

Course Outline

Code: MBT301

Title: Pharmaceutical and Food Microbiology

School of:	Science & Engineering
Teaching Session:	Semester 1
Year:	2019
Course Coordinator:	Dr Ipek Kurtböke Telephone: 07 5430 2819 Email: IKurtbok@usc.edu.au
Course Moderator:	Assoc. Prof. Mohammad Katouli

Please go to the USC website for up to date information on the teaching sessions and campuses where this course is usually offered.

1. What is this course about?

1.1 Description

In this course you learn the essential microbiological processes that play significant roles in the current and future global food and pharmaceutical industries. You learn how to implement relevant microbiological safety, preservation and quality assurance strategies to prevent food spoilage and food-borne infections. Laboratory practicals are designed to complement your learning. The course also addresses ethical and professional issues related to both industries. Gain of laboratory skills is an essential component of the course as well as understanding the theory behind each experiment.

1.2 Course topics

The Big Picture; Pharmaceutical and Food Microbiology and current issues related to these industries
Food borne diseases and Food handling and safety
Principals and industrial aspects of food and pharmaceutical fermentation
Fermentation related to beverage industry
Fermentation related to dairy and meat industry
Exotic foods and microbial biomass as food source
Principals and stages of pharmaceutical fermentation and microbial products
Advanced laboratory skills, ethics, communication and professionalism

2. What level is this course?

300 level Graduate - Independent application of graduate knowledge and skills. Meets AQF and professional requirements. May require pre-requisites and developing level knowledge/skills. Normally taken in the 3rd or 4th year of an undergraduate program

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

Specific Learning Outcomes On successful completion of this course, you should be able to:	Assessment tasks You will be assessed on the learning outcomes in task/s:	Graduate Qualities or Professional Standards mapping Completing these tasks successfully will contribute to you becoming:
Describe and apply theoretical and practical knowledge of: <ul style="list-style-type: none"> • fermentative production of beverages and food; • pharmaceutical industry related strategies used to discover new drugs or produce the known ones effectively • current issues related to food borne diseases and food safety 	1. Early assessment exam 2. Mid-term exam 4. Final exam	Empowered Knowledgeable
Interpret and analyse data and other information related to food fermentation and spoilage as well as testing of pharmaceutical/health compounds of microbial origin	3. Laboratory Portfolio	Empowered Ethical Knowledgeable
Act professionally by demonstrating graduate level laboratory skills and biosafety adhering to ethical codes of conduct in data collection and analysis	3. Laboratory Portfolio	Empowered Ethical Knowledgeable

5. Am I eligible to enrol in this course?

Refer to the [USC Glossary of terms](#) for definitions of “pre-requisites, co-requisites and anti-requisites”.

5.1 Enrolment restrictions

Nil

5.2 Pre-requisites

LFS261 or MBT263

5.3 Co-requisites

Nil

5.4 Anti-requisites

Nil

5.5 Specific assumed prior knowledge and skills (where applicable)

Competent laboratory skills and scientific report writing

6. How am I going to be assessed?

6.1 Grading scale

Standard – High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL)

6.2 Assessment tasks

Task No.	Assessment Tasks	Individual or Group	Weighting %	Duration / length	When should I submit?	Where should I submit it?
1	Early Assessment Exam	Individual	Formative	1 hour	Week 4	Tutorial room
2	Mid-term Exam	Individual	20%	2 hour	Week 7	Lecture room
3	Laboratory Portfolio	Individual	50% [a] Laboratory quizzes (20%) and [b] Laboratory report (30%)	a] 30min quiz b] up to 3000 words	a] Weeks 5,7,9,11,13 b] end of the semester	a] Laboratory b] to be submitted in the last practical (week 13) to the course coordinator as hard copy
4	Final Exam	Individual	30%	2 hours	Central Exam Period	TBA
			100%			

Assessment Task 1: Early Assessment Quiz

Goal:	This is an important quiz that allows you to consider how you are managing the foundational theoretical knowledge and progress in the course and will help you in being successful for the mid-term exam.	
Product:	Formative quiz	
Format:	One hour - Multiple choice/short answer exam related to content in the first three lectures	
Criteria:	Application of theoretical and practical knowledge of food borne diseases and food spoilage	
Generic skill assessed	Skill assessment level	
Problem solving	Graduate	

