UNIT OUTLINE
Medical Microbiology 432
Semester 2 2012

Unit Index No: 311396

Credit points: 25 points

Unit availability: 2012, study period: Semester 2. location: Bentley only.

Pre-requisite Units: Medical Microbiology 331 AND Lab Med. Practice 332/334/435/436 as appropriate if participating in a microbiology placement

Unit Coordinator: Dr Paul Costantino

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Fax: (08) 9266 2342

Online category: Supplemental

UNIT COORDINATOR CONTACT DETAILS

Please make appointments if you wish to see me regarding aspects of the unit. I will endeavour to be fairly prompt with returning phone calls, email and faxed queries. Email is one of the best and most efficient ways to contact me. My contact details are located above.

If you have a question regarding an aspect of the lecture or practical material then your first port of call is the recommended text book. Please don’t email me expecting to be freely given the answers to the end of lecture or practical manual questions. They are designed to make you read and understand your lecture notes and to use the text book. They will require effort on your part. I will always ask you what information you have managed to find and ask you to explain the problem in developing an answer before offering suggestions or explanations.

My office phone is NOT connected to an answering service. If you need to leave a message please do so by ringing the School Enquiries Office on 9266 7374. You can dial x7374 from any internal Curtin phone.

REQUIREMENTS TO COMPLETE THE UNIT

Prerequisites

All students in this unit will have completed the prerequisite units in Medical Microbiology or their equivalent and it is assumed that you have knowledge and skills to this level. Despite this previous study there is a significant degree of reinforcement in the material covered in this unit. However if your study of microbiology occurred some time ago or you have not undertaken a microbiology placement in Med. Lab. Practice and you feel that your understanding might be inadequate you should revise material covered in the second year and first semester third year units.

Students will be expected to display practical skills and understanding, particularly with respect to safe practice and asepsis commensurate with their level of microbiology background. Students who do not show satisfactory laboratory competence will have this reflected in Laboratory grades.
Technology

It is helpful, but not essential, that you have access to:
• a computer with an internet connection, which you can use effectively
• email (preferred), a telephone or a fax machine to contact me and other students studying this unit.

You can access the computing facilities on campus if you do not have a computer at home.

Aims

The aim of this unit is to further extend students understanding of the infectious agents causing human disease, their identification, pathogenesis and role in disease as well as their control. A particular emphasis will be made of the role of the microbiology laboratory in the diagnosis and treatment of infection caused by viruses, parasites and fungi. Some bacterial pathogens that are either less frequently encountered in the routine laboratory or more difficult to cultivate and/or identify will be studied and examined during the practical classes.

Unit Outcomes

This unit is designed to introduce you to both theoretical and practical aspects of Medical Microbiology, particularly as undertaken for the diagnosis of infectious disease but also for research in associated fields.

On successful completion of this unit a student will be able to:

1. Describe common infectious diseases (viral, fungal, parasitic) affecting various body sites and discuss the choice and application of the laboratory methods needed to investigate these diseases and identify their causative organisms.
2. Demonstrate the ability to critically evaluate scientific information and data. Succinctly but accurately report these conclusions.
3. Perform, describe and evaluate laboratory investigations in clinical virology
4. Describe, evaluate and perform the laboratory methods for "in vitro" detection of bacterial resistance to antibiotics.
5. Select, perform and interpret laboratory investigations required to examine specimens in diagnostic microbiology. Effectively communicate results of these laboratory investigations.
6. Display an awareness of recent developments and research in medical microbiology.

Professional Skill Outcomes

Students will be expected to bring forward and further develop the following skills from the first semester prerequisite unit in Medical Microbiology:

- display a sound understanding and application of aseptic methods in the handling of infectious materials including laboratory cultures.
- plate out a mixture of bacterial organisms and successfully separate the organisms.
- successfully pick and subculture bacterial isolates from single colonies.
- Understand and practice suitable labelling of laboratory cultures.
- prepare and microscopically exam stained smears stained by Gram’s, Acid-fast and other simple staining methods.
- perform and interpret primary identifying tests for bacterial cultures including: catalase, coagulase, oxidase, OF(glucose), motility.
- know the culture requirements for the isolation of bacterial pathogens studied during the laboratory sessions.
- recognise the growth characteristics of common pathogens and know how to proceed to identify these isolates
- recognise common fungal pathogens in culture and apply methods needed for the identification of genera and species including stained wet mounts, slide cultures and identification tests.
- show a working knowledge of methods used for the identification of viruses in clinical samples.
- Perform and understand molecular diagnostic virology tests
- know the requirements for the successful culture of cells in vitro.
- prepare materials for microscopy to find and identify common parasite forms in clinical material

