National School of Healthcare Science

NHS
Health Education England

Modernising Scientific Careers Practitioner Training Programme BSc (Hons) Healthcare Science Curriculum

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CONTENTS

SECTION 1: INTRODUCTION TO THE PROGRAMME

READERSHIP

The Practitioner Training Programme (PTP) is an integrated academic and work-based undergraduate BSc (Hons) degree which may be undertaken through an on-site academic programme or through an apprenticeship. This document provides the curriculum (both academic and work-based) for the PTP and will be of interest to:

- academic and administrative staff, including external examiners within Higher Education Institutions (HEIs) which are accountable for the delivery of the curriculum;
- employers who may wish to support apprentices or employees in undertaking the PTP degree programme;
- learners, host departments and managers of services that employ healthcare science (HCS) staff;
- work-based trainers, including all those involved in supervising, mentoring, co-ordinating, assessing and delivering PTP education and training;
- Health Education England (HEE) Local Education and Training Boards (LETBs) and all HCS education and training commissioning organisations in the UK;
- National School of Healthcare Science (NSHCS);
- Academy for Healthcare Science (AHCS);
- patients and the public.

A list of abbreviations and glossary of terms used is provided in the appendices.

Introduction to Modernising Scientific Careers (MSC) and the Practitioner Training Programme (PTP)

1.1 Healthcare Science and the MSC Education and Training Programme

1. The HCS workforce plays a central role in safe and effective patient care across all pathways of care from health and wellbeing to end of life. There are approximately 55,000 employees in the HCS workforce in the NHS in the UK, and approximately 80% of all diagnoses can be attributed to their work.
2. Healthcare science involves the application of science, technology and engineering to health. *Good Scientific Practice* (GSP)[1] sets out the principles and values on which good practice within healthcare science is founded. It makes explicit the professional standards of behaviour and practice that must be achieved and maintained by all those who work in healthcare science. GSP and the Academy for Healthcare Science's (AHCS) Standards of Proficiency[2] and Standards of Education and Training[3] form the basis for all MSC training curricula that contextualise the Standards of Proficiency set down by the Health and Care Professions Council (HCPC) in a way that is accessible to the profession and the public.
3. The HCS workforce and services are grouped into four broad areas called divisions, namely: Life Sciences, Physical Sciences, Physiological Sciences and Clinical Bioinformatics. Within each division there are a number of HCS specialisms. With advances in scientific technology, changes to the delivery of healthcare scientific services and the development of MSC, the boundaries between these divisions have been shifting. MSC recognises this important change and to date has identified seven PTP themes (groupings of specialisms within a HCS division), which define training across a total of 19 HCS specialisms.

