

Curtin

UNIVERSITY OF TECHNOLOGY

MEDICAL MICROBIOLOGY 331

Unit Outline

2012

SCHOOL OF
BIOMEDICAL SCIENCES



Unit Outline

Medical Microbiology 331

Semester 1 2012

Unit Index No:	310490
Credit points:	25 points
Unit availability:	2012, study period: Semester 1. Location: Bentley only.
Pre-requisite Units:	Medical Microbiology 235 or equivalent.
Unit Coordinator:	Dr Paul Costantino
Address:	School of Biomedical Sciences Curtin University of Technology GPO Box U1987 PERTH WA 6845
Email:	P.Costantino@curtin.edu.au (ensure correct spelling)
Phone:	(08) 9266 7485 (no voice mail), messages may be left with Janette at the enquiries desk on 9266 7374
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

Prerequisite Skills

The content covered in MM331 assumes that you:

- are competent in English and the components of MM235 from the first semester of second year
- have good written and verbal communication skills
- can effectively source, access and use library resources (printed and electronic)
- are familiar with the use of a computer and the internet.

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

MM331 is designed to introduce you to the predominant characteristics of the more common bacteria encountered in the clinical laboratory, the sites in the human body where these organisms are found and the disease states they can cause in humans. A particular emphasis will be made of the role of the microbiology laboratory in the diagnosis and treatment of infection caused by specific organisms – this will include study of organisms and laboratory methods in bacteriology, parasitology and mycology. In addition, students will be given an insight into current aspects of research surrounding specific groups of pathogenic microbes and you will also gain an awareness of specimen collection and processing methodologies.

Learning Outcomes

This unit is designed to further your theoretical knowledge and practical skills in Medical Microbiology, particularly as undertaken for the diagnosis of infectious disease but also for research in associated fields.

On successful completion of this unit, students should be able to:

1. Exhibit a sound knowledge of medical bacteriology including the pathogenic significance, laboratory isolation, classification and identification of important groups of bacteria.
2. Display an understanding of medical virology, parasitology and mycology and the methods used in the laboratory for diagnosis of infection with these organisms.
3. Name and describe the more common causative organisms of specific infectious diseases affecting various body sites.
4. Apply advanced practical skills and knowledge for the handling of laboratory specimens in diagnostic microbiology.

Specific learning objectives and outcomes are shown for Practical exercises and will be provided for the lecture program with lecture notes when available.

Professional Skill Outcomes

On successful completion of this unit you will have completed tasks that will have developed the following skills:

Effective Communication

Communicating with your lecturer and other students by use of written and verbal presentations

Awareness of quality assurance requirements

Monitoring and record keeping of these requirements.

Problem Solving and Decision Making

Setting aside time to study, research, revise and review unit materials. Reviewing lecture materials
Submitting assignments and self-study exercise. Completion of assessments

Teamwork

Completing group-practical exercises. Recording, presentation and
Discussion of practical results.

Practical Competence

'Hands-on' experiments in practical sessions
Completion of practical exercises competently and safely

Syllabus of the unit

The following outlines the material covered under lecture topics for this unit in the first semester.