**As a result of completing the laboratory exercises in this unit students will develop the following skills and be able to:**

- perform direct microscopy on clinical specimens as appropriate and choose and inoculate suitable culture media for the isolation of common pathogens from clinical samples.
- recognise the presence of pathogens in cultures from clinical specimens and successfully isolate and identify pathogens as far as possible with the methods available.
- understand the effects of antibiotics on bacteria and the methods used for susceptibility testing and detection of bacterial resistance. Perform susceptibility test methods as appropriate for pathogens isolated from clinical specimens.
- report the results from laboratory examination of clinical samples in a meaningful and concise fashion consistent with diagnostic laboratory practise.
- further specific outcomes are shown with the individual laboratory exercises.

**These outcomes will be assessed in practical exercises, assessment exercises and end of semester examinations.**
### SYLLABUS

#### VIROLOGY

**Nature of viruses.**
- Viral components - capsids, envelopes, nucleic acids. Classification of viruses.
- Laboratory methods used in the diagnosis of virus infections.
- Viral culture: cell cultures, animals, detection of infection, cytopathic effects, haemadsorption, immunofluorescence, neutralisation. Serological tests for virus infection. Direct demonstration; immunofluorescence, electron microscopy, EIA, PCR.
- Papillomavirus (HPV) and Human Immunodeficiency Virus (HIV).
- Contrasting the replication and clinical effects of these two topical viruses.
- Human Hepatitis B and the Picornaviruses.
- Both these are very small viruses but quite different in a number of ways.
- Other viral pathogens, DNA and RNA viruses.
- View different viruses and clinical effects they have.
- Haemorrhagic fever.
- A special disease manifestation from a special group of viruses.
- Prions
- Infectious proteins! These are not viruses.
- Anti-viral therapy.
- Look at vaccination and examining the development of effective anti-viral therapies.

#### PARASITES CAUSING HUMAN DISEASE

**Revision and consolidation of the following:** laboratory methods in parasitology, the lifecycles and diagnostic forms of trematodes, cestodes, nematodes and protozoa encountered in Australia.

**Extend knowledge of protozoa to include Entamoeba, Cryptosporidium, Isospora, Pneumocystis and Balantium.**

**Recognition of faecal protozoa that are generally regarded as non-pathogenic e.g. Entamoeba coli, Entamoeba hartmanni, Endolimax nana and Iodamoeba bütschlii.**

**Introduce some of the more exotic parasites not commonly seen in Australia, their detection and diagnosis.**
- Blood nematodes e.g. *Wuchereria bancrofti, Brugia malayi, Brugia timori, Loa loa, Mansonella sp.*
- Microfilaria worms found in tissue and skin e.g. *Onchocerca volvulus, Mansonella streptocerca, Dracunculus medinensis*
- Tissue dwelling nematodes e.g. *Parastrongylus, Trichinella spiralis*
- trypanosomiasis, leishmaniasis and filariasis

#### MYCOLOGY

**Revision of fungal structure and terminology**

- **Superficial Mycoses**
  - Definition, diseases and causal fungi
- **Cutaneous Mycoses**
  - Definition, dermatophytes, clinical types, epidemiology classification, morphology, laboratory identification
- **Subcutaneous Mycoses**
  - General characteristics, causal fungi, etiological characteristics and laboratory identification
- **Systemic Mycoses**
  - Diseases which occur in Australia, causal fungi and their characteristics

#### BACTERIOLOGY

**Revision of diagnostic methods for streptococci, staphylococci, Enterobacteriaceae, Neisseriaceae, pseudomonads.**

**Introduce some of the significant organisms that may be isolated infrequently in the clinical laboratory or that are difficult to cultivate in the clinical laboratory, their pathogenesis, disease features and laboratory ID features/tests: Mycobacterium, the organisms of the HACEK group, causes of atypical pneumonia.**

**Consolidate knowledge of the laboratory features and ID processes for selected organisms from the following genera during practical classes: Burkholderia, Stenotrophomonas, Plesiomonas, Chromobacterium, Aeromonas, Yersinia, Pasteurella, Kingella, Acinetobacter, Corynebacterium, Vibrio**
UNIT MATERIALS

Unit Outline
The Unit Outline (this document) gives you important information about the general aims of the unit, texts and references, as well as details about the assessment, including the allocation of marks, grading criteria and submission dates. You should make this unit outline the first document that you read for the unit. Study it carefully, paying particular attention to assessment instructions and dates.