1.2 Introduction to the Practitioner Training Programme (PTP)

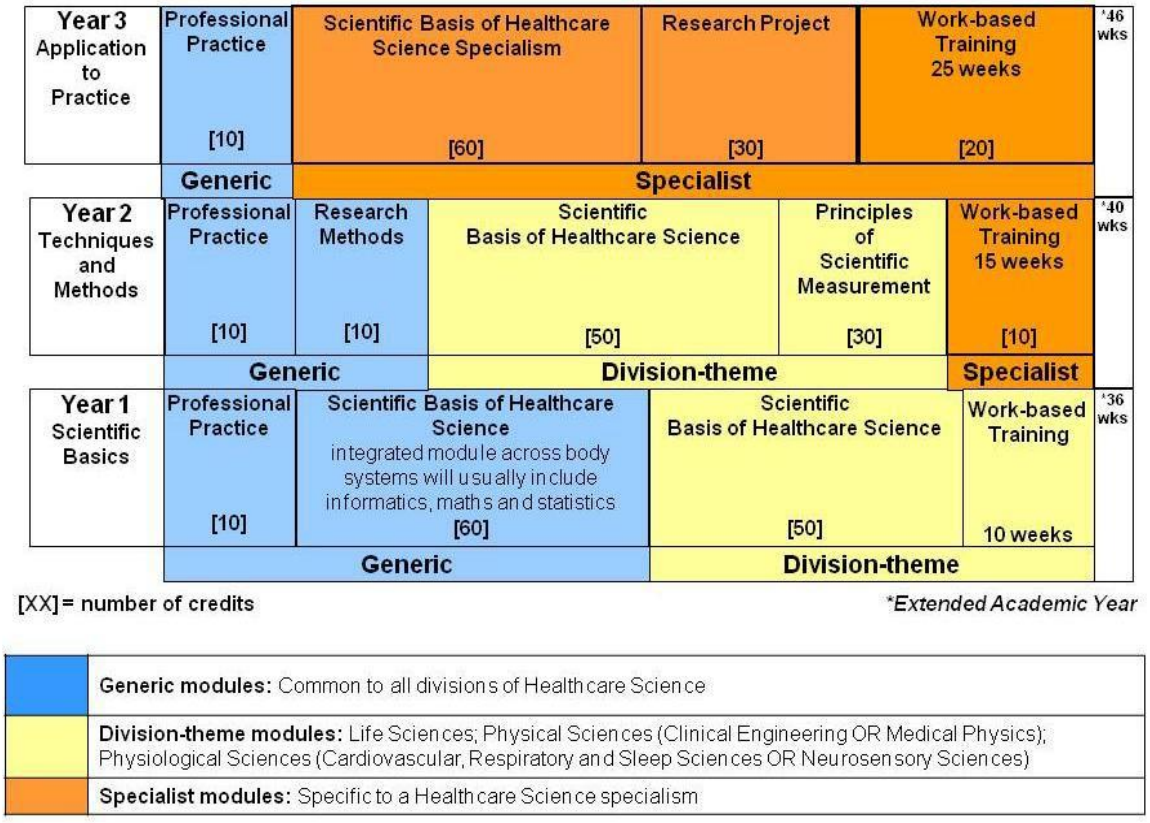
4. The HCS Practitioner Training Programme (HCS PTP) is a degree programme that has 2 routes of delivery:
   i. *On-site academic route:* an academic degree programme in which the learner[4] undertakes work-based placements but is not employed
   ii. *Apprenticeship route:* an in-service degree where the apprentice is employed whilst undertaking the PTP
5. The PTP typically will take a minimum of 3 years (but may be longer depending on the learner and the requirements of the employer and/or HEI to complete. It leads to a BSc Honours degree qualification that is contextualised for workplace occupational competency as a Healthcare Science Practitioner (HCSP) who provides HCS scientific and technical services within the HCS divisions and specialisms of Life Science, Physiological Science, or Physical Science.
6. The BSc (Hons) PTP is designed to provide the HCSP with a strong science-based,

[1] http://ahcs.flinthosts.co.uk/wordpress/wp-content/uploads/2013/09/AHCS-Good-Scientific-Practice.pdf
[2] http://www.ahcs.ac.uk/wordpress/wp-content/uploads/2014/07/AHCS_StandardsofProficiency.pdf
[3] http://www.ahcs.ac.uk/wordpress/wp-content/uploads/2014/08/AHCS_PTPStandardsOfEducationAndTraining.pdf
[4] the term *learner* is generally used to include both students undertaking the PTP through the on-site academic route and the apprenticeship route, except where reference to apprentices is specifically required.

patient-centred education and training in a specialist area of HCS. The overall aim of this HCSP education and training programme is to prepare the learner to fulfil the function of a HCSP working in a clinical HCS setting. The programme combines and integrates both academic and work-based learning and has a strong patient and technical scientific focus. Within the first year learners will experience of number of short placements or 'tasters' within the chosen PTP theme and gain some exposure to other aspects of the patient pathways, for example through clinics, patient education programmes, medical records and other area in which HCS contributes to patient care. This will give the learner a wide appreciation of the many related specialisms within HCS and a more holistic view of the areas that contribute to high-quality patient-centred care.

7. The diagram below depicts the broad framework and credit structure around which all PTP BSc (Hons) degree programmes in HCS are structured. The divisions within the MSC Programme (Life Sciences, Physical Sciences, Physiological Sciences and Clinical Bioinformatics)[5] have interpreted and adapted this framework to fit the range of HCS specialisms within the division/theme. Further refinement has been undertaken by each HEI to develop and deliver BSc (Hons) programmes that enable learners to meet the learning outcomes of the course. There is a strong generic programme that emphasises professional practice, research and the scientific basis of HCS.

High-level framework for the integrated BSc (Hons) in Healthcare Science



[XX] = number of credits

*Extended Academic Year

	Generic modules: Common to all divisions of Healthcare Science
	Division-theme modules: Life Sciences; Physical Sciences (Clinical Engineering OR Medical Physics); Physiological Sciences (Cardiovascular, Respiratory and Sleep Sciences OR Neurosensory Sciences)
	Specialist modules: Specific to a Healthcare Science specialism

[5] Although at the current time there is no PTP in Clinical Bioinformatics.

