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 CHC 105 WINTER 2016

Instructor(s):				
	Dr. P. Dunfield	BI 319D	220-2469	pfdunfie@ucalgary.ca
	Dr. D. Storey	BI 196A	220-5274	storey@ucalgary.ca
	W. Huddleston	EEEL 235B	220-7739	wrhuddle@ucalgary.ca

Desire 2 Learn site for this course is CMMB343 L01-(Winter 2016)-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. 8	15%	In-Class	MFH 162
Second Midterm Exam	Mar. 16	15%	In-Class	MFH 162
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.

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. 2016. CMMB 343 Lab Manual
Madigan and Martinko. Brock: Biology of Microorganisms.
14th 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.

9. 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.

10. **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.

STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS. Students are expected to be familiar with http://www.ucalgary.ca/pubs/calendar/current/sc-5-1.html of the on-line calendar.

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

11. 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 (FOIPP). 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: suvpaca@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.

Department Approval _____ORIGINAL SIGNED_____ Date_____

M343 co W16; 1/6/2016 10:20 AM

UNIVERSITY OF CALGARY
DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

CMMB 343
MICROBIOLOGY

TERM: Winter 2016 SECTION NO: 01

Prerequisites: Chemistry 351 and one of Biology 231 or 243 or 311 or Medical Science 341.

NOTE: A student may not register in a course unless he/she has a grade of at least C- in each prerequisite course.

Prior completion of or concurrent registration in Biochemistry 393 and Chemistry 353 is strongly recommended.

COURSE COORDINATOR:	Dr. D. Storey			
LECTURER(S):	Dr. D. Storey	BI 196A	220-5274	storey@ucalgary.ca
	Dr. P. Dunfield	BI 319D	220-2469	pfdunfie@ucalgary.ca
LAB COORDINATOR:	W Huddleston	EEEL 235B	220-7739	wrhuddle@ucalgary.ca

LECTURES:	MWF	15:00 – 15:50	CHC 105
LABS:	T	09:00/13:00	EEEL 303/369
	R	09:00/13:00	EEEL 303/369

TEXT: Required: Huddleston et al. 2016. CMMB 343 Lab Manual
Madigan and Martinko. Brock Biology of Microorganisms.
14th 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 following page.

MARK DISTRIBUTION:

A. Composition of Final Grade

Laboratory		30%	
First Midterm Exam	Feb. 8	15% (50 min)	In-Class
Second Midterm Exam	Mar. 16	15% (50 min)	In-Class
Final Laboratory exam		10% (2 hours)	
Final exam (cumulative)		30% (3 hours)	

A+ ≥ 93
A ≥ 89
A- ≥ 84
B+ ≥ 79
B ≥ 77
B- ≥ 73
C+ ≥ 70
C ≥ 65
C- ≥ 60
D+ ≥ 55
D ≥ 50
F < 50

B. Final Exam
There will be a final examination scheduled by the Registrar's Office.

An introductory study of the systematics, ecology, physiology, molecular biology and role in pathogenesis of the major groups of prokaryotes.

CMMB 343 - Lecture schedule Winter 2016

Date	Topic	Lecturer
Jan 11	Introduction (Microorganisms and Microbiology)	P. Dunfield
Jan 13	Microbial diversity	P. Dunfield
Jan 15	Microbial ecosystems	P. Dunfield
Jan 18	Adaptation to extreme environments	P. Dunfield
Jan 20	Symbioses	P. Dunfield
Jan 22	Microbial growth curves	P. Dunfield
Jan 25	Metabolism (Glycolysis and Fermentation)	D. Storey
Jan 27	Metabolism (Aerobic respiration and the Electron transport chain)	D. Storey
Jan 29	Metabolism (Redox and energetics)	P. Dunfield
Feb 1	Metabolism (Anaerobic respiration and Lithotrophy)	P. Dunfield
Feb 3	The Nitrogen cycle	P. Dunfield
Feb 5	The Carbon cycle / Microbes and global climate change	P. Dunfield
Feb 8	**First Midterm Exam (in class, TBA) 50 minutes**	Dunfield/Storey
Feb 10	Microbial Ecology	P. Dunfield
Feb 12	Motility/chemotaxis	P. Dunfield
Feb 14-20	**Reading WEEK**	
Feb 22	Cell structure	P. Dunfield
Feb 24	Cell structure	P. Dunfield
Feb 26	Cell structure	P. Dunfield
Feb 29	Bacterial genomes	P. Dunfield
Mar 2	Genomes and gene organization	P. Dunfield
Mar 4	Bacterial Genetics: Plasmid and Conjugation	D. Storey
Mar 7	Bacterial Genetics:Conjugation	D. Storey
Mar 9	Bacterial Genetics:Transformation	D. Storey
Mar 11	Bacterial Genetics:Genetic engineering	D. Storey
Mar 14	Bacteriophages and viruses	D. Storey
Mar 16	**Second Midterm exam (in class, TBA) 50 minutes**	Dunfield/Storey
Mar 18	Bacteriophages and viruses	D. Storey
Mar 21	Bacteriophages and viruses	D. Storey
Mar 23	Bacteriophages and viruses	D. Storey
Mar 25	Good Friday University closed	
Mar 28	Human Microbiome and Health	D. Storey
Mar 30	Microbes that cause infections	D. Storey
Apr 1	Microbes that cause infections	D. Storey
Apr 4	Microbes that cause infections	D. Storey
Apr 6	Microbes that cause infections	D. Storey
Apr 8	Immunology	D. Storey
Apr 11	Immunology	D. Storey
Apr 13	Immunology	D. Storey

Final Exam (cumulative): April 16-27, 2016

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 – Nanct Trun and Janine Trempy, 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 2016 Lab Manual). If your class schedule conflicts with the open lab schedule (see page v of the 2016 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 2016 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.

LABORATORY SCHEDULE

Location: odd sections - EEEL 369; even sections - EEEL 303

WARNING: this course requires time in the labortory outside of scheduled class time (see page xiv). If your class schedule conflicts with the open lab schedule, contact Mr. Huddleston (wrhuddle@ucalgary.ca) to make alternate arrangements.

Date	**Exercise**	**Assignment Due Date**
January 12/14	**NO LABS**	Pre-Laboratory due January 15
January 19/21	**LABORATORY 1**	Exercise 1 due January 26/28
January 26/28	**LABORATORY 2**	Exercise 2 due Jan 29/Feb 1
February 2/4	**LABORATORY 3**	Exercise 3 due February 5/8
February 9/11	**LABORATORY 4**	Ames Test Exercise due Feb 9/11 Exercise 4 due February 10/12
February 16/18	**NO LABS (READING WEEK)**	
February 23/25	**CLASS PRESENTATIONS**	
March 1/3	**MIDTERM LAB EXAM** **BACTERIAL UNKNOWN**	Unknown due March 4/7
March 8/10	**LABORATORY 5** **BACTERIAL UNKNOWN**	Exercise 5 due March 11/14
March 15/17	**LABORATORY 6** **BACTERIAL UNKNOWN**	Exercise 6 due March 22/24
March 22/24	**LABORATORY 7** **BACTERIAL UNKNOWN**	Exercise 7 due March 25/28 Journal due March 29/31
March 29/31	**NO LABS**	
April 5/7	**FINAL LAB EXAM**	

OPEN LAB SCHEDULE
Monday: 0900-1200
Wednesday: 0900-1500
Friday: 0900-1500