Textbooks and References
The following text is highly recommended for this unit.

Robertson Library level 2 Reserve 616.9041 WIN
Robertson Library level 6 616.9041 WIN
Robertson Library level 6 Quarto (Large) Books Q 616.9041 WIN

Additional recommended texts

Other texts that you may find useful are:
Murray, P. R. et al. (2009) Medical Microbiology, 6th Ed. Mosby

Laboratory Manual
Access to the following laboratory manual is essential:
• Medical Microbiology 432 Laboratory Manual (2012 version)
The texts and manual are available from the Curtin University Bookshop.

Web-Based Resources and Lecture notes
Lecture notes in the form of PowerPoint presentations and other information will be made available on the Internet through the Flexible Learning Environment for Curtin Students (FLECS – Blackboard site). The login address for the site is:

http://lms.curtin.edu.au

Use the “Help” icon/link at the top of the page for assistance.
DELIVERY OF UNIT

Tuition Pattern

- Lecture: 2 x 1 hour for 12 weeks (Total of 24 hours)
  Attendance at lectures is strongly recommended.

- Practical/tutorial: 4 hours per week spread over three days for 7 weeks (Total of 28 hours):
  Wednesday session 1.5 hours
  Thursday session 2 hours
  Friday session 0.5 hour*

  *The final weekly session (Friday) is scheduled as a 0.5-hour completion and discussion time which will be used for a post-lab tutorial for some exercises. This final session may be extended to 1 hour if the Thursday laboratory session has been shortened to 1.5 hours.

Tutorials/Post labs

These are times allocated to reporting of the results of practical exercises and associated discussion. They may also provide opportunity to clarify points from lectures or private study. Attendance is compulsory.

Practicals

Attendance at practical sessions is considered compulsory. An attendance sheet will be passed around each week for signing. **Failure to complete assessable elements will result in failure in this unit.** During this semester you will be working with some significant clinical pathogens. These organisms could make you ill if they are mishandled. For this reason, all materials and reagents must be handled as if they were infectious. For your own protection, you will not be allowed to attend the sessions if you do not wear appropriate protective clothing e.g. lab coat and closed footwear. You will also find a fine point permanent marking pen useful.

Results from practical exercises must be recorded in a satisfactory, professional manner. A mark based on the completion of laboratory reports will be provided for each student.

Feedback on practical reports will usually be given in the week that these are returned to you.

ASSESSMENT

To pass this unit you must complete the assessment tasks listed below. To obtain a pass grade you must achieve a satisfactory standard in the practical component (i.e. ≥ 15/30%) and the combined theory components (Mid-semester test + Final Theory Exam i.e. ≥ 35/70%). Because of this requirement, it is possible to pass one component and not the other, resulting in an overall unit mark of greater than 50% but with a grade of F (fail).

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Worth</th>
<th>Applies to…</th>
</tr>
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<tbody>
<tr>
<td>Virology Practical Report</td>
<td>10%</td>
<td>Practical Exercises and/or discussion materials</td>
</tr>
<tr>
<td>Parasitology Practical Report</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Mycology Practical Report</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Bacteriology Report</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Mid-semester Written test</td>
<td>20%</td>
<td>Lectures (Weeks 1-4)</td>
</tr>
<tr>
<td>Final theory examination</td>
<td>50%</td>
<td>Lectures (Week 5 onwards)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

**Assessment Details**

**Mid-Semester Test (20% of final mark).** One during semester around week 6 during the lecture timeslot, date shown in the class schedule. The paper consists of short answer questions covering lecture material to that time in the semester.
Laboratory Work. This component of the unit will be based on FOUR (4) submitted practical reports (one for each of the main microbiology disciplines presented during the semester). Each report is worth either 5 or 10% which will provide an overall practical mark of 30% for the unit (see the breakdown in the table above).