Syllabus and Lecture topics	
BACTERIOLOGY	
	Introduction to Antibacterial agents Classes of antibiotics, mechanisms of action, target organisms, intrinsically resistant organisms, routes of administration, and specific sites of effectiveness. The CDS and CLSI disc methods of antimicrobial susceptibility testing. Introduction to ESBL's and AMP C B-lactamase resistance and the laboratory detection, recognition and reporting of these antimicrobial profiles.
	Gram-positive cocci <i>Streptococci</i> : review of identifying characteristics, classification antigenic typing, pathogenesis and virulence factors. Further study of medically important species and associated diseases. <i>Staphylococci</i> : review only of identification and classification. Disease association, genetics and antibiotic resistance, epidemiology.
	Gram-positive bacilli <i>Corynebacterium</i> : clinical significance - diphtheria, bacteraemias, laboratory isolation and characteristics. <i>Listeria</i> , <i>Bacillus</i> and <i>Clostridium</i> .
	Fermentative Gram-negative bacilli The Enterobacteriaceae Gram-negative cell wall structure and pathogenesis, other virulence properties. Isolation, identification and clinical significance of selected genera; <i>Escherichia</i> , <i>Shigella</i> , <i>Klebsiella</i> , <i>Serratia</i> , <i>Enterobacter</i> , <i>Proteus-Providencia</i> group, <i>Salmonellae</i> , <i>Yersinia</i> . Antibiotic resistance in this group.
	The <i>Vibrionaceae</i> Gastrointestinal pathogens - laboratory isolation, epidemiology and pathogenesis. Vibrios and septic infections. <i>Aeromonas</i> and <i>Plesiomonas</i> laboratory and clinical aspects.
	Non-fermentative Gram-negative bacilli Laboratory and clinical characteristics of <i>Pseudomonas</i> , other GN non-fermenters. The fastidious Gram-negative bacilli including <i>Haemophilus</i>
	Gram-negative cocci <i>Neisseria</i> : clinical significance, virulence properties, laboratory isolation, antibiotic treatment and resistance. Other GNC - <i>Acinetobacter</i> , <i>Moraxella catarrhalis</i>
PARASITES CAUSING HUMAN DISEASE	
	Laboratory methods in parasitology. Trematodes encountered in Australia including <i>Fasciola hepatica</i> and the blood flukes.
	Major cestodes in Australia. <i>Hymenolepis nana</i> , <i>Taenia saginata</i> , <i>Taenia solium</i> , <i>Echinococcus granulosus</i> and other zoonotic cestodes.
	Nematodes in Australia. <i>Ascaris lumbricoides</i> , Hookworm spp., <i>Trichuris trichiura</i> , <i>Enterobius vermicularis</i> . <i>Strongyloides stercoralis</i> .
	<i>Giardia</i> and other protozoa.
MYCOLOGY	
	Fungi Introduction, definition, structure, terminology and treatments.
	Definitions of Superficial, Cutaneous, Subcutaneous and Systemic Mycoses Examples of diseases and causal fungi, especially the dermatophytes and filamentous fungi & moulds like <i>Aspergillus sp.</i> <i>Penicillium sp.</i> Introduction to dimorphic fungi and yeast including <i>Candida sp.</i> and <i>Cryptococcus neoformans</i> .

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.

Winn, W., Allen, S., Janda, W., Koneman, E., Procop, G., Schreckenberger, P., & Woods, G. 2006. *Koneman's Color Atlas and Textbook of Diagnostic Microbiology*. (6th ed). Lippincott, Philadelphia.

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Robertson Library level 6 616.9041 WIN

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

Additional recommended texts

Forbes, B.A., Sahm, D.F., & Weissfeld, A.S. 2007. *Bailey and Scott's Diagnostic Microbiology* (12th ed). Mosby Inc, Missouri.

Engelkirk, P.G., and Duben-Engelkirk, J. 2008. *Laboratory Diagnosis of Infectious Diseases – essentials of Diagnostic Microbiology*. Lippincott Williams and Wilkins, Philadelphia.

Fischbach, F., and Dunning, M.B. 2009. *A manual of Laboratory and Diagnostic Tests* (8th ed). Lippincott Williams and Wilkins, Philadelphia.

Bauman, R. W. 2011. *Microbiology: with diseases by taxonomy*. (3rd ed). Benjamin Cummings, San Francisco.

Other texts that you may find useful are:

Brooks, G.F., Butel, J.S. (2004) *Jawetz, Melnick&Adelberg's Medical Microbiology* 23rd Ed. McGraw Hill

Greenwood, D. et al. (2007) *Medical Microbiology*, 7th Ed. Churchill Livingstone.

Mims, C., Dockrell, H.M.. et al (2008) *Medical Microbiology* . 4th Ed. Mosby.

Murray, P. R. et al. (2003) *Manual of Clinical Microbiology*, 8th Ed. ASM Press

Murray, P. R. et al. (2007) *Manual of Clinical Microbiology*, 9th Ed. American Society for Microbiology.

Murray, P. R. et al. (2009) *Medical Microbiology*, 6th Ed. Mosby

Laboratory Manual

Access to the following **laboratory manual** is essential:

- *Medical Microbiology 331 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 2 hours of practical classes during the second week of semester, then
- 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 or completed by the laboratory demonstrator each week. **Failure to complete assessable elements will result in failure in this unit.** During this semester you will be working with 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. A fine point permanent marking pen is essential.

You will require a copy of selected tables in Chapters 6 and 7 from the following text **before** commencing the **first** practical session. Place the tables in a display book or similar folder and bring these with you to each practical session throughout the semester. *Check the “Blackboard” site for MM331 before going to the library to photocopy these.*

Barrow, G.I. and Feltham, R.K.A. 1993. *Cowan and Steel’s manual for the identification of medical bacteria*. (3rd edition). Cambridge University Press, Cambridge.

