UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: September 1995
REVISED COURSE IMPLEMENTATION DATE: September 2022
COURSE TO BE REVIEWED (six years after UEC approval)**:** January 2028
Course outline form version: 05/18/2018

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: BIO 320	**Number of Credits:** 3 Course credit policy (105)

Course Full Title: Biochemistry
Course Short Title: Biochemistry
(Transcripts only display 30 characters. Departments may recommend a short title if one is needed. If left blank, one will be assigned.)

Faculty: Faculty of Science	**Department (or program if no department):** Biology

Calendar Description:

Covers the structures, function, and metabolic interactions of lipids, steroids, vitamins, amino acids, and proteins. An emphasis will be placed on metabolic processes that have an impact on human diseases.

Note: This course is offered as BIO 320 and BIOC 320. Students may take only one of these for credit.

Prerequisites (or NONE):	BIO 201 and CHEM 213.
Corequisites (if applicable, or NONE):	
Pre/corequisites (if applicable, or NONE):	

Antirequisite Courses *(Cannot be taken for additional credit.)*
Former course code/number:
Cross-listed with: **BIOC 320**
Dual-listed with:
Equivalent course(s): **BIOC 320**
(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar hours	45
Tutorials/workshops	
Supervised laboratory hours	
Experiential (field experience, practicum, internship, etc.)	
Supervised online activities	
Other contact hours:	
Total hours	**45**

Labs to be scheduled independent of lecture hours: ☒ No ☐ Yes

Special Topics *(Double-click on boxes to select.)*
This course is offered with different topics:
☒ No ☐ Yes *(If yes, topic will be recorded when offered.)*

Independent Study
If offered as an Independent Study course, this course may be repeated for further credit: *(If yes, topic will be recorded.)*
☒ No ☐ Yes, repeat(s) ☐ Yes, no limit

Transfer Credit
Transfer credit already exists: *(See **bctransferguide.ca**.)*
☐ No ☒ Yes
Submit outline for (re)articulation:
☐ No ☒ Yes *(If yes, fill in transfer credit form.)*

Grading System
☒ Letter Grades ☐ Credit/No Credit

Maximum enrolment (for information only): 36

Expected Frequency of Course Offerings:
Every semester *(Every semester, Fall only, annually, etc.)*

Department / Program Head or Director: Gregory Schmaltz	**Date approved:**	September 2021
Faculty Council approval	**Date approved:**	October 8, 2021
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	January 28, 2022

Learning Outcomes:

Upon successful completion of this course, students will be able to:

1. Categorize the major human biochemical pathways in carbohydrate, amino acid and lipid metabolism. Emphasis is placed on the integration/application of these pathways and their importance in human health and disease.
2. Compare the regulatory mechanisms controlling major metabolic pathways and relate these mechanisms to physiological state.
3. Identify ketone bodies and understand their role in ketosis and ketogenic diets.
4. Identify the biochemical components of plasma lipoproteins and their importance in human health and disease.
5. Operate in collaborative small groups via problem-based learning (PBL) to perform critical thinking of clinical data sets.
6. Present biochemical findings of clinical data sets in small group discussions.
7. Evaluate results from modern laboratory techniques including protein purification, functional assays, mass spectrometry and amino acid sequencing.
8. Illustrate important biochemical features of hemoglobin & myoglobin and how these features relate to their physiological role.
9. Discuss the regulation and importance of the urea cycle and its integration with the citric acid cycle. Students will evaluate case studies on urea cycle enzymatic deficiencies and treatments.
10. Differentiate between non-essential and essential amino acids and identify amino acid synthetic pathways in humans.
11. Discuss current research findings involving regional Indigenous plants and their biochemical role in human health.

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion.)*

Lecture

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials *(If more space is required, download Supplemental Texts and Resource Materials form.)*

	Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	Berg, Tymoczko & Stryer	Biochemistry	☒	Freeman	2019
2.			☐		
3.			☐		
4.			☐		
5.			☐		

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

Typical Evaluation Methods and Weighting

Final exam:	25%	Assignments:	10%	Field experience:	%	Portfolio:	%
Midterm exams (2):	50%	Project:	%	Practicum:	%	Paper:	10%
Quizzes/tests:	5%	Lab work:	%	Shop work:	%	Total:	100%

Details (if necessary):

Typical Course Content and Topics

Week 1: Lipids: structure, function and physical properties
Week 2: Fatty acid metabolism: beta-oxidation and ketone bodies
Week 3: Fatty acid metabolism: fatty acid synthesis
Week 4: Cholesterol metabolism: lipid transport and plasma lipoproteins
Week 5: Amino acid structures and amino acid chemistry (titration curves)
Week 6: Protein structure and function
Week 7: Proteins: analytical lab techniques
Week 8: Proteins: mass spectrometry and amino acid sequencing
Week 9: Case Study: The Biochemistry of Hemoglobin and myoglobin
Week 10: Amino acid metabolism: aminotransferases and citric acid cycle
Week 11: Amino acid metabolism: the urea cycle and urea cycle disorders
Week 12: Amino acid synthesis
Week 13: Current research: Indigenous plants and implications on human health and disease