Final semester Examination:

Theory: 2 hour paper, format to be advised (covering material not covered in the mid-semester test). **50% of final mark**

Practical: Nil practical exam.

In accordance with Curtin policy, students are advised that this unit is a **SIGNIFICANT UNIT** in which failure twice may lead to termination of a student’s course. Students should note that a mark of 50% or more in both the theoretical and practical component of the unit is required in order to secure a pass, and that **failure in any one area 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 student's total mark may exceed 50%.

<table>
<thead>
<tr>
<th>Example</th>
<th>Degree of seriousness</th>
<th>Typical Penalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students submitting very similar work (even as a result of legitimate co-operation)</td>
<td>Collusion</td>
<td>Loss of marks for that question or assignment etc by both students</td>
</tr>
<tr>
<td>Not referencing input (factual statements, definitions etc) where students’ words are used</td>
<td>Minor to Intermediate</td>
<td>Loss of 5% of assessment entity for each instance</td>
</tr>
<tr>
<td>Not referencing input where plagiarised words are used</td>
<td>Depends on context, but may be serious</td>
<td>Loss of 50 – 100% of marks for that question or assignment as appropriate</td>
</tr>
<tr>
<td>Not acknowledging ideas or concepts of others (ie. stealing intellectual property)</td>
<td>Serious misconduct</td>
<td>Loss of marks plus an additional penalty which could entail failure of unit and/or possible termination from course depending on the circumstances</td>
</tr>
</tbody>
</table>


Plagiarism Policy (as adopted by the School of Biomedical Sciences)

It is not acceptable to simply copy the words of other students or authors when completing the weekly exercises and assignments in this unit. This action constitutes plagiarism and is regarded as academic malpractice. The penalties for plagiarism can be severe and may include termination from your course of study. All direct quotes must be correctly attributed to the author and should be kept to a minimum. Also, you should include a list of references to acknowledge the source(s) of information used to produce any written work. Use the “Chicago” referencing system. The library has a handout on the Chicago referencing systems available online at:

[http://libguides.library.curtin.edu.au/referencing](http://libguides.library.curtin.edu.au/referencing) (Look for the Chicago referencing link on the right hand side of the page)

The School of Biomedical Sciences advises students that it will use screening software to check for plagiarism in submitted work suspected of containing plagiarised material and also for routine screening of text as deemed appropriate by the Head of School.

Useful examples and explanations of plagiarism may be seen at the following web site – These will help you in understanding the nature of this form of academic malpractice.

[http://www.indiana.edu/~wts/pamphlets/plagiarism.pdf](http://www.indiana.edu/~wts/pamphlets/plagiarism.pdf)

As a guide only, typical penalties which may be imposed by the School of Biomedical Sciences for some of the more common types of plagiarism (including collusion) are shown in the Table below. Please note that each case of academic malpractice is assessed individually, and that penalties actually imposed by the Head of School (or delgatee) may vary from the examples shown in the Table.

COPYRIGHT / STUDENT CHARTER / GRIEVANCE PROCEDURES

In accordance with university policy, information regarding the above topics can be found online (http://www.policies.curtin.edu.au).
This CD is available through the Student Services office and contains information which may be useful to you.

EXAMINATIONS AND RESULTS

Your exam results are usually released in the third week following the last week of exams. Please log into your Oasis account regularly during this time to check your results status. See below regarding supplementary exams and travel arrangements at this time.

Supplementary examinations

Supplementary examinations are awarded only at the discretion of the Board of Examiners. The aim of a supplementary examination is to allow you to correct minor problems/deficiencies in the initial assessment and not to gain extra study time or correct major problems. The number of supplementary examinations awarded will be kept to a minimum for any one examination period and for this course of study. University policy is that only one supplementary exam be awarded per student per study period.

NB. Supplementary examinations are not automatically awarded. The Board of Examiners will carefully review individual cases. No written or personal application for a supplementary examination will be considered.

Supplementary examinations, if awarded, will be indicated on the official Curtin examination result statement posted to all students, and will also be sent to you via OCC (see under ‘Results’ above). It is your responsibility to check your status. Students should note that supplementary examinations for units conducted in the School will usually be held at the end of the week exam results are published. Please check outside Helen Tonkin’s office for these dates which are published very early into each semester. A student who does not sit for a scheduled supplementary examination has no claim to a further examination. If you are awarded a supplementary examination it is imperative that you confirm the time and venue for the exam.

