

Module Details	
Module Title	Integrated Laboratory and Skills Development 2
Module Code	PHA5018-D
Academic Year	2024/5
Credits	40
School	Life Sciences (Faculty-wide)
FHEQ Level	FHEQ Level 5

Contact Hours	
Type	Hours
Directed Study	270
Laboratories	90
Lectures	10
Tutorials	4

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

Module Aims
<p>This module will integrate laboratory practice based on the established principles of formulation and processing and their application in the preparation of pharmaceutical and cosmetic products. By the end of this module, students will critically appraise solid, semi-solid and liquid (aqueous and non-aqueous) formulations and emerging formulation technologies for optimising dosage forms. Students will also develop and demonstrate professional, inclusive and ethical collaboration skills.</p>

## Outline Syllabus

Critical evaluation of physicochemical properties of homogeneous and heterogeneous systems using laboratory-based experimental techniques. Range of dosage forms (solids, semi-solids, liquids both aqueous and nonaqueous versions, suspensions, emulsions), types of excipients and solid dosage form preparations.

The role of colloid, surface properties and material sciences in dosage form design. The importance of water structure and hydrophobic effects in multiphase dosage forms. Experimental design and data evaluation of practical experiments concerning unit operations, powder attributes, granulation, spheronisation, tableting and their physicochemical characterisations.

Technologies to measure and compare the composition and impact of cosmetic products. Methods to measure substrate (e.g. skin, hair, nails) and formulation (stability, composition). Methods to evaluate product performance, stability and safety. Ethics for in vitro versus in vivo testing and requirements for animal replacement models.

Sustainable manufacturing and inclusivity in diverse pharmaceutical, sectors. Discrimination and inclusive working practice. Halal and Kosher certified formulations, cruelty-free cosmetics; plant-based cosmetics.

Podcast based on sustainable development concepts including carrying capacity of ecosystems as related to providing for human needs; applying their impact on the economy, society and environment; natural medicine; bee products; pharmaceuticals in wastewater; packaging related to cosmetics. Communication of pharmaceutical and cosmetic product information to lay persons.

Introduction to psychology, statistics and digital intervention in relation to consumer and/or patient needs.

## Learning Outcomes

Outcome Number	Description
01	Understand and critically appraise the established physicochemical properties of homogeneous and heterogeneous systems using laboratory-based experimental techniques.
02	Critically analyse the range of dosage (solid, semi-solid, liquid) forms and physicochemical principles of their design and formulation.
03	Apply knowledge and critically appraise theoretical concepts together with a practical understanding of unit operations involved in the manufacturing of solid dosage forms.
04	Critically appreciate methods to measure both substrate (eg. skin, hair, nail) and formulation (stability composition) and to evaluate product performance, stability and safety.
05	Critically analyse experimental results both independently and in groups and participate in debates with peers.
06	Communicate effectively in written and oral presentations relating to laboratory work and the theory behind experiments.
07	Effectively, accurately, and clearly communicate information and ideas in an appropriate verbal and visual format in such a way as to articulate their understanding to academic, specialist and non-specialist audiences.
08	Evaluate professionalism by reflecting on inclusive formulations, using a structured or semi-structured model of reflection, to determine learning from the experience and make use of Specific, Measurable, Achievable, Realistic and Timely (SMART) objectives to plan further learning needs.
09	Critically evaluate experimental design and data by the incorporation of basic statistics, psychology and digital skills to solve formulation problems and support consumer and/or patient needs.
10	Apply inclusivity and/or sustainable development concepts in a professional setting.

## Learning, Teaching and Assessment Strategy

The module uses workshops, lectures and tutorials to teach the fundamental aspects concerning the integrated labs. Students will complete a mixture of wet and dry laboratory experiments supported by weekly online pre-lab and post-lab learning packages. These include short videos that demonstrate key skills and a set of structured activities (reading, online VLE, quizzes, etc) that scaffold the learning. Students will submit laboratory handbooks and reports towards a continual assessment of their progress.

Feedback is given orally both in interactive workshops and in practical sessions. Laboratory-based work will include staff-led demonstration of practical and manipulative skills at the bench and students' experimental work. Laboratory skills will be taught and practised in laboratory sessions. Data analysis will be taught and practised through problem-based learning and workshops.

The laboratory sessions also provide the opportunity to gain experience using established concepts of formulations and processing, and involve working in small groups, recording and interpreting qualitative and quantitative data with the use of statistics, working to deadlines and communication skills.

### Professional and skills development:

Support the development of basic statistics, consumer behaviour, sustainable formulations (sustainable development goals, SDG3. Good health and wellbeing, and SDG9. Industry, innovation and infrastructure): Halal and Kosher certified formulations, cruelty-free cosmetics; plant-based cosmetics), podcast, and reflection with SMART action plan through workshops and lectures.

Formative feedback will be given on a written laboratory report in semester 1. The summative exam will assess the wider theoretical knowledge outlined in the module descriptor. Students will submit the coursework report in semester 2 evaluating their experimental results, consumer behaviour (introduction to psychology), digital advances, qualitative and quantitative data analyses and scientific report writing skills. The understanding of the theory behind the practical lab sessions, application of knowledge and the laboratory skills are assessed in a practical laboratory-based spot-viva assessment.

Communication of sustainable development of pharmaceutical and/or cosmetic formulations (podcast) and reflection on inclusive practice of cosmetic and/or pharmaceutical formulations will assess the contents summatively. Where reassessment of the practical element is required, students will be given a data set or an opportunity to complete the practical on an alternative occasion, whichever is more appropriate.

### Mode of Assessment

Type	Method	Description	Weighting
Summative	Examination - oral/viva voce	Spot-viva	15%
Summative	Coursework - Written	Reflection - 1500 words	15%
Summative	Laboratory Report	Laboratory report - 2500 words	50%
Formative	Coursework	Formative feedback of practical work and report - 500 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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