

Module Details	
Module Title	Pharmaceutical and Cosmetic Preformulation
Module Code	PHA4013-D
Academic Year	2024/5
Credits	40
School	Life Sciences (Faculty-wide)
FHEQ Level	FHEQ Level 4

Contact Hours	
Type	Hours
Directed Study	308
Practical Classes or Workshops	42
Lectures	42
Tutorials	8

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Academic Year

Module Aims
<p>To introduce students to the core principles of preformulation that affect drug/cosmetic product performance and stability. By the end of this module students will have developed an understanding of physicochemical principles including the physicochemical properties of active pharmaceutical ingredients (API) and excipients, related measurement techniques, and their significance in the design of elegant, stable, safe and effective pharmaceutical and cosmetic products.</p>

## Outline Syllabus

Pathway to the development of the stable, effective and safe dosage form by profiles of the physicochemical properties of the ingredients with respect to a proposed dosage form.

Core principles of pharmaceutical and cosmetic products design and preformulation attributes: sensitivity, irritability, wettability organoleptic properties, purity, thermal characterisation, dissolution and solubility, properties of solutions, solid-liquid interface, disperse systems, rheology and , kinetics.

Crystal and particle characterisations, thermal and chemical stability of pharmaceutical and cosmetic products. Fundamental principles of polymer, protein and colloid science which underline many cosmetic formulations. Fundamental physical chemistry concepts in the context of final product development. The research and development process required for product commercial release and reformulation.

The main excipient classes (surfactants, emollients, rheology modifiers, humectants, preservatives, and dyes/pigments) will be reviewed in relation to preformulations to meet a specific product brief (with skin, hair and nails as substrates) Testing methods, such as safety and stability trials and microbiological evaluation.

## Learning Outcomes

Outcome Number	Description
01	Evaluate different physicochemical properties and apply the knowledge in the development of pharmaceutical and cosmetic products.
02	Understand and apply core principles to determine a molecule's physical characteristics, kinetic stability.
03	Evaluate physicochemical properties of the ingredients in relation to a particular dosage form and its storage.
04	Evaluate the methods to establish compound compatibility with common excipients.
05	Evaluate the appropriateness of the main classes of ingredients to solving preformulation problems and their contribution to the performance of a product.
06	Understand and apply the core principles of thermodynamics of colloidal systems and the stability of dispersed systems.
07	Understand and apply concepts of skin, hair and nails as substrates and targets for cosmetic products and understand the factors that impact product innovation and performance.
08	Critically appraise the methods to measure both substrate (e.g. skin, hair) and formulation (stability, composition) and to evaluate product performance, stability and safety.
09	Write a scientific report and be able to manage time and learning effectively.
10	Work effectively within teams and accurately communicate scientific information to peers and mentors with structured and coherent arguments.

## Learning, Teaching and Assessment Strategy

Lectures will deliver core content, providing students with the opportunity to acquire the information to enhance their knowledge and understanding of preformulation concepts. This will be complemented by workshops, group discussions and tutorials to allow students to apply this learning to specific exemplar problems. Students will then apply their knowledge in laboratory practicals as part of the 'Integrated Labs and Skills Development' module. The virtual platform tutorials/discussions will also be used to support learning and monitor progress as students move through the curriculum. Students will work in a group to analyse the analytical characterisation data.

Directed study provides students with the opportunity to undertake guided reading and to develop their own portfolio of learning and knowledge.

The virtual learning environment (VLE) will be used to provide access to online resources, lecture notes and external links to websites of interest.

Directed study will provide students with the opportunity to undertake guided reading and to develop their own portfolio of learning to understand the core principles and enhance transferable skills and knowledge relating to evaluation of their own role and subject provision. The VLE will be used to provide access to online resources, lecture notes and external links to websites of interest and for classroom tests.

Classroom tests (MCQs - individual) support as diagnostic tests, providing students with an opportunity to apply the principles covered by this module and enhance understanding using a range of literature sources. Model MCQ questions will be discussed in lectures/workshops.

Guidance on the group task will be provided in the workshop. The group task, followed by an oral presentation on cosmetic preformulation, will support students to engage in student-led research apply their knowledge and problem-solving skills within the core subject, develop their group work skills, learn from their peers, communicate to a specialist audience and demonstrate good time management skills.

Students will develop an individual formative report based on the cosmetic preformulation task and feedback on this will be provided. Students will undertake coursework based on an individual task concerning pharmaceutical preformulations.

### Mode of Assessment

Type	Method	Description	Weighting
Summative	Examination - MCQ	MCQ test (individual) (1 MCQ in Semester 1 and 1 MCQ in Semester 2)	20%
Summative	Presentation	Preformulation task and oral presentation	30%
Summative	Coursework - Written	Preformulation task and written report (individual) (2000 words)	50%
Formative	Self and Peer Assessment	Model questions in lecture/workshop (30 mins)	N/A
Formative	Coursework - Written	Preformulation report (1000 words)	N/A

### Reading List

To access the reading list for this module, please visit <https://bradford.rl.talis.com/index.html>

**Please note:**

*This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.*

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