



Course Outline

Code: CHM310 Title: Physical Chemistry

School of:	Science & Engineering
Teaching Session:	Semester 1
Year:	2019
Course Coordinator:	Dr Tianfang Wang Email: twang@usc.edu.au
Course Moderator:	Dr Peter Brooks

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

Producing and analysing quantitative data is central to the problem-solving role of a physical chemist. You produce quantitative data in the laboratory from Bohr's model, calorimetry and catalysis experiments. You analyse quantitative data by rearranging equations, performing dimensional analysis of units, graphing data, differentiating and integrating. Case studies are used to investigate the wave-like properties of all matter and how chemical equilibrium changed the course of history. You also study the three laws of thermodynamics and ideal and real gases.

1.2 Course topics

Is it a wave, is it a particle, could it be both? Energy, enthalpy, entropy; is the gas ideal or real? Chemical equilibrium changed the course of history, which phase is which and when?

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 outcome in task/s:	Graduate Qualities or Professional Standards mapping Completing these tasks successfully will contribute to you becoming:
Apply knowledge of physical chemistry to analyse and solve problems involving quantitative data	1, Topic presentations and reports 2, Final exam	Knowledgeable.
Produce quantitative data and compare the data to physical chemistry literature	1, Topic presentations and reports	Creative and critical thinkers.
Communicate in scientific writing and orally (to peers and staff)	1, Topic presentations and reports	Empowered.

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

SCI105 Chemistry

5.3 Co-requisites

Nil

5.4 Anti-requisites

Nil

5.5 Specific assumed prior knowledge and skills (where applicable)

Nil

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 Details of early feedback on progress

You will have feedbacks on the reports of practical classes and journal article questions during tutorials, with relevance to the final exam.

6.3 Assessment tasks

Task No.	Assessment Tasks	Individual or Group	Weighting %	What is the duration / length?	When should I submit?	Where should I submit it?
1	Mathematical and practical application of knowledge of 6 topics – choose your best 5 – or your best 5 marks count	Group & individual	50 %	Part A (group): Five x 10 min presentations of mathematical application of topic knowledge selected by each group, plus 2 min question time	Odd Weeks starting Week 5	In class
				Part B (individual): Five x 500 word reports of practical application of topic knowledge	Even Weeks starting Week 4	
2	Final exam	Individual	50%	2 hours (1500 words)	Central exam period	As set
			100%			

Assessment Task 1: Topic presentations and reports

Goal:	Presentations of quantitative step-wise solutions to physical chemistry problems and produce quantitative data in teams and compare it to physical chemistry literature to write individual reports
Product:	Five x 10-min presentations of mathematical application of topic knowledge and five x 500 word reports of practical application of topic knowledge
Format:	Presentation format is demonstration of knowledge of topic and then application of this knowledge to solve a physical chemistry problem. Report format is: title, abstract, introduction, methods, results, discussion, conclusion, references
Criteria	Apply knowledge of physical chemistry to analyse and solve problems involving quantitative data. Produce quantitative data and compare it to physical chemistry literature. Communicate in scientific writing and orally (to peers and staff).

Assessment Task 2: Final exam

Goal:	Apply knowledge of physical chemistry to analyse and solve problems involving quantitative data
Product:	2 hours (1500 words)
Format:	Analyse quantitative data using different methods to solve physical chemistry problems based on materials from lectures, tutorials and laboratory activities.
Criteria	Apply knowledge of physical chemistry to analyse and solve problems involving quantitative data.

7. What are the course activities?

7.1 Directed study hours

The directed study hours listed here are a portion of the workload for this course. A 12 unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Directed study hours may vary by location. Student workload is calculated at 12.5 learning hours per one unit.

Location: Specific Campus(es) or online:	Directed study hours for location:
USC Sippy Downs	Lecture: 2 hours per week; Laboratory: 3 hours per fortnight; Tutorial: 2 hours per fortnight.

7.2 Course content

Week # / Module #	What key concepts/content will I learn?
1-2	Electronic structure of atoms including case studies investigating the wave-like properties of all matter
3-4	Thermochemistry including the First Law of Thermodynamics, enthalpies of reaction and calorimetry
5-6	Chemical thermodynamics including Second and Third Laws of Thermodynamics and Gibbs Free Energy
7-8	Gases including real deviations from ideal behaviour
9-10	Chemical kinetics: the four factors that affect the rate of reaction investigated (including concentration and physical state of reactants, temperature and catalysis)
11-12	Chemical equilibrium including a case study about how chemical equilibrium change the course of history
13	Phase chemistry including intermolecular forces, enthalpies of physical change and phase diagrams

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
Brown, LeMay, Bursten, Murphy & Woodward	2011	Chemistry: The central science 12th edition	Pearson Education Inc.

8.2 Specific requirements

Laboratory coat, safety glasses, closed in footwear.

9. Risk management

The health and safety risk in this course may be rated moderate. It is your responsibility to familiarise yourself with the Health and Safety policies and procedures applicable within campus areas, specific to the course and relevant to the workshop, field site or organisation involved. You are also responsible for strictly following all controls instructed by the academic staff, course material or inductions. Risk assessments have been performed for each experiment and Material Safety Data Sheets are available at each laboratory session.

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