



UNIVERSITY OF
CALGARY

DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

1. **Course:** BIOL/MDSC 501 - PRINCIPLES AND MECHANISMS OF PHARMACOLOGY

Lecture Section(s) L01 MW 5:00-6:20PM HSG 500 FALL 2015

Instructor(s): Dr. Donna Slater 210-7660 dmslater@ucalgary.ca

Desire 2 Learn (D2L) course website: <https://d2l.ucalgary.ca/d2l/home/107077>

Biological Sciences Department BI 186 403-220-3140 biosci@ucalgary.ca

2. **Prerequisites:** BCEM 393 443 and one of Zoology 241,463 or MDSC 404, or consent of the Course Coordinator
See section 3.5.C in the Faculty of Science section of the online Calendar
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:

Midterm Examination	30%	October 19 th in class
Written Report	30%	November 18 th - submit hard copy in class & on D2L
Final Examination	40%	To be scheduled during university exam period (Dec 11 th -22 nd , 2015)

Each piece of work (assignment, midterm test or final examination) submitted by the student will be assigned a percentage score. The 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.

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.6](#) of the University Calendar

5. **Scheduled out-of-class activities:**

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 (recommended): Rang and Dale's Pharmacology

- 6th edition. By HP Rang, MM Dale, JM Ritter & RJ Flower
- 7th edition. By HP Rang, MM Dale, JM Ritter, RJ Flower & G Henderson
- 8th edition. By HP Rang, JM Ritter, RJ Flower & G Henderson

Any of the above is HIGHLY recommended and provides a strong basis for the course lectures

Online Course Components: Tutorial assignments will be completed online, via the D2L course website. Students must ensure they have adequate access to the course website, and that they leave adequate time to access and complete the tutorial assignments before the due dates/times.

7. **Examination Policy:** Examinations are closed book; use of any aids, other than those listed on the examination front page, is not allowed. Students should also read the Calendar, [Section G](#), on Examinations.

8. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- (a) **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) 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 _____

COURSE INFORMATION SHEET
MDSC/BIOL 501 - Fall 2015

Principles and Mechanisms of Pharmacology

1. COURSE DESCRIPTION: This introductory pharmacology course will cover:

(i) basic physiological and biophysical principles of pharmacology, including how drugs interact with cell receptors (pharmacodynamics) and factors affecting drug absorption, distribution and elimination (pharmacokinetics) from the body, as well as

(ii) the mechanisms of action of the major drugs employed in the treatment of (a) disorders of the cardiovascular and renal systems (e.g. hypertension), central nervous system (e.g. depression, addiction), gastrointestinal (e.g. inflammatory bowel disorders), and reproductive organs (e.g. birth control and pre-term labour), (b) inflammation, pain and fever, and (c) cancer.

This course is designed for senior undergraduate or junior graduate students in the biological/biomedical sciences. Course content will be delivered by lectures with specialist lecturers for each topic. Additional tutorials will also be available.

2. PRE-REQUISITES: Biochemistry 393, 443 and one of Zoology 461, 463, or Medical Sciences 404, or consent of Course Coordinator (Dr. D.M. Slater).

3. PARTICIPANTS: A class of HIGHLY MOTIVATED, DEDICATED, ENTHUSIASTIC AND QUESTIONING, CRITICAL senior undergraduates or first year graduate students will interact with highly qualified lecturers selected for their scientific/clinical/industry expertise.

4. PHILOSOPHY OF INSTRUCTION: This course expects that an interactive environment for learning will be established to facilitate the ability to think and integrate. This will be accomplished through active stimulation of class discussion and questions. In other words, we WANT discussion and stimulating questions!!!!

5. EVALUATION: Marks will be based on formal mid-term (2) and final examinations.

Grading scale: >96, A+; 90-95, A; 85-89, A-; 85-89, B+; 80-84, B; 75-79, B-; 70-74, C+; 65-69, C; 60-64, C-; etc. (Please see the example below and adjust accordingly)

Breakdown: Mid-term exam - 1	30%
Written Report	30%
Final Exam -	40% (during December Exam period)

6. COURSE CONTENT: All classes are on Monday and Wednesday from 5:00 - 6:20 pm lectures in G500 of the Health Sciences Building in the Faculty of Medicine.

This course is divided into units presented in team-taught lectures and optional, online tutorial sessions (TBA). The suggested text is *Pharmacology* (6th, or 7th or 8th edition) by HP Rang, MM Dale, JM Ritter and RJ Flower (Churchill Livingstone Press) (cost < \$80). This is an outstanding text that you will definitely use in the future!!

Letter grade conversion scheme for BIOL/MDSC 501

A+	96%
A	90-95%
A-	85-89%
B+	80-84%
B	75-79%
B-	70-74%

C+	65-69%
C	60-64%
C-	57-59%
D+	54-56%
D	50-53%
F	<50%

MDSC 501

Principles and Mechanisms of Pharmacology

Instructors:

Donna Slater, PhD Course Coordinator

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Dr. Ebba Kurz

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Dr. Stephanie Warner

stephanie.warner@ucalgary.ca

Office Hours and Policy on Answering Student Emails

Meetings with course coordinator and TA are available by appointment. Please email with MDSC/BIOLOG 501 in the subject line of the message. The course coordinator and TA will endeavour to respond within 2 working days. Instructors are not expected to respond to questions within 48 hours of exams.

Time and Location:

Fall 2015 September 9th to December 7th

Lectures will be held on Mondays and Wednesdays at 5:00-6:20pm in G500

Prerequisite:

BCEM 393, 443 plus MDSC 404, or ZOOL 461, 463 or consent of Course Coordinator

Overarching Theme

Introduce some of the basic principles of pharmacology with specific emphasis on the mechanisms of receptor signaling and enzyme interaction

Global Objectives

- Introduce basic physiological and biophysical concepts of pharmacology, including how drugs act and the factors affecting their absorption, distribution and elimination
- To facilitate the ability to integrate information provided and apply to the principles and mechanisms of pharmacology in the context of select disease and or pathologies

Learning Objectives

By the end of this course, using the lectures provided and recommended reading resources, students will gain an understanding of the basic role of pharmacology and will be able to:-

Using named examples in selected physiological and pathophysiological systems:-

- (i) describe the difference between what drugs do and how they work in the body
- (ii) categorize the main targets for drug interaction at the cellular level- e.g. receptors, enzymes, ion channels
- (iii) understand that many drugs exert their effects via interaction (antagonist/agonist/inhibition/activation) with specific receptors, signaling pathways, enzymes and channels within different target tissues
- (iv) explain the role of selected chemical mediators and how they may be manipulated in pharmacology
- (v) describe the main forms of drug action for the treatment of selected pathophysiology and diseases

Recommended Textbooks/Readings

Rang and Dale's Pharmacology

- 6th edition. By HP Rang, MM Dale, JM Ritter & RJ Flower
- 7th edition. By HP Rang, MM Dale, JM Ritter, RJ Flower & G Henderson
- 8th edition. By HP Rang, JM Ritter, RJ Flower & G Henderson

Any of the above is HIGHLY recommended and provides a strong basis for the course lectures

Evaluation

The University policy on grading and related matters is described in section F.2 of the 2015-2016 Calendar. In determining the overall grade in the course, the following weights will be used:

Assignment	Percentage of Grade	Due Date
1. Mid-term Exam	30%	October 19 th in class
2. Written Report	30%	November 18 th - submit in class & on D2L
3. Final Exam	40%	To be scheduled during university exam period (Dec 11 th -22 nd , 2015)

** The use of aids (open book, programmable calculator) will not be permitted in either exam

**A passing grade is required for each exam if the student is to pass the course as a whole

A Note regarding Writing Assignments:

In keeping with the University of Calgary's emphasis on the importance of academic writing in student assignments (section E.2 of 2015-16 Calendar), this course relies heavily on writing and the grading thereof in determining a student's mark. Competency in writing is not the exclusive domain of the humanities and social sciences, nor does it solely mean accuracy in mechanics (grammar, spelling, punctuation). The University of Calgary offers a number of instructional services through the Students' Success Centre's Writing Support Services (<http://www.ucalgary.ca/writingsupport/>) for students seeking feedback on assignments or seeking to improve their general writing skills. Students are **strongly encouraged** to take advantage of these programs.

Grading Scheme:

A+ 96-100%	B+ 80-84%	C+ 65-69%	D+ 54-56%
A 90-95%	B 75-79%	C 60-64%	D 50-53%
A- 85--89%	B- 70-74%	C- 57-59%	F 0-49%

Missed Components of Term Work:

It is the agreement of Faculty and Staff involved in MDSC501 that **extensions will NOT be granted** on the written assignment. The only exceptions to this are those in keeping with the University Calendar (illness, religious conviction, or domestic affliction) that are received in writing and with supporting documentation.