Assessment Task 2: Mid-term exam

Goal:	You will demonstrate your knowledge of principles and strategies covered in lectures 1 to 6 . In particular, you will apply pharmaceutical and food microbiology knowledge to practical issues encountered in food industry.	
Product:	Exam	
Format:	Two hour written exam composed of multiple choice questions, short answer and essay question(s)	
Criteria:	Application of theoretical and practical knowledge of: <ul style="list-style-type: none"> • principles of food fermentation & beverage production • strategies and current issues related to food safety Critical interpretation of information on: <ul style="list-style-type: none"> • effectiveness of food safety strategies • large scale production of fermented beverages in industrial context 	
Generic skill assessed	Skill assessment level	
Problem solving	Graduate	

Assessment Task 3: Laboratory Portfolio

Goal:	This assessment has been designed for you to specifically develop your competencies in the laboratory – which is an essential skill for Biomed students and for many other disciplines under general science umbrella including microbiology and biotechnology. At the end of the course you should have graduate level competence that is essential for gaining employment.	
Product:	Laboratory quizzes and a laboratory report	
Format:	<p>Laboratory quizzes: 30 min exam after completion of each practical composed of four essay questions. Only students who actively participated in the laboratory activity can take these quizzes.</p> <p>Laboratory report: Individual report (up to 3000 words) from practical number #2 (Probiotics and microbiology of milk and dairy products) that adheres to the given report structure (rubric) to be provided by the Course-Coordinator</p>	
Criteria:	<p>Laboratory quizzes: Demonstration and application of theoretical and practical knowledge gained in the practicals Interpretation and analysis of data and other information (e.g. water quality and safety, probiotics, microbial content of fresh and frozen food, beverage production, safety of stored food products)</p> <p>Laboratory report: Interpretation and analysis of data and other information (probiotics and milk and dairy products) Application of ethical codes of conduct Scientific communication</p>	
Generic skill assessed	Skill assessment level	
Communication	Graduate	
Information literacy	Graduate	
Organization	Graduate	

Assessment Task 4: Final Exam

Goal:	To assess your graduate level of knowledge critically applied to evaluate microbial metabolism and resulting microbial end products in relevant industrial contexts (covered in lectures 7-13)	
Product:	Exam	
Format:	Two hours - a written examination composed of five essay questions	
Criteria:	<p>Application of theoretical and practical knowledge of:</p> <ul style="list-style-type: none"> • specific food and pharmaceutical products & their production <p>Critical interpretation of information/data from case examples to assess the following in different industrial contexts:</p> <ul style="list-style-type: none"> • effective production and quality and safety of fermented products <p>Act professionally by identifying issues related to:</p> <ul style="list-style-type: none"> • safe food production and biosafety • ethical codes of conduct in pharmaceutical, food and beverage industries 	
Generic skill assessed	Skill assessment level	
Problem solving	Graduate	

7. What are the course activities?**7.1 Directed study hours**

2 hour lecture per week, 2 hour tutorial per fortnight, 2.5 hour laboratory practical every fortnight

7.2 Teaching semester/session(s) offered

Sippy Downs: Semester 1

7.3 Course content

Teaching Week / Module	What key concepts/ content will I learn?	What activities will I engage in to learn the concepts/content?	
		Directed Study Activities	Independent Study Activities
1	The Big Picture; Introduction to Food Microbiology and current issues related to these industries	Lecture and tutorial supplementary audio-visual material In addition, laboratory practicals during the semester will complement learning outcomes	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture Complete online laboratory safety quiz using the provided link at the blackboard, bring the printed hard copy to the first practical and hand it to your course coordinator.
2	Sources of microorganisms in food and microbial food spoilage	Lecture and tutorial supplementary audio-visual material.	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture
3	Microbial food-borne diseases Part I	Lecture and tutorial supplementary audio-visual material Laboratory Practical- 1: Detection and enumeration of pathogenic microorganisms in water	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture
4	Microbial food-borne diseases Part II	Lecture and tutorial, supplementary audio-visual material	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture
5	Introduction to industrial microbiology and principles and processes of food and pharmaceutical fermentation	Lecture and tutorial, supplementary audio-visual material Laboratory Practical- 2: Probiotics and microbiology of milk and dairy products (QUIZ #1 starts here covering the contents of practical #1: Detection and enumeration of pathogenic microorganisms in water)	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture
6	Microbiology of fermented production Part I: Beverages	Lecture and tutorial, supplementary audio-visual material Laboratory Practical- 3:	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture

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7	Microbiology of fermented food production Part II: Dairy	Lecture and tutorial, supplementary audio-visual material Laboratory Practical- 3: Microbial components of minced meat, fresh and refrigerated food (QUIZ #2 covering the contents of practical #2: Probiotics and microbiology of milk and dairy products)	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture
8	Microbiology of fermented production Part III: Meat and exotic products	Lecture and tutorial, supplementary audio-visual material	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture
9	Microbial food sources and toxins	Lecture and tutorial, supplementary audio-visual material Laboratory Practical- 4: Sauerkraut and wine production (QUIZ #3 covering the contents of practical #3: Microbial components of minced meat, fresh and refrigerated food)	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture
10	Industrial fermentation for pharmaceuticals (Part-I)	Lecture and tutorial, supplementary audio-visual material,	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture
11	Industrial fermentation for pharmaceuticals (Part-II)	Lecture and tutorial, supplementary audio-visual material Laboratory Practical-5: Detection of mycotoxin producing fungi in grain and nuts (QUIZ #4 covering the contents of practical #4:v Sauerkraut and wine production)	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture
12	Microbial enzymes and bio- preservatives of microbial origin for food and pharmaceutical industrial use (Part I)	Lecture and tutorial, supplementary audio-visual material	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture
13	Microbial enzymes and biopreservatives of microbial origin for industrial use (Part II)	Lecture and tutorial, supplementary audio-visual material Laboratory Practical- 6: Review of final results & wine titrations (QUIZ #5 covering the contents of practical #5: Detection of mycotoxin producing fungi in grain and nuts)	Read relevant sections in your text book, refer to review questions to revise key points delivered in lecture

Please note that the course activities may be subject to variation.

8. What resources do I need to undertake this course?

Please note that course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Blackboard site. Please log in as soon as possible.

8.1 Prescribed text(s)

Please note that you need to have regular access to the resource(s) listed below as they are required:

Author	Year	Title	Publisher
Ray B. and Bhunia A.	Latest edition	Fundamental Food Microbiology	CRC Press

8.2 Required and recommended readings

1. Laboratory manual prepared by the Course-coordinator to be obtained from the USC's MaPS **(required)**.
2. Capuccino, J.G. and Sherman, N. (Latest edition). *Microbiology, A Laboratory Manual*. San Francisco: Benjamin Cummings **(recommended)**.
3. Waites, M.J., Morgan, N.L., Rockey, J.S. and Higton, G. (Latest Edition). *Industrial Microbiology, An Introduction*. Blackwell Science **(recommended)**.

8.3 Specific requirements

Protective clothing for laboratory and strict adherence to the laboratory safety guidelines

9. Risk management

Each student must complete an online laboratory health and safety quiz accessed via a link on Blackboard and hand into the Course Coordinator on entry to the first laboratory

It is your responsibility as a student to review course material, search online, discuss with lecturers and peers, and understand the health and safety risks associated with your specific course of study. It is also your responsibility to familiarise yourself with the University's general health and safety principles by reviewing the [online Health Safety and Wellbeing training module for students](#), and following the instructions of the University staff.

10. What administrative information is relevant to this course?

10.1 Assessment: Academic Integrity

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Blackboard, are electronically checked through SafeAssign. This software allows for text comparisons to be made between your submitted assessment item and all other work that SafeAssign has access to.

10.2 Assessment: Additional requirements

Eligibility for Supplementary Assessment

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:

- a) The final mark is in the percentage range 47% to 49.4%
- b) The course is graded using the Standard Grading scale
- c) You have not failed an assessment task in the course due to academic misconduct

10.3 Assessment: Submission penalties

Late submission of assessment tasks will be penalised at the following maximum rate:

- 5% (of the assessment task's identified value) per day for the first two days from the date identified as the due date for the assessment task.
- 10% (of the assessment task's identified value) for the third day
- 20% (of the assessment task's identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task.
- A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task.

Weekdays and weekends are included in the calculation of days late.

To request an extension, you must contact your Course Coordinator and supply the required documentation to negotiate an outcome.

10.4 Study help

In the first instance, you should contact your tutor, then the Course Coordinator. Additional assistance is provided to all students through Academic Skills Advisers. To book an appointment or find a drop-in session go to [Student Hub](#).

Contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au

10.5 Links to relevant University policy and procedures

For more information on Academic Learning & Teaching categories including:

- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Administration of Central Examinations
- Deferred Examinations
- Student Academic Misconduct
- Students with a Disability

Visit the USC website:

<http://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching>

10.6 General Enquiries

In person:

- **USC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **USC SouthBank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **USC Fraser Coast** - Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au