



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

1. Course: CMMB 343 – MICROBIOLOGY

Lecture Section:	L01	MWF	15:00-15:50	ENG 60	WINTER 2018
LABS:		T	09:00/13:00	EEEL 303/369	
		R	09:00/13:00	EEEL 303/369	
Course Coordinator:	Dr. S.L. Wong				
Instructor(s):	Dr. A. Manko	BI 466		220-8573	anna.manko@ucalgary.ca
	Dr. S.L. Wong	BI 178A		220-5721	slwong@ucalgary.ca
Lab Coordinator:	W. Huddleston	EEEL 235B		220-7739	wrhuddle@ucalgary.ca

Desire 2 Learn site for this course is CMMB343 L01-(Winter 2018)-Microbiology
Biological Sciences Department BI 186; (403) 220-3140; biosci@ucalgary.ca

- 2. PREREQUISITE(S):** Chemistry 351 and one of Biology 231 or 243 or 311 or Medical Science 341.
See section 3.5.C in the Faculty of Science section of the online Calendar
(<http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html>)

- 3. Grading:** The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Laboratory		40%		
First Midterm Exam	Feb. 7	15%	In-Class	TBA
Second Midterm Exam	Mar. 14	15%	In-Class	TBA
Final exam (cumulative)		30%		

(There will be a final exam scheduled by the Registrar's Office.)

Each piece of work (laboratory reports, midterm test or final examination) submitted by the student will be assigned a percentage score. The student's average percentage score for the various components listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade using the conversion scale provided below, bearing in mind that a maximum grade of D+ will result if the student does not write and pass (> 50%) the final lab exam and the laboratory component of the course. Students must attend all laboratory classes; lab assignments will not be accepted from students who were absent without a valid excuse from the lab in which data were collected/distributed. Students who miss a substantial number of labs will not be permitted to write the final laboratory exam.

Letter Grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Min. Percent Required	93	89	84	79	76	73	70	65	60	55	50

- 4. Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.3](#) of the University Calendar
- 5. Dates and times of class exercises held outside of class hours:** The weekly laboratory exercises will require students to return to the lab the day following their scheduled lab to record experimental results. The lab will be open throughout the day (Monday, Wednesday and Friday) to accommodate students.

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a clash with this out-of-class-time-activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

- 6. Course Materials:** TEXT: Required: Huddleston et al. 2018. CMMB 343 Lab Manual
Madigan and Martinko. Brock: Biology of Microorganisms.
15th Edition. Pearson Prentice-Hall.
A laboratory jacket (available at the bookstore) is **required** for CMMB 343
Optional: Leboffe and Pierce. A Photographic Atlas for the Microbiology Laboratory. 4th Edition.
Morton Publishing Company.
- RESERVE READING ROOM: Books and reviews are listed on the last page.

7. **Examination Policy:** No electronic or written aids (e.g. cell phones, tablets, computers, PDAs, notes, textbooks) will be allowed during writing of any exams. Non-programmable calculators will be permitted to answer quantitative questions on exams, if applicable, and permission to do this will be clearly indicated on the examination paper. Students should also read the Calendar, [Section G](#), on Examinations.
8. In this course, the quality of the student's writing in laboratory reports will be a factor in the evaluation of those reports. See also [Section E.2](#) of the University Calendar.
9. **Human studies statement:** indicating whether students in the course may be expected to participate as subjects or researchers. See also [Section E.5](#) of the University Calendar.

ETHICS IN THE BIOLOGICAL SCIENCES

Studies in the Biological Sciences involve the use of living and dead organisms. Students taking laboratory- and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Department strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered by the Department of Biological Sciences should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Undergraduate Program Director of the Department.

See also <http://www.ucalgary.ca/pubs/calendar/current/e-5.html>.

10. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- (a) **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K. Student Misconduct to inform yourself of definitions, processes and penalties.
- (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points.
- (c) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf.

Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of Biological Sciences, Dr. H. Addy by email addy@ucalgary.ca or phone 403 220-3140.
- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPPA). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>.
- (f) **Student Union Information:** VP Academic Phone: 403 220-3911 Email: suypaca@ucalgary.ca
SU Faculty Rep. Phone: 403 220-3913 Email: science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca;
Student Ombuds Office: 403 220-6420 Email: ombuds@ucalgary.ca; <http://ucalgary.ca/provost/students/ombuds>
- (g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- (h) **U.S.R.I.:** At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference - please participate in USRI Surveys.