Do not plan or book holidays with a departure date before the supplementary exam dates – you will not be given a second chance to sit for these.

Deferred assessment

Deferment of an examination is not automatic. Students may be permitted by the relevant Board of Examiners to defer an examination or other assessment where circumstances outside their control have arisen. However, a student's overall performance may be taken into account in granting permission to defer an examination.

Applications for deferment on health grounds or as a result of extenuating circumstances must be submitted not later than seven (7) days after the scheduled examination event or assessment date.

If it becomes necessary to apply for a deferred assessment on medical grounds, it is recommended that you consult/seek medical advice from a registered medical practitioner ASAP, so that the medical certificate will more accurately represent your particular circumstances. A delay in seeking medical advice will make it more difficult for a medical practitioner to substantiate your health status and as a consequence, may or may not issue a medical certificate. A detailed medical certificate should be attached to the application where appropriate and should at least include your name followed by the statement:

“(insert your name) …was not medically fit to undertake the …(insert description)… university assessment/exam for … (insert unit name) on the … (insert date/time)… because of … (insert reason)”

The prescribed application form may be obtained from either the Faculty Student Services Office (FSSO), the Course Administrator or the school’s enquiries office. Completed forms must be submitted to the Course Administrator or school office. This includes applications for deferred assessment for units in your course of study conducted by other Schools.

MOBILE PHONES

As a courtesy to both lecturers and other students, if you have a mobile phone, please ensure that it is turned off during lecture and practical sessions. Students who do not comply with this request can be asked to leave the class.
<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE Week Commencing</th>
<th>LECTURE TOPICS 300.219</th>
<th>PRACTICAL SESSIONS 308.250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>July 9-13</td>
<td>Unit Outline</td>
<td>No Practical</td>
</tr>
</tbody>
</table>
| 1 | July 16 | Virology 1. The Nature of Viruses (BB)  
Virology 2. Laboratory diagnosis of viral infections (BB) | No Practical |
| 2 | July 23 | Virology 3. HPV/HIV (BB)  
Thurs: Virology  
Fri: Virology |
| 3 | July 30 | Virology 5. Other viral pathogens (BB)  
Thurs: Virology/Bacto  
Fri: Virology |
| 4 | Aug 6 | Virology 7. Prions (BB)  
Thurs: Virology  
Fri: No Practical |
| 5 | Aug 13 | Parasitology 1 (MPF)  
Parasitology 2 (MPF) | No Practical |
| 6 | Aug 20 | Mid Semester Test (on Weeks 1-4) | Wed: Bacto  
Thurs: Parasitology  
Fri: No practice |
| 7 | Aug 27-31 | Week Free | No Practical |
| 8 | Sep 3 | Parasitology 3 (MPF)  
Parasitology 4 (MPF) | Wed: No Practical  
Thurs: Parasitology  
Fri: No practical |
| 9 | Sep 10 | Parasitology 5 (PJC) The Human Cost  
Parasitology 6 (PJC) Micro Parasites | Wed: Bacto  
Thurs: Bacto  
Fri: Bacto |
| 10 | Sep 17 | Mycology 1 Introduction to Medical Mycology (MM)  
Bacteria 1 Mycobacteria (PJC) | Wed: Mycology  
Thurs: Bacto  
Fri: No Practical |
| 11 | Sep 24 | Mycology 2 Fungal Pathogenicity & Laboratory Processing (MM)  
Bacteria 2 Bacterial causes of atypical pneumonia (PJC) | Wed: Mycology  
Thurs: Bacto  
Fri: No Practical |
| 12 | Oct 1 | Mycology 3 Superficial & Cutaneous Mycoses (MM)  
Bacteria 3 The HACEK Group (PJC) | Wed: Mycology  
Thurs: Bacto  
Fri: No Practical |
| 13 | Oct 8 | Mycology 4 Invasive & Systemic Mycoses (MM)  
Mycology 5 Emerging Pathogens, Treatment & Other Techniques (MM) | Wed: Mycology  
Thurs: No Practical  
Fri: No Practical |

Oct 15-19 | Study Week |
Oct 22 | Examinations Begin |

Brian Brestovac (BB), Martin Finn (MPF), Mary Malkowski (MM), Paul Costantino (PJC)