**SECTION 1: MODULE SPECIFICATIONS**

1. Title of the module: **PHAM 1090:** **ASC4 - Advanced Science Elective 4: Advanced Drug Delivery Technologies**
2. School which will be responsible for management of the module: **Medway School of Pharmacy**
3. **Start date of the module**: Autumn 2011
4. **The cohort of students (onwards) to which the module will be applicable**: September 2008
5. **The number of students expected to take the module**: maximum 45
6. **Modules to be withdrawn on the introduction of this proposed module and consultation with other relevant Schools and Faculties regarding the withdrawal:** None
7. **Level of the module**: Master
8. **The number of credits which the module represents**: 20 credits
9. **Which term(s) the module is to be taught in (or other teaching pattern):** Term 2
10. **Prerequisite and co-requisite modules**: A successful completion of all modules from Stages 1, 2 and 3 of MPharm programme
11. **The programme(s) of study to which the module contributes**: Master of Pharmacy (MPharm)
12. **The intended subject specific learning outcomes and, as appropriate, their relationship to programme learning outcomes**

**SSLO 1:** A comprehensive understanding of the concepts that underpin advanced therapeutic agents and their delivery.

**SSLO 2:** A critical awareness and understanding of current problems and/or new insights associated with pharmaceutical agents and their delivery.

**Related to programme learning outcomes**

Substances used in Medicines (SB)

**PO6.** Biotechnology products and excipients; pharmaceutical application of the technologies of genomics and proteomics.

Design and Manufacture of Medicines (SB)

**PO7.** The properties of materials used for the delivery of biologically active molecules.

**PO8.** The principles of medicine formulation and systems for medicine delivery in the body.

The Actions and Uses of Medicines and Other Agents (SB)

**PO17.** The actions of medicines within living systems: molecular; cellular; biological and physical aspects.

**PO18**. Absorption, distribution, metabolism and excretion (ADME) of medicines, including routes of administration, concepts and mathematical modelling.

**PO22**. The clinical evaluation of new medicines

**PO24**. Medicine delivery devices, wound management products and other medical devices (including diagnostic agents and devices).

1. **The intended generic learning outcomes and, as appropriate, their relationship to programme learning outcomes**

**SSLO 3:** An ability to identify and resolve complex issues in the topics covered both systematically and creatively.

**SSLO 4:** An ability to critically assess relevant scientific publications and communicate their conclusions clearly to specialist and non-specialist audiences.

**Related to programme learning outcomes:**

**Cognitive Abilities and Skills:** (SB)

**PO38.** Demonstration of knowledge and critical understanding of essential facts, concepts, principles and theories relating to the subject areas identified above.

**PO40.** Recognition and analysis of problems and planning of strategies for their solution.

**PO41.** Critical evaluation, interpretation and synthesis of pharmaceutical information and data.

**PO43.** Presentation of pharmaceutical science material and arguments clearly and correctly, in writing and orally, to both specialist and lay audiences.

**Pharmacy-related Practical Skills (SB)**

**PO51.** The planning, design and execution of self-directed and original research investigations, from the problem-recognition stage through to the evaluation and appraisal of results and findings; this to include the ability to select appropriate techniques and procedures.

**PO53**. The ability to evaluate critically and to interpret purposively data derived from laboratory and clinical observations and measurements, in terms of their significance and the theory underlying them.

**Transferable Skills (SB)**

**PO57.** Interpersonal skills: the ability to interact effectively with patients; the public and health care professionals, including communication, both written and oral.

**PO59**. Problem-solving, relating to qualitative and quantitative information, extending to situations where evaluations have to be made on the basis of limited information.

**PO60.** Numeracy and computation, including such aspects as error analysis, orde r-of-magnitude estimations, correct use of units and modes of data presentation.

**PO61**. Acquisition, transformation, interpretation and critical evaluation of data.

**PO62.** Information retrieval in relation to primary and secondary information sources, including information retrieval through online computer searches.

**PO63**. Information technology skills, including word processing, spreadsheet use, database use, archiving data and information, and internet communication.

**PO64.** Time-management and organisation, as evidenced by the ability to plan and implement efficient and effective modes of working.

