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

1. **Course: BIOLOGY 505 – MEDICINAL PLANT BIOCHEMISTRY**

Lecture Sections: L01 MWF 2:00-2:50 SA 109 WINTER 2018

Course Coordinator: Dr. D-K Ro

Instructor(s):				
	Dr. P. Facchini	BI 396	220-7651	pfacchin@ucalgary.ca
	Dr. D-K. Ro	BI 393	220-7099	daekyun.ro@ucalgary.ca

D2L Course Website: BIOL 505 L01 (Winter 2018) – Medicinal Plant Biochemistry
Biological Sciences Department BI 186; (403) 220-3140; biosci@ucalgary.ca

2. **PREREQUISITE(S):** Biology 331 and Biochemistry 393

ANTIREQUISITE(S): Credit for both Biology 505 and Botany 503 will not be allowed.
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:

Midterm Exam	30 %	In-Class February 26, 2018
Seminar	20 %	
Term Paper	20 %	
Final Exam	30 %	

There will be a final exam scheduled by the Registrar's office.

A passing grade is required for the final examination and laboratory reports. Each piece of work (term paper, seminar, 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.

Letter Grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Min. Percent Required	90	85	80	77	73	70	67	63	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. **Scheduled out-of-class activities:** Dates and times of approved class activities held outside of class hours. N/A

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: Plant Biochemistry and Molecular Biology. Hans-Walter Heldt., Oxford University Press, 1997.

Biochemistry & Molecular Biology of Plants. Buchanan, B., W. Gruissem & R. Jones, American Society of Plant Physiologists, 2000.

7. **Examination Policy**: No aids (e.g. calculators) are allowed in the examinations. Students should also read the Calendar, Section G, on Examinations.

8. **Writing across the curriculum statement:** In this course, the quality of the student's writing in assignments will be a factor in the evaluation of this component. See also Section E.2 of the University Calendar.

Department Approval ORIGINAL SIGNED Date

9. **Human studies statement:** Students in the course are not 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 fieldwork 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 (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.

LEARNING OUTCOMES

- Describe the general chemical structure, distribution in nature, and biosynthesis in plants of benzylisoquinoline alkaloids
- Describe the general chemical structure, distribution in nature, and biosynthesis in plants of monoterpenoid indole alkaloids
- Describe the general chemical structure, distribution in nature, and biosynthesis in plants of tropane alkaloids, calystigines and nicotine
- Describe the general chemical structure, distribution in nature, and biosynthesis in plants of glucosinolates and cyanogenic glycosides
- Define the current state of research on the biochemistry, cell biology and biotechnology of plant specialized metabolites
- Describe the general chemical structure, distribution in nature, and biosynthesis in plants of terpenoids
- Describe the general chemical structure, distribution in nature, and biosynthesis in plants of phenylprolanoids
- Define the basic strategies for the metabolic engineering of plant biosynthetic pathways.
- Describe the contribution of natural products in pharmaceutical industries.

TENTATIVE LECTURE SCHEDULE

Date	Topic	Instructor
January 8	Introduction of natural products	DKR
January 10	Bioactive natural products	DKR
January 12	Terpenoid principle and history	DKR
January 15	Terpene mechanism	DKR
January 17	Terpene synthase gene family	DKR
January 19	Terpene precursor biosynthesis I	DKR
January 22	Terpene precursor biosynthesis II	DKR
January 24	Terpenoid biotechnology	DKR
January 26	Research tools in plant metabolism study	DKR
January 29	Carotenoid principle	DKR
January 31	Carotenoid metabolism I	DKR
February 2	Carotenoid metabolism II	DKR
February 5	Carotenoid application	DKR
February 7	Introduction of phenylpropanoid	DKR
February 9	Phenylpropanoid metabolism I	DKR
February 12	Phenylpropanoid metabolism II	DKR
February 14	Bioactive phenylpropanoid	DKR
February 16	Review	DKR
February 19-23	READING WEEK	
February 26	MIDTERM EXAM – in class	
February 28	Terpenophenolics	PJF
March 2	Benzylisoquinoline alkaloids I	PJF
March 5	Benzylisoquinoline alkaloids II	PJF
March 7	Benzylisoquinoline alkaloids III	PJF
March 9	Monoterpenoid indole alkaloids I	PJF
March 12	Monoterpenoid indole alkaloids II	PJF
March 14	Monoterpenoid indole alkaloids III	PJF
March 16	Tropane alkaloids and nicotine I	PJF
March 19	Tropane alkaloids and nicotine II	PJF
March 21	Purine alkaloids I	PJF
March 23	Purine alkaloids II	PJF
March 26	Pyrrolizidine alkaloids	PJF
March 28	Cellular compartmentalization of alkaloid metabolism I	PJF
March 30	GOOD FRIDAY	
April 2	Cellular compartmentalization of alkaloid metabolism II	PJF
April 4	Glucosinolates I	PJF
April 6	Glucosinolates II	PJF
April 9	Cyanogenic glucosides I	PJF
April 11	Cyanogenic glucosides II	PJF