



The University of Southern Queensland

Course specification

The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.
Please consult the web for updates that may occur during the year.

Description: Wine Biochemistry

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
WIN	2204	91464	2, 2009	EXT	1.00	Toowoomba

Academic group:	FOSCI
Academic org:	FOS002
Student contribution band:	6
ASCED code:	019905

STAFFING

Examiner: Robert Learmonth

Moderator: Ursula Kennedy

REQUISITES

Pre-requisite: BIO1101 and CHE2120 and WIN2102

RATIONALE

This course provides an introduction to the major classes of biochemical compounds, their structures, chemistry and metabolism, and major metabolic processes including respiration and photosynthesis. The course also addresses biochemical reactions and additives during wine production and storage, to complement courses in wine production.

SYNOPSIS

Biochemistry may be considered as the description of life at the molecular level. The chemical and physical nature of structures and functions within living cells is studied. This course allows students to develop an understanding of the major classes of biochemical compounds found in living organisms and the metabolism of these compounds. It discusses the structures and chemistry of biomolecules, bioenergetics of metabolic reactions and central metabolic processes including metabolism of carbohydrates, respiration and photosynthesis. This is extended to consider the biochemistry of important enzyme-catalysed reactions during production and storage of wine. Impacts of enzymes from the grapes, the microbes used to ferment wine, and used as winemaking additives are discussed. The course also considers biochemical and spectroscopic analysis of wine.

OBJECTIVES

On completion of this course students will be able to:

1. demonstrate a knowledge of the major classes of biochemical compounds, including carbohydrates, lipids and proteins (Assignment 1, Exam);
2. describe the action of enzymes and their applications metabolism (Exam);

3. demonstrate an awareness of the core metabolic processes which occur in most organisms (including grape vines and winemaking micro-organisms) (Exam);
4. demonstrate familiarity with the integration of metabolic pathways in an organism (Exam);
5. describe the roles of enzymes in winemaking, the sources of these enzymes, their activities and impacts on wine production and quality (Assignment 2, Exam)
6. describe and identify biochemical components that impact on wine production and quality (Assignment 2, Exam)

TOPICS

	Description	Weighting (%)
1.	Biological Macromolecules: structure and chemistry, carbohydrates, lipids, proteins.	20.00
2.	Enzymes: structure, mechanisms of action. enzyme kinetics, allosteric enzymes.	10.00
3.	Bioenergetics: energetics of reactions, ATP and other high energy compounds, energy content of carbohydrates, lipids, proteins.	10.00
4.	Metabolic regulation, central metabolic pathways of carbohydrate metabolism: glycolysis, gluconeogenesis, carbohydrate storage (synthesis and degradation of glycogen and starch)	10.00
5.	Respiratory metabolism: citric acid cycle, electron transport chain, oxidative phosphorylation.	10.00
6.	Photosynthesis: light reactions, Calvin cycle.	10.00
7.	Biochemistry of yeast metabolism and production of wine sensory components	10.00
8.	Biochemistry of added winemaking enzymes and microbial enzymes	10.00
9.	Biochemical analyses of grapes and wine; enzyme assays and spectroscopic analyses	10.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at <http://bookshop.usq.edu.au> click 'Semester', then enter your 'Course Code' (no spaces).

Nelson, DL & Cox, MM 2008, *Lehninger principles of biochemistry*, 5th edn, WH Freeman, New York.

REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Berg, JM, Tymoczko, JL & Stryer, L 2007, *Biochemistry*, 6th edn, WH Freeman, New York.

Boulton, RB, Singleton, VL, Bisson, LF & Kumkee, RW 1999, *Principles and practices of winemaking*, Aspen Publishing, Gaithersburg.

(ISBN 0 8342 1270 6)

Ebeler, SE, Takeoka, GR & Winterhalter, P 2007, *Authentication of Food and Wine*, Oxford University Press,

(ISBN-10: 0841239657, ISBN-13: 978-0841239654)

Farkas , B 1988, *Technology and Biochemistry of Wine*, CRC Press,

(ISBN-10: 2881240704, ISBN-13: 978-2881240706)

Margalit , Y 2004, *Concepts in Wine Chemistry*, 2nd edn, Wine Appreciation Guild,

(ISBN-10: 1891267744, ISBN-13: 978-1891267741)

Mathews, CK, Van Holde, KE & Ahern, KG 2000, *Biochemistry*, 3rd edn, The Benjamin/Cummings Publishing Company, California.

Osgood, M & Ocorr, K 2008, *The absolute, ultimate guide of lehninger principles of biochemistry - study guide & solutions manual*, 5th edn, WH Freeman, New York.

Rankine, BC 2004, *Making good wine: A manual of winemaking practice for Australia and New Zealand*, MacMillan, Sydney.

Voet, D, Voet, JG & Pratt, CW 2006, *Fundamentals of biochemistry*, 2nd edn, John Wiley and Sons, New York.

Zoecklein, BW, Fugelsand, KC, Gump, BH & Nury, FS 1999, *Wine analysis and production*, Kluwer Academic/Plenum, New York.

(ISBN 0 412 98921 2)

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Directed Study	80.00
Examinations	2.00
Private Study	83.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	20.00	20.00	20 Jul 2009 (see note 1)
ASSIGNMENT 2	20.00	20.00	20 Jul 2009 (see note 2)
2 HOUR CLOSED EXAMINATION	60.00	60.00	END S2 (see note 3)

NOTES

1. Examiner will advise due dates of Assignment 1.
2. Examiner will advise due dates of Assignment 2.
3. The date of the exam will be during the examination period and will become available during the semester. Please check the exam timetable once published.

IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:
It is the students' responsibility to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.
- 2 Requirements for students to complete each assessment item satisfactorily:
To complete each of the assessment items satisfactorily, students must obtain at least 50% of the marks available for each assessment item. (Depending upon the requirements in Statement 4 below, students may not have to satisfactorily complete each assessment item to receive a passing grade in this course).
- 3 Penalties for late submission of required work:
If students submit assignments after the due date without (prior) approval of the examiner then a penalty of 5% of the total marks gained by the student for the assignment may apply for each working day late up to ten working days at which time a mark of zero may be recorded. No assignments will be accepted after model answers have been posted.
- 4 Requirements for student to be awarded a passing grade in the course:
To be assured of receiving a passing grade a student must achieve at least 50% of the total weighted marks available for the course.
- 5 Method used to combine assessment results to attain final grade:
The final grades for students will be assigned on the basis of the aggregate of the weighted marks obtained for each of the summative assessment items in the course.
- 6 Examination information:
In a Closed Examination, candidates are allowed to bring only writing and drawing instruments into the examination.
- 7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held during the next examination period.
- 8 University Regulations:
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL

<http://www.usq.edu.au/corporateservices/calendar/part5.htm> or in the current USQ Handbook.

ASSESSMENT NOTES

- 9 The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner. Students must retain a copy of each item submitted for assessment. If requested by the Examiner, students will be required to provide a copy of the assignments submitted for assessment purposes. Such copies should be despatched to USQ within 24 hours of receipt of a request being received. The examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.