CMMB 343 - Lecture schedule Winter 2018

Date	Topic	Lecturer
Jan 8	Introduction (Microorganisms and Microbiology)	A. Manko
Jan 10	Importance of microorganisms to evolution and life	A. Manko
Jan 12	Bacterial Cell Structure	A. Manko
Jan 15	Bacterial Cell Structure	A. Manko
Jan 17	Bacterial Cell Structure	A. Manko
Jan 19	Growth and Metabolism	A. Manko
Jan 22	Growth and Metabolism	A. Manko
Jan 24	Growth and Metabolism	A. Manko
Jan 26	Growth and Metabolism	A. Manko
Jan 29	Adaptation to Extreme Environments	A. Manko
Jan 31	Nutrient Cycles	A. Manko
Feb 2	The Carbon cycle / Microbes and global climate change	A. Manko
Feb 5	Microbial Ecosystems	A. Manko
Feb 7	First Midterm Exam (in class, TBA) 50 minutes	
Feb 9	Microbial Ecology	A. Manko
Feb 12	Microbial Ecology	A. Manko
Feb 14	Bacterial genomes	S.-L. Wong
Feb 16	Genomes and gene organization	S.-L. Wong
Feb 18-25	Reading WEEK	
Feb 26	Gene organization and Transposon	S.-L. Wong
Feb 28	Transposon	S.-L. Wong
Mar 2	Plasmid and Conjugation	S.-L. Wong
Mar 5	Conjugation	S.-L. Wong
Mar 7	Transformation	S.-L. Wong
Mar 9	Genetic engineering	S.-L. Wong
Mar 12	Bacteriophages and viruses	S.-L. Wong
Mar 14	Second Midterm exam (in class, TBA) 50 minutes	
Mar 16	Bacteriophages and viruses	S.-L. Wong
Mar 19	Bacteriophages and viruses	S.-L. Wong
Mar 21	Protein secretion	S.-L. Wong
Mar 23	Protein secretion	S.-L. Wong
Mar 26	Bacterial communication	S.-L. Wong
Mar 28	Bacterial communication	S.-L. Wong
Mar 30	Good Friday (No class)	
Apr 2	Microbes that cause infections	A. Manko
Apr 4	Microbes that cause infections	A. Manko
Apr 6	Microbes that cause infections	A. Manko
Apr 9	Immunology	S.-L. Wong
Apr 11	Immunology	S.-L. Wong
Apr 13	Immunology	S.-L. Wong

Final Exam (cumulative): April 16-26, 2018

MICROBIOLOGY RESERVED READING LIST

- Brock Biology of Microorganisms (14th edition) Madigan, Martinko, Stahl and Clark, 2015
Bacterial Metabolism (2nd ed.) - Gottschalk - QR 88 G67
Bacterial Energetics (The Bacteria Volume 12) - Krulwich - QR 41 G78
Biology of the Prokaryotes – Lengeler et al., (1999)
Early Life - Margulis - QH 325 M32
Microbiology: An Evolving Science, 3rd edition – Slonczewski and Foster- 2013
Physiology of the Bacterial Cell: A Molecular Approach - Neidhardt et al. - QR 84 N44
Variations in Autotrophic Life - Shively and Barton - QR 88 V37
Bergey's Manual of Systematic Bacteriology on ONE HOUR RESERVE - 7th Ed. - QR 81 S63
8th Ed. - QR 81 S63
9th Ed. vol.1 - QR 81 S633
vol.2 - QR 81 S633
- Molecular Genetics of Bacteria – Snyder and Champness – (4th Ed.), 2013
Molecular Evolution - Terzaghi et al., - QR 371 M68
Microbiology - An Introduction (4th Ed.) - Tortora et al., - QR 41.2 T67
Fundamental Bacterial Genetics – Nancie Trun and Janine Trempey, 2004 Edition
Basic Virology – Edward K. Wagner, Martinez J. Hewlett; 2nd Edition, 2003
Genes VIII – Benjamin Lewis, 2004 Edition

Laboratory Attendance:

Attendance is required at all laboratory classes. It is the student's responsibility to provide a written medical or other legal excuse for an absence immediately upon return to class. The documentation must be explicit in regards to the days missed, the reason, and when the student can return to classes. A doctor's or medical clinic note that does not include a valid reason for missing the lab will not be accepted.

Laboratory Warning:

This course requires time in the laboratory outside of scheduled class time (see page xiv of the 2018 Lab Manual). If your class schedule conflicts with the open lab schedule (see page v of the 2018 Lab Manual), contact W Huddleston (wrhuddle@ucalgary.ca) to make alternate arrangements.

Academic Misconduct:

Academic misconduct will not be tolerated in CMMB 343. A **single offence of cheating or plagiarism** on term work, quizzes or examinations may lead to severe disciplinary action. **Cheating** involves giving or receiving information during a quiz or examination. **Plagiarism** involves submitting work as if it is the student's own work. Any work, in whole or in part, must be referenced if it is obtained from any other source. Refer to the University of Calgary online calendar at <http://www.ucalgary.ca/honesty> for further information.

Regrading of Term Work and Midterm Exams

A student that is not satisfied with the grading of a laboratory submission should first speak to the lab TA. If satisfaction is not achieved, the student should submit the piece of term work to W Huddleston for an independent reappraisal. This **MUST** be done within **15 days** of the work being returned to the student. Refer to the University of Calgary calendar and page vi of the 2018 Lab Manual for further information. Same rule applies to the two midterm exams. Please contact the corresponding instructors within 15 days after the official posting of the exam scores.

LEARNING OUTCOMES

At the end of the course you should be able to:

1. Describe and explain the differences between organisms in the three Domains (Eukarya, Archaea, and Bacteria). Further you should be able to explain which of the three are Prokaryotes. (Disciplinary knowledge, Science in society)
2. Explain and discuss the prominent role of Prokaryotes in:
 - a. Evolution
 - b. Nutrient cycling
 - c. Extreme environments.
3. Describe and discuss topics in the field of microbiology, such as bacteriology, virology, immunology, bacterial genetics, molecular biology, bacterial ecology, metabolism, host-microbe interactions. (Disciplinary knowledge, Science in society)
4. Work safely and effectively with bacteria and bacteriophage using sterile technique with bacteria. (Technical skills)
5. Communicate effectively in lab reports using appropriate scientific terms. (Communication)
6. Create a presentation on a specific microbe. (Communication)
7. Identify an unknown microbe using appropriate diagnostic tools. (Curiosity and Creativity, Critical thinking)
8. Work with another student to carry out experiments, collect and analyze the data and then write your lab reports independently. (Research, Collaboration, Self-directed learning, Communication, Career Skills)