



<b>Course code</b>	PHM2010
<b>Course title (English)</b>	Pharmaceutical Physical Chemistry
<b>Course title (Chinese)</b>	药物理学
<b>Units</b>	2
<b>Language of Instruction</b>	English
<b>Description (English)</b>	This course aims to provide the undergraduate students majoring in Pharmaceutical Sciences a systematic understanding of the basic principles of pharmaceutical physical chemistry. The course will discuss the different states of matters, various types of pharmaceutical solutions of non-electrolytes, strong electrolytes and their colligative properties. The course will also study the principles of thermodynamics, dynamic equilibrium and catalysis. Lastly, the course will discuss related topics that will provide the students the basic knowledge necessary for their future study of other course subjects such as chemistry, pharmacokinetics and pharmaceutics.
<b>Description (Chinese)</b>	本课程的目的是通过讨论物质的不同状态、非电解质、强电解质的各种药物溶液及其依数性质，使学生系统地了解药物物理化学的原理。该课程还将讨论热力学、动态平衡和催化，这些主题为学生提供化学、药代动力学和药剂学研究所需的基本知识。

### Learning Outcomes

Upon completing this course, the students are expected to have the following learning outcomes:

Regarding the KNOWLEDGE aspect, the students are expected to be able to describe and integrate the most important concepts, principles and knowledge in physical chemistry and physical pharmacy.

Regarding the SKILLS aspect, the students are expected to gradually develop the basic skills that would enable them to apply the learned concepts, principles and knowledge in understanding and explaining real cases and situations in dosage form design and drug formulation.

Regarding developing and/or enhancing the GENERIC SKILLS AND VALUES of the students, this course is expected to do and accomplish the following:

have acquired the ability to seek, compile, present and critically examine information in relation to physical chemical property.



### **Indicative Teaching Plan**

<b>Week</b>	<b>Content/Topic/Activity</b>
1	Introduction to Physical Chemistry: Importance of Physical Chemistry in Pharmaceutical Sciences
2	State of Matters: The Perfect Gases and Real Gses; Change of States (Physical Transitions), Intermolecular Interactions
3	The First Law of Thermodynamics: Work, Heat, and Energy Tgermochemistry
4	The Second and Third Laws of Thermodynamics: Entropy, the Helmholtz Energy, Gibbs Energy, and Standard Molar Gibbs Energy
5	Chemical Equilibrium: The Rquilibrium Constant, Chemical Potentials of Liquids
6	Rates of Chemical Reactions: Rate Laws
7	Arrhenius Equation, Reaction Mechanisms
8	Review and midterm exam
9	Buffered and Isotonic Solution
10	Surface Phenomina
11	Rheology of pharmaceutical systems
12	Metrimeritics
13	Drug release and dissolution
14	Drug diffusion