Robertson Library Level 2 reserve 616.014 COW
Robertson Library Level 6 616.014 COW

Tables: 6.1, 6.2b, 6.3a & b, 6.8, 6.9a & b
7.1, 7.2a, 7.3, 7.4a, 7.6a & b, 7.8b & c, 7.9a to g, 7.10b & c

Results from practical exercises must be recorded in a satisfactory, professional manner and be ready for assessment. A mark based on the completion of selected laboratory reports will be provided for each student. Each week a number of practical reports will be selected at random for marking from the total of 10 to be completed by you during the semester.

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

METHOD OF 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 combined practical components (Prac. Reports + Prac. Exam i.e. $\geq 15/30\%$) **and** the combined theory components (Mid-semester test + Final Theory Exam i.e. $\geq 35/70\%$). Because of this requirement, **it is not uncommon 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).**

Assessment Task	Worth	Applies to...
Selected practical reports and exercises	10%	Practicals
Written test	20%	Theory Content
Final practical examination*	20%	Practicals
Final theory examination	50%	Lectures
TOTAL	100%	

*Part of the practical assessment for this unit will include the preparation of a purity plate during one of the last three designated practical sessions (Prac 6-8). This will occur without prior warning as part of the regular practical exercises.

Assessment Details

Mid-Semester Test: One during semester around week 6, date shown in the class schedule. The paper consists of short answer and multi-choice questions covering lecture material to that time in the semester.

20% of final mark.

Laboratory Work: This component of assessment will comprise marks for selected practical reports including any tutorial questions. This mark will also be influenced by attendance and performance in scheduled laboratory sessions.

10% of final mark.

Final semester Examinations:

Theory: 2 hour paper, format to be advised (covering the whole semester).

50% of final mark

Practical: To be held during normal laboratory times in final week of the semester. Will consist of spot questions and laboratory exercises.

LIMITED MATERIALS WILL BE ALLOWED

20% of the final semester mark

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%.

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://library.curtin.edu.au/research_and_information_skills/referencing/chicago.pdf)

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.shtml>

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 delegate) may vary from the examples shown in the Table.

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

Refer to the Plagiarism Policy at <http://policies.curtin.edu.au/documents/plagiarism.pdf> for full details.

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>).

START UP 2012

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. Supplementary exams are offered via the Official Communication Channel (OCC) in the week preceding the release of your exam results. Please log into your Oasis account regularly during this time to check your status. See below regarding 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 can be awarded per student per study per

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.

Timetable for Medical Microbiology 331, Semester 1, 2012

Week no.	Week of	LECTURE Monday 1400-1500 302.001	LECTURE Monday 1500-1600 302.001	LECTURE Tuesday 1700-1800 302.001	PRACTICAL 308.250
	20 Feb	ORIENTATION WEEK – Discuss Unit Outline, Thurs 23rd Feb, 1030-1100, 401.002			
1	27 Feb	Intro. to Antibacterial Agents PJC	Fermentative GNB + ESBL PJC	UTI & Processing Urine PJC	Prac 1. Wed 1hour Thurs 1 hour
2	5 Mar	Processing Pus and Wound Swabs PJC	Catalase Positive GPC PJC	Catalase Negative GPC 1. PJC	Prac 2. Wed/Thurs/Fri
3	12 Mar	Catalase Negative GPC 2. PJC	Non-Fermentative GNB PJC	Other GNB PJC	Prac 3. Wed/Thurs/Fri
4	19 Mar	GPB PJC	Bacterial GIT infections PJC	Faecal Processing PJC	Prac 4. Wed/Thurs/Fri
5	26 Mar	Parasitology 1 PJC	Parasitology 2 PJC	No Lecture	Prac 5. Wed/Thurs/Fri
6	2 April	Parasitology 3 PJC	Mid-Semester Test (date/time not negotiable)	No Lecture	No Practical
7	9 April	EASTER/WEEK FREE			
8	16 April	GNC PJC	Intro. to Mycology PJC	No Lecture	Prac 6. Wed/Thurs/Fri
9	23 April	Ear/Eyes/Nose/ Throat infections TK	Processing sputum and lower RTI TK	No Lecture	No Practical
10	30 April	Review Mid Semester Test	Mycobacteria TK	No Lecture	Prac 7. Wed/Thurs/Fri
11	7 May	Genital Tract Infections PJC	Cardiovascular and systemic infections PJC	No Lecture	Prac 8. Wed/Thurs/Fri
12	14 May	No Lecture	CNS infections PJC	No Lecture	No Practical
13	21 May	No Lecture	No Lecture	No Lecture	PRACTICAL ASSESSMENT
14	28 May	STUDY WEEK			
	4 June	EXAMINATIONS BEGIN			

PJC: Dr Paul J Costantino, TK: Assoc. Prof. TK Mukkur