



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 Microbiology

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
WIN	2206	91466	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 WIN2102

RATIONALE

Microbiological considerations are important in grape and wine production. It is important that wine industry professionals understand the involvement and significance of micro-organisms in viticulture and wine making, and become sufficiently familiar with microbiology to gain an appreciation of the roles played by micro-organisms in the environment, and potential positive and negative impacts of micro-organisms on grapevine health and wine production processes. This course includes an introduction to the biology of bacteria, yeasts, fungi and viruses, as well as instruction on selection and management of winemaking yeast and bacteria, microbial wine spoilage and microbial control.

SYNOPSIS

This course in wine microbiology is aimed at providing knowledge to wine industry professionals on the positive and negative impacts that micro-organisms can have on quality of grapes and wine. It begins with a general introduction to microbiology, including consideration of the relevance of microbiology in improving our daily lives and the environment. This course includes discussion of the history and diversity of micro-organisms, microbial cell structure and function, metabolism, nutrition, growth and control of micro-organisms, classification and reproduction of fungi, factors affecting the interactions of micro-organisms including bacteria, viruses, fungi and protists with plants, an introduction to the types and roles of micro-organisms found in wines, roles of yeasts and bacteria in wine making and spoilage reactions, and control of micro-organisms in wine making. Consideration of more advanced aspects of wine microbiology in this course include selection and management of winemaking yeast and bacteria for optimal primary and secondary fermentations, development of new winemaking strains and conventional and novel approaches to strain selection and fermentation management.

OBJECTIVES

On completion of this course students will be able to:

1. demonstrate an understanding of key microbiological terms (Exam);
2. demonstrate a working knowledge of the taxonomy and morphological features of micro-organisms, including viruses, bacteria, fungi and protozoa (Assignment 1, Exam);
3. demonstrate an understanding of the various metabolic processes of bacteria and roles of bacteria in ecological, biotechnological and pathogenic functions (Assignment 1, Exam);
4. describe the general characteristics, classification, in vivo and in vitro replication of viruses and their relevance to the wine industry (Exam);
5. describe the range of micro-organisms associated with wine (Assignment 2, Exam);
6. describe the role of the micro-organisms in grape and wine production, including potential positive and negative impacts (Assignment 2, Exam);
7. discuss the traditional and novel winemaking yeasts and bacteria, their requirements and their benefits (Assignment 2, Exam);
8. critically appraise traditional and novel approaches to selection of yeast and bacterial strains for wine making (Assignment 2, Exam);
9. outline the types of microbial spoilage reactions, their identifying sensory characteristics (Exam);
10. discuss microbial control options and their potential impacts on the wine produced (Exam).

TOPICS

	Description	Weighting (%)
1.	History and diversity of micro-organisms	5.00
2.	Microscopy and its role in microbiology	5.00
3.	Overview of cell structure and function	5.00
4.	Introduction to bacteria	5.00
5.	Introduction to fungi and yeasts	5.00
6.	Introduction to viruses	5.00
7.	Nutrition, growth and control of micro-organisms	5.00
8.	Microbial metabolism	5.00
9.	Microbial genetics	5.00
10.	General concepts of Microbial ecosystems	5.00
11.	Impact of micro-organisms in the vineyard	10.00
12.	Characterisation of winemaking micro-organisms and their impact on winemaking processes	5.00
13.	Introduction to yeast genetics, yeast identification and development of new yeast strains, comparison of properties of traditional and non-traditional winemaking yeasts, genetic engineering approaches to yeast improvement	5.00
14.	Primary fermentation as a microbial ecosystem: impact of wild yeasts, seeded and non-seeded ferments and impacts on wine fermentation performance and sensory profiles	5.00

15.	Malolactic fermentation as a microbial ecosystem, contributions of bacterial species and impact on sensory profiles	5.00
16.	Microbial wine spoilage and management of spoilage micro-organisms	10.00
17.	Microbial control approaches and their impact on wine quality	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).

Black, JG 2007, *Microbiology: principles and explorations*, 7th edn, John Wiley & Sons Inc., Hoboken, NJ,
(ISBN: 0471420840)

Ribereau-Gayon, R, Dubourdieu, D, Doneche B & Lonvaud, A 2005, *The handbook of enology, Volume 1: The microbiology of wine and vinification*, John Wiley & Sons, Hoboken, NJ,

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.

Barnett, JA, Payne RW & Yarrow, D 2000, *Yeasts: characteristics and identification*, 3rd edn, Cambridge University Press, Cambridge.

Bergey, D 1993, *Bergey's manual of determinative bacteriology*, 9th edn, Williams & Wilkins, Baltimore.

Bonnett, R 2002, *Wine microbiology and biotechnology*, Taylor & Francis Inc, London.

Delfini, C & Formica, JW 2001, *Wine microbiology: science and technology*, Marcel Dekker Inc, New York.

Fleet, GH 1993, *Wine microbiology and biotechnology*, Hardwood Academic Publishers, Switzerland.

Fugelsang, KC 1997, *Wine microbiology*, Chapman & Hall, New York.

Jackson, RS 2000, *Wine science principles, practice, perception*, 2nd edn, Academic Press, San Diego, California.

Kurtzman, CP & Fell, JW (eds), NJW 1998, *The yeasts: a taxonomic study*, 4th edn, Elsevier Science Publishers, New York.

Marriott, NG 2006, *Principles of food sanitation*, 5th edn, Springer, New York, N.Y.

Martinko, JM, Madigan, MT & Parker, J 2003, *Brock biology of microorganisms*, 10th edn, Pearson Education, Upper Saddle River, NJ.

Zoecklein, BW, Fugelsand, KC, Gump, BH & Nury, FS 1999, *Wine analysis and production*, Kluwer Academic/Plenum, New York, pp280-302.

(pp 280-302)

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.