

## Enquiry for Course Details

<b>CHEM3542 Physical chemistry: statistical thermodynamics and kinetics theory (6 credits)</b>		Academic Year	2020										
Offering Department	Chemistry	Quota	50										
Course Co-ordinator	Dr. J Yang, Chemistry < juny@hku.hk >												
Teachers Involved	(Dr J Yang, Chemistry)												
Course Objectives	The course presents fundamental principles and topics on statistical thermodynamics and kinetic theory in order to provide a solid foundation for students intending to further their studies in physical chemistry and related fields.												
Course Contents & Topics	Principles of Statistical Thermodynamics - Thermodynamic laws - Ensembles and partition functions: microcanonical, canonical and grand-canonical - Systems of independent molecules: ideal gas - Molecular degrees of freedom: translation, rotation, vibration, and electronic - Ideal gas mixture: chemical equilibrium, binding, and titration - Quantum statistics Chemical equilibrium and kinetics theory - Rate theory: collision theory, transition state theory, electron transfer												
Course Learning Outcomes	On successful completion of this course, students should be able to: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">CLO 1</td> <td>understand and use the terminology and nomenclature in statistical thermodynamics and topics discussed in the course</td> </tr> <tr> <td>CLO 2</td> <td>demonstrate knowledge and understanding of basic concepts in statistical thermodynamics</td> </tr> <tr> <td>CLO 3</td> <td>understand correlation between macroscopic observables and microscopic statistical model systems</td> </tr> </table>			CLO 1	understand and use the terminology and nomenclature in statistical thermodynamics and topics discussed in the course	CLO 2	demonstrate knowledge and understanding of basic concepts in statistical thermodynamics	CLO 3	understand correlation between macroscopic observables and microscopic statistical model systems				
CLO 1	understand and use the terminology and nomenclature in statistical thermodynamics and topics discussed in the course												
CLO 2	demonstrate knowledge and understanding of basic concepts in statistical thermodynamics												
CLO 3	understand correlation between macroscopic observables and microscopic statistical model systems												
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM2541												
Course Status with Related Major/Minor /Professional Core	2020 Major in Chemistry (Intensive) ( Core/Compulsory ) 2020 Minor in Chemistry ( Disciplinary Elective ) 2019 Major in Chemistry (Intensive) ( Core/Compulsory ) 2019 Minor in Chemistry ( Disciplinary Elective ) 2018 Major in Chemistry (Intensive) ( Core/Compulsory ) 2018 Minor in Chemistry ( Disciplinary Elective ) 2017 Major in Chemistry (Intensive) ( Core/Compulsory ) 2017 Minor in Chemistry ( Disciplinary Elective ) 2016 Major in Chemistry (Intensive) ( Core/Compulsory ) 2016 Minor in Chemistry ( Disciplinary Elective )												
Course to PLO Mapping	2020 Major in Chemistry (Intensive) < PLO 1,2,3,4,5 > 2019 Major in Chemistry (Intensive) < PLO 1,2,3,4,5 > 2018 Major in Chemistry (Intensive) < PLO 1,2,3,4,5 > 2017 Major in Chemistry (Intensive) < PLO 1,2,3,4,5 > 2016 Major in Chemistry (Intensive) < PLO 1,2,3,4,5 >												
Offer in 2020 - 2021	Y 2nd sem	Examination	May										
Offer in 2021 - 2022	Y												
Course Grade	A+ to F												
Grade Descriptors	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;">A</td> <td>Thorough mastery at an advanced level of extensive knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of strong analytical / critical abilities and logical thinking. Can apply the knowledge to practical questions in Physical Chemistry.</td> </tr> <tr> <td>B</td> <td>Substantial command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical / critical abilities and logical thinking. Understand the scope of Physical Chemistry questions that can be applied with the knowledge.</td> </tr> <tr> <td>C</td> <td>General but incomplete command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical thinking. Can apply the knowledge to familiar situations.</td> </tr> <tr> <td>D</td> <td>Partial but limited command of knowledge of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate limited evidence of analytical thinking. Understand the question to be solved with knowledge.</td> </tr> <tr> <td>Fail</td> <td>Little or no evidence of command of knowledge of statistical thermodynamics and reaction dynamics.</td> </tr> </table>			A	Thorough mastery at an advanced level of extensive knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of strong analytical / critical abilities and logical thinking. Can apply the knowledge to practical questions in Physical Chemistry.	B	Substantial command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical / critical abilities and logical thinking. Understand the scope of Physical Chemistry questions that can be applied with the knowledge.	C	General but incomplete command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical thinking. Can apply the knowledge to familiar situations.	D	Partial but limited command of knowledge of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate limited evidence of analytical thinking. Understand the question to be solved with knowledge.	Fail	Little or no evidence of command of knowledge of statistical thermodynamics and reaction dynamics.
A	Thorough mastery at an advanced level of extensive knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of strong analytical / critical abilities and logical thinking. Can apply the knowledge to practical questions in Physical Chemistry.												
B	Substantial command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical / critical abilities and logical thinking. Understand the scope of Physical Chemistry questions that can be applied with the knowledge.												
C	General but incomplete command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical thinking. Can apply the knowledge to familiar situations.												
D	Partial but limited command of knowledge of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate limited evidence of analytical thinking. Understand the question to be solved with knowledge.												
Fail	Little or no evidence of command of knowledge of statistical thermodynamics and reaction dynamics.												
Course Type	Lecture with laboratory component course												

Course Teaching & Learning Activities	<b>Activities</b>		<b>Details</b>	<b>No. of Hours</b>
	Laboratory			24
	Lectures			24
	Tutorials			4
	Reading / Self study			100
Assessment Methods and Weighting	<b>Methods</b>	<b>Details</b>	<b>Weighting in final course grade (%)</b>	<b>Assessment Methods to CLO Mapping</b>
	Assignments		50	CLO 1,2,3
	Examination		50	CLO 1,2,3
Required/recommended reading and online materials	P. Atkins, Physical Chemistry (10th edition) KA Dill, Molecular driving forces: statistical thermodynamics in biology, chemistry, physics and nanoscience T. L. Hill, An introduction to Statistical Thermodynamics			
Course Website	Nil			
Additional Course Information	Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this course. Students are strongly recommended to take CHEM3541 Physical Chemistry: Introduction to Quantum Chemistry before taking this course.			

[← Back](#) / [🏠 Home](#)