturer will enroll you into a class and its related assignments
- You will be notified by the Turnitin helpdesk of your login and password details.
- You then logon and complete your user profile
- When you are ready to submit an assignment, login and click on MYCLASSES
- After selecting a class, the CLASS PORTFOLIO will display, listing all assignments and allowable draft versions for that class (Unit)
- You can select either a draft or final submission and follow the upload process as outlined in the student’s user guide (available online). If this is a draft version you review the report and amend your assignment accordingly.
- Once your final assignment is submitted you will receive a digital receipt from Turnitin (on screen and sent to your student email). Attach a copy of this to your hardcopy for handing in to your lecturer/tutor. This is vital, as your lecturer will need this to complete the marking of your assignment.

Where can I access the Students User Guide to Turnitin?
All information and documentation related to Turnitin including
- Student User Guides
- Information on Using Turnitin as a Student at Curtin
- FAQs and Help with technical problems
- What you need to Know about Papers Submitted to Turnitin

can be found at the following address: