

## MODULE DESCRIPTOR

### Module Title

Foundations in Medicine Design

Reference	PL1002	Version	3
Created	February 2024	SCQF Level	SCQF 7
Approved	July 2022	SCQF Points	30
Amended	April 2024	ECTS Points	15

### Aims of Module

To provide an introduction to physicochemical properties relevant to pharmaceuticals in the context of drug design and dosage forms.

### Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Demonstrate an understanding of the basic physicochemical properties of pharmaceutical materials.
- 2 Apply mathematical expressions in relation to chemical and pharmaceutical systems.
- 3 Demonstrate an understanding of the techniques used to generate qualitative and quantitative experimental data and demonstrate data analysis and handling.

### Indicative Module Content

The application of physicochemical principles in a quantitative way to engage with practical pharmaceutical issues such as medicine formulation, design, manufacture and delivery to the patient. Topics will include: Thermodynamics-energetics: processes of change such as drug dissolution or transfer of drugs across membranes. Drug solubility-concentrations; ideal and non-ideal solutions; colligative properties; colloids, solutions and dissolution rates. Physical properties of drugs and excipients-gases (aerosols), liquids, crystalline and amorphous solids. Ionisation of drugs in solution-equilibrium constants; acids, bases and salts; pH; buffer solutions; partitioning. Preformulation-the importance of determining drug and excipient properties and compatibilities prior to their formulation into a medicine. Surface activity and surfactants-the role of surfactants in medicines and adsorption in pharmaceutical products. Rheological flow characteristics (performance) of liquids and semi-solids. Drug stability and degradation-reaction kinetics, rate constants; effect of environmental factors; shelf-life. This module highlights the need for ensuring health and well-being (SGD 3 good health and well-being), while making conscious decisions about the use and disposal of resources required to provide a quality learning experience with minimal environmental impact (SDG 12 responsible consumption and production).

### Module Delivery

This is a lecture based module supplemented with formative quizzes, tutorials, practical laboratory classes and guided reading.

### Indicative Student Workload

	Full Time	Part Time
Contact Hours	70	N/A
Non-Contact Hours	230	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	300	N/A
<i>Actual Placement hours for professional, statutory or regulatory body</i>		

### ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

#### Component 1

Type: Examination Weighting: 100% Outcomes Assessed: 1, 2, 3  
 Description: Closed book written examination

### MODULE PERFORMANCE DESCRIPTOR

#### Explanatory Text

Component 1 (Examination) comprises 100%. A minimum of a Grade D is required to pass the module.

Module Grade	Minimum Requirements to achieve Module Grade:
A	A
B	B
C	C
D	D
E	E
F	F
NS	Non-submission of work by published deadline or non-attendance for examination

### Module Requirements

Prerequisites for Module	None, in addition to course requirements.
Corequisites for module	None.
Precluded Modules	None.

**INDICATIVE BIBLIOGRAPHY**

- 1 DENTON, P. and ROSTRON, C., 2013. *Pharmaceutics: the science of medicine design*. First Edition. Oxford: Oxford University Press.
- 2 FLORENCE, A.T. and ATTWOOD, D., 2016. *Physicochemical Principles of Pharmacy*. Sixth Edition. London: Pharmaceutical Press.
- 3 AULTON, M.E. ed., 2022. *Aulton's Pharmaceutics: The Design and Manufacture of Medicines*. Sixth Edition. Edinburgh: Churchill Livingstone.
- 4 CAIRNS, D., 2012. *Essentials of Pharmaceutical Chemistry*. Fourth Edition. London: Pharmaceutical Press.
- 5 ATTWOOD, D. and FLORENCE, A.T., 2012. *Physical Pharmacy*. Second Edition. London: Pharmaceutical Press.
- 6 GAISFORD, S. and SAUNDERS, M., 2012. *Essentials of Pharmaceutical Preformulation*. First Edition. Hoboken: Wiley-Blackwell.