Desire 2 Learn (D2L)

Desire 2 Learn is located on the University of Calgary server and will be used extensively for communication with students. **It is the student's responsibility to ensure that s/he gets all posted communications and documents and that s/he receives emails sent by instructors or fellow students through D2L.** Your email address on D2L is the one you gave to the Registrar. Using an email address on the University server (name@ucalgary.ca) will ensure that you receive emails and that, should the server ever be down, instructors will be aware of it. Other servers sometimes filter D2L or instructor group mailings as spam; **we therefore require that you have your [name@ucalgary.ca](mailto:yourname@ucalgary.ca) email address linked to D2L.**

Policies Governing the Course:

Attendance

Attendance at lectures is strongly encouraged. Posted lecture notes form the basis of information required; however, class questions, discussion and additional information in the lecture will add depth to the knowledge base and facilitate greater success in the course assignment and exams.

Conduct During Lectures

Students are expected to conduct themselves in a mature and courteous manner during ALL lectures. Students are expected to frame their comments and questions to lecturers in respectful and appropriate language, always maintaining sensitivity towards the topic.

Students are expected to take notes during each session and should not rely solely on handout material supplied by the instructors.

Electronic Devices

The Bachelor of Health Sciences program aims to create a supportive and respectful learning environment for all students. Research studies have found that student use of electronic devices (laptops, tablets, etc) in the classroom negatively affects the learning of both the user and those sitting nearby. Inappropriate use of laptops is also disruptive to your fellow classmates and disrespectful to the lecturer. Their use in the classroom is **strongly discouraged** and may be prohibited by instructors except in circumstances related to course content. Should laptops be permitted, their use is limited to taking notes and **NOT to surf the web, check email or do other unrelated work**. Students who use their laptops inappropriately or are otherwise disruptive during lectures will be asked to leave. Repeat offences may be considered non-academic misconduct and disciplined accordingly.

Cell phones, PDAs, and similar devices **must be turned off** (not merely silent) during class time. Students who disregard this rule during lectures or tutorials will be asked to leave. These items are not permitted under any circumstance during any examinations.

Copyright

It is the responsibility of students and professors to ensure that materials they post or distribute to others comply with the Copyright Act and the University's Fair Dealing Guidance for Students (library.ucalgary.ca/files/library/guidance_for_students.pdf). Further information for students is available on the Copyright Office web page (<http://library.ucalgary.ca/copyright>)

A Note Regarding Instructor Intellectual Property

Generally speaking, course materials created by professor(s) (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the professor(s). These

materials may **NOT** be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course *at the same time* may be allowed under fair dealing.

Academic Accommodations Based on Disability

It is the student's responsibility to register with Student Accessibility Services to be eligible for formal academic accommodation. If you are a student who may require academic accommodation and have not registered with Student Accessibility Services, please contact their office at (403) 220-8237; <http://www.ucalgary.ca/access/>. Students will be provided with all necessary accommodations to ensure equal opportunity to succeed in this course. Please provide the instructor your accommodation letter from Student Accessibility Services within 14 days after the start of this course so that all needed arrangements for exams and assignments can be made.

Accommodations on Protected Grounds other than Disability

Students who require an accommodation in relation to their coursework based on a protected ground other than disability, should communicate this need, preferably in writing, to the designated BHSc program contact, Mrs. Jennifer Logan (jljlogan@ucalgary), or to Dr. Ebba Kurz, Associate Dean, Undergraduate Health and Science Education, Cumming School of Medicine. Students who require an accommodation unrelated to their coursework or the requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Vice-Provost (Student Experience). For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/.

Academic Misconduct

Cheating, plagiarism, and other forms of academic misconduct are very serious offences that will be dealt with rigorously in all cases. Consequences include failure on the assignment, failure in the course and possibly suspension or expulsion from the BHSc program or the University. The Cumming School of Medicine follows a zero tolerance policy regarding dishonesty. **All incidences of academic dishonesty will be reported to the O'Brien Centre Office and be recorded in their student records.** The University calendar is explicit about what is construed as academic misconduct and on the appropriate penalties. Students are referred to the "Student Misconduct" sections of the University Calendar for further information.

Recording of Lectures

Audio or video recording of lectures is prohibited except where explicit permission has been received from the course coordinator and individual instructor.

Other Important Information

Freedom of Information and Protection of Privacy Act

This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP) and students should identify themselves on written assignments (exams and term work.) by their name and ID number on the front page and ID on each subsequent page. Assignments given by you to your course instructor will remain confidential unless otherwise stated before submission. The assignment cannot be returned to anyone else without

your expressed permission to the instructor. Grades will be made available on an individual basis and students will not have access to other students' grades without expressed consent. Similarly, any information about yourself that you share with your course instructor will not be given to anyone else without your permission.

