

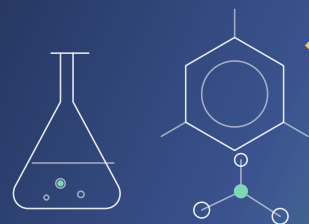
Module code

SPC-2206

Type of module

Undergraduate: Chemistry – Major Core

Chemical Thermodynamics and Reaction Kinetics



Modular credits

4

Total student engagement

56 hours

Prerequisite

SPC-1203
Fundamentals of
Physical and
Spectroscopic
Chemistry

Anti-requisite

None

Aims

To provide students with a foundational understanding of thermodynamic principles, phase equilibria, and chemical kinetics. Students will learn to predict and explain the behaviour of chemical systems in equilibrium and during reactions.

Module learning outcomes (MLO)

On successful completion of this module, a student will be expected to be able to:

MLO 1

Apply the laws of thermodynamics to predict spontaneity, equilibrium, and phase behaviour in pure substances and mixtures, including interpretation of phase diagrams and use of the Gibbs and Clausius–Clapeyron equations.

MLO 2

Analyse the behaviour of ideal and real solutions, and explain how Raoult's Law and colligative properties arise from the thermodynamic principles governing mixtures.

MLO 3

Derive and use rate laws to describe and interpret chemical reaction kinetics, including integrated rate laws, temperature effects (Arrhenius equation), and experimental methods for determining rate parameters.

MLO 4

Evaluate reaction mechanisms and photochemical processes using steady-state and pre-equilibrium approximations, and describe the kinetics of reactions in solution and excited-state dynamics using concepts such as diffusion control, chain reactions, and fluorescence quenching.

Module contents

Second law of thermodynamics

Phase equilibria

Thermodynamics of mixture

Introduction to reaction kinetics

Integrated rate laws and half-life

Temperature dependence of reaction rates

Assessment

60%

Examination

40%

Coursework

Examination
60%

20%

20%

Examination — 60%

Quizzes and Assignments — 20%

Class tests — 20%

Formative assessment

Weekly discussion
and feedback

Summative assessment

COMPONENT	WEIGHTING
Examination	60%
Coursework	40%
Individual	40%
Quizzes and Assignments	20%
Class tests	20%

Graduate attributes and skills

Programme learning objectives (PLO) addressed

1

PLO 1 (Fundamental Knowledge in Chemistry)

3

PLO 3 (Critical Thinking and Problem-Solving Skills)

6

PLO 6 (Digital Literacy and Lifelong Learning Skills)

Sustainability concept addressed

4

SDG 4 Quality Education

9

SDG 9 Industry, Innovation and Infrastructure

Digital skills/software used (not limited to)

- Word processing software (e.g. Microsoft Word)
- Data processing (e.g. Microsoft Excel)
- Learning management system (e.g. Canvas)
- Organisational tools (e.g. Outlook calendar)

Micro-credentialling option

No

Stackable towards GenBESTARI Undergraduate Degree Programme or other relevant Lifelong Learning Programmes

No

Document details

Office ODVCE

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