**PO65.** Independent study skills as preparation for continuing professional development.

**PO67.** Analysis and critical appraisal of published literature.

**PO68**. Application of general, biological and medical statistics.

**PO70**. Recognition of the need to work within personal limitations.

1. **A synopsis of the curriculum**

* Nanoparticles for drug delivery
* Polymers for drug delivery
* Vaccine delivery

1. **Indicative Reading List**
2. Merisko-Liversidge, E., Liversidge, G. and Cooper, E. (2003) Nanosizing: a formulation approach for poorly-water-soluble compounds. *Eur. J. Pharm. Sci.,* 18, 113 – 120.
3. Rieux, A., Fievez, V., et al. (2006) Nanoparticles as potential oral delivery systems for proteins and vaccines: A mechanistic approach *J. Control. Release,* 116, 1-27.
4. C. Li and S. Wallace (2008) Polymer-drug conjugates: Recent development in clinical oncology, *Advanced Drug Delivery Reviews*, 60, 886–898
5. J.H. Parka *et al* (2008) Polymeric nanomedicine for cancer therapy, *Progress in Polymer Science*, 33, 113–137
6. J.R. Junutula *et al* (2008) Site-specific conjugation of a cytotoxic drug to an antibody improves the therapeutic index, *Nature biotechnology*, 26, 925-932
7. O.H. Brekke *et al.* (2003) Therapeutic antibodies for human diseases at the dawn of the twenty-first century, *Nature Reviews Drug Discovery*, 2, 52-62
8. **Learning and Teaching Methods, including the nature and number of contact hours and the total study hours which will be expected of students, and how these relate to achievement of the intended learning outcomes**

Acquisition of outcomes is through a combination of lectures, workshops and MSCL. They are given by specialists from within the School.

Summary of Learning and Teaching Activities

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Lectures | Workshops | MSCL | Private Study | Formal assessment | Total hours |
| 30 | 8 | 90 | 69 | 1 x 3 hours exam | 200 |

Directed Learning and Teaching Activities

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | Lectures | Workshops | MSCL | Total hours |
| Nanoparticles for hydrophobic drug delivery | 10 | 1x2h | 30 | 42 |
| Polymers for drug delivery | 10 | 2x2h | 30 | 44 |
| Vaccine delivery | 10 | 1x2h | 30 | 42 |
| Total hours | 30 | 8 | 90 | 128 |

1. **Assessment methods and how these relate to testing achievement of the intended learning outcomes**

|  |  |  |  |
| --- | --- | --- | --- |
| Methods of assessment | Learning outcomes assessed | Weighting | *Outline Details* |
| Coursework | SSLO 1 – 4 | 40% | *1 Interim assessment*  *Satisfactory attendance and performance at workshops* |
| Examination | SSLO 1 - 4 | 60% | 3 hours Examination |

Progress and attainment of learning outcomes are determined through different method of assessment:

**Coursework (40%)**

SSLO 1, SSLO 2, SSLO 3 and SSLO 4 will be assessed through writing a short essay (1000 -1500 words). At the beginning of term 2, students will be given the choice of three recent research papers relevant to the course. Students will have to critically discuss and reflect on one research paper.

**Examination (60%)**

SSLO 1, SSLO 2, SSLO 3 and SSLO 4 will be assessed by written examination.

1. **Implications for learning resources, including staff, library, IT and space**

Lecture notes will be given to the students or made available via Moodle. All publications in the reading list are available on line via the UoK or UoG library portal.

|  |  |
| --- | --- |
| Teaching Staff | Subject Area |
| Prof. I. K. Cumming | Nanoparticles for drug delivery |
| Dr G. Williams | Vaccine delivery |
| Dr N. Lavignac | Polymers for drug delivery |

1. **The School recognises and has embedded the expectations of current disability equality legislation, and supports students with a declared disability or special educational need in its teaching. Within this module we will make reasonable adjustments wherever necessary, including additional or substitute materials, teaching modes or assessment methods for students who have declared and discussed their learning support needs. Arrangements for students with declared disabilities will be made on an individual basis, in consultation with the University’s disability/dyslexia support service, and specialist support will be provided where needed.**

**SECTION 2: MODULE IS PART OF A PROGRAMME OF STUDY IN A UNIVERSITY SCHOOL**

**Statement by the School Director of Learning and Teaching/School Director of Graduate Studies (as appropriate):** "I confirm I have been consulted on the above module proposal and have given advice on the correct procedures and required content of module proposals"

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| --- | --- |
| ................................................................  Director of Learning and Teaching/Director of Graduate Studies (delete as applicable)  …………………………………………………  Print Name | ..............................................  Date |

**Statement by the Head of School:** "I confirm that the School has approved the introduction of the module and, where the module is proposed by School staff, will be responsible for its resourcing"

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| --- | --- |
| .................................................................  Head of School  …………………………………………………….  Print Name | ..............................................  Date |