Appeals

If there is a concern with the course, academic matter or a grade, first communicate with the instructor. If these concerns cannot be resolved, students can proceed with an academic appeal, as per Section I of the University Calendar. Students must follow the official reappraisal / appeal process and should contact the Student Ombudsperson Office,

(<http://www.ucalgary.ca/provost/students/ombuds>), for assistance with this and with any other academic concerns, including academic and non-academic misconduct.

Resources for Support of Student Learning and Wellness

Student Success Centre <http://www.ucalgary.ca/ssc/>

Student Wellness Centre <http://www.ucalgary.ca/wellnesscentre/>

Distress Centre <http://www.distresscentre.com/>

Student Union (SU) Information

The SU Vice-President Academic can be reached at (403) 220-3911 or suvpaca@ucalgary.ca the SU representative for the Cumming School of Medicine can be reached at medrep@su.ucalgary.ca

Emergency Evacuation/Assembly Points

Assembly points for emergencies have been identified across campus. Assembly points are designed to establish a location for information updates from the emergency responders to the evacuees; and from the evacuated population to the emergency responders. The primary assembly point for the Health Science Centre is the Health & Research Innovation Centre (HRIC) Atrium. The alternate assembly point is Parking Lot 6.

Safewalk

Campus security will escort individuals, day or night, anywhere on campus (including McMahon Stadium, Health Sciences Centre, Student Family Housing, the Alberta Children's Hospital and the University LRT station). Call 220-5333. Use any campus phone, emergency phone or the yellow phone located at most parking lot pay booths.

Lecture and exam schedule

	Date	Topic	Lecturer	Note
1	Sept. 9 (W)	Course introduction and overview	Dr. Slater / TA	Lectures/Paper/ Exams etc
		General Principles & Chemical Mediators		
2	Sept. 14 (M)	Pharmacodynamics I	Prof. Giembycz	
3	Sept. 16 (W)	Pharmacodynamics II	Prof. Giembycz	
4	Sept. 21 (M)	Introduction to Pharmacokinetics	Prof. Cribb	
5	Sept. 23 (W)	GPCRs and Cell Signaling	Dr. Slater	
6	Sept. 28 (M)	Nuclear Receptors	Dr. Slater	
7	Sept. 30 (W)	Autonomic Nervous System	Prof. Giembycz	
8	Oct. 5 (M)	Inflammatory Mediators & Anti-Inflammatory Drugs	Dr. Slater	
9	Oct. 7 (W)	(i) Review for mid-term exam (ii) Written paper - expectations	Dr. Slater / TA	Detailed info on written paper
	Oct. 12 (M)	THANKSGIVING HOLIDAY	NO CLASS	
		Drugs Affecting Major Organ Systems		
10	Oct. 14 (W)	Respiratory I	Dr. Warner	
11	Oct. 19 (M)	MID-TERM EXAMINATION (lecture 2-8)	Dr. Slater / TA	(30%)
12	Oct. 21 (W)	Respiratory II	Dr. Warner	
13	Oct. 26 (M)	Reproduction/ Endocrine	Dr. Slater	
14	Oct. 28 (W)	Pain	Dr. Altier	
15	Nov. 2 (M)	Cardiovascular / Renal I	Prof. Cole	
16	Nov. 4 (W)	Cardiovascular / Renal II	Prof. Cole	
17	Nov. 9 (M)	Cardiovascular / Renal III	Prof. Cole	
	Nov. 11 (W)	READING / REMEMBRANCE DAY	NO CLASS	
18	Nov. 16 (M)	GI Pharmacology I	Dr. Hirota	
19	Nov. 18 (W)	GI Pharmacology II	Dr. Hirota	Paper due (30%)
		The Nervous System and Cancer		
20	Nov. 23 (M)	Neuro I	Dr Borgland	
21	Nov. 25 (W)	Neuro II	Dr Borgland	
22	Nov. 30 (M)	Cancer I	Dr. Kurz	
23	Dec. 2 (W)	Cancer II	Dr. Kurz	
24	Dec. 7 (M)	FINAL Class – Review Tutorial	Dr. Slater / TA	
	Dec 11 – 22	Final Exam - To be scheduled	Dr. Slater / TA	(40%)

Written report = 30% - hard copy due November 18th 2015 in class and on D2L

Mid-term exam = 30% - Monday Oct 19, 2015

Final Exam = 40% - during final examination period