8. Once employed as a HCSP a range of career development options will be available, including structured in-post programmes of continuous personal and professional development (CPPD), provided through Accredited Scientific Practice programmes.[6]
9. PTP degrees can be delivered either as an on-site academic programme with clinical placements, or through an apprenticeship[7], in which the learner is employed whilst the degree is undertaken. HEIs offering the degree apprenticeship must join the Skills Funding Agency's (SFA) Register of Apprenticeship Training Providers (RoATP)[8].
10. HEIs can choose to deliver the degree apprenticeship inclusive of the mandatory end-point synoptic assessment (EPA)[9] through an "integrated" degree, or may choose to only deliver the academic component of the apprenticeship and without including the EPA in its assessment programme – a "non-integrated" degree. Where employers choose the non-integrated degree for an apprentice, they will be required to ensure that the apprentice undertakes the EPA once the degree is obtained through an appropriately accredited Assessment Organisation (AO) that is on the SFA Register of Apprenticeship Assessment Organisations (RoAAO), in order that the apprenticeship is completed.[10] Whichever options are chosen, the PTP will develop the technical, scientific, interpersonal and behavioural skills and knowledge of learners so that they can operate effectively in HCS as a HCSP.

1.3 Practitioner Training Programme Outcomes

11. Graduates of the BSc (Hons) will possess the essential knowledge, skills, experience values, behaviours and attitudes required of a newly qualified HCSP. They will have the necessary expertise in applied scientific techniques underpinned by theoretical knowledge within a division or related specialism and will work in a range of healthcare settings. Many will work directly with patients but all HCSPs will work in roles that will have an impact on patient care and outcomes. Learning, therefore, must be in the context of the patient and patient-centred care.
12. On successful completion of the BSc (Hons) (academic and work-based learning outcomes) all graduates should be able to demonstrate the outcomes of the AHCS's Standards of Proficiency for HCSPs,[11] which will enable them to register on its Professional Standards Authority (PSA) accredited register. In addition, Life Science graduates should also be able to demonstrate the outcomes of the HCPC Standards of Proficiency for Biomedical Scientists, which will enable them to register with the HCPC as Biomedical Scientists. Degree programmes must align to the Quality Assurance Agency's (QAA)[12] level 6, but which will have been extended and contextualised to the NHS job role for HCSP.

13. The AHCS Standards of Proficiency cover three key areas:
    - professional autonomy and accountability;

[6] http://hee.nhs.uk/2015/03/26/modernising-scientific-careers-accredited-scientific-practice-asp/
[7] Less commonly, some individuals will be employed by a trust and undertake the degree on a part-time basis.
[8] https://www.gov.uk/government/collections/register-of-apprenticeship-training-providers
[9] described more fully in Section 1.8
[10] Of significance, it should be noted that the employer will be responsible for the costs attached to the EPA. Employers and HEIs should be aware that the funding cap for this programme is fixed at £27,000. This may therefore require employers to fund the EPA outwith the apprenticeship levy and be an additional cost to the overall apprenticeship.
[11] http://www.ahcs.ac.uk/wordpress/wp-content/uploads/2014/07/AHCS_StandardsofProficiency.pdf
[12] http://www.qaa.ac.uk/en

- skills required for practice as a HCS Practitioner;
- knowledge of healthcare science.

14. **Entry routes:** Entry into BSc (Hons) on-site academic HCS programmes is through the UCAS application process.[13] Increasingly, employers and patients are expected to be part of and contribute to the selection process, with HEIs using values-based recruitment[14] as an underpinning principle of their selection processes. Those seeking to undertake the PTP through an apprenticeship will be competitively appointed by employers who will involve their local HEIs in the appointment process.
15. **Award titles and mode of delivery:** These degree programmes can be delivered either as on site academic programmes or as in-service apprenticeship programmes. The title of the degree programme should be consistent with current HCS terminology.[15] See http://www.nshcs.org.uk/for-trainees/accreditation/134-accreditation-for-heis for further details.
16. **Apprenticeship Standard:** where employers appoint apprentices to undertake the degree, the apprenticeship standard for HCSPs (Level 6)[16], the PTP degree and the End-point Assessment (EPA) demonstrating achievement of the standard must be achieved, either through an integrated or non-integrated degree.[17]
17. **Relevant Quality Assurance Agency (QAA) Code(s) of Practice:** HEIs must adhere to the current QAA Code of Practice for the Assurance of Academic Quality and Standards in Higher Education.
18. **Accreditation:** A BSc (Hons) HCS programme must hold accreditation from HEE's NSHCS to confirm that it meets the Standards of Accreditation for the HCS BSc (Hons),[18] reflecting the AHCS Standards of Education and Training and those of the HCPC[19], where appropriate.
19. **Accreditation of prior learning (APL):** A process of APL that conforms to the guidelines below must be defined by each HEI provider. This must clearly describe the minimum and maximum level of APL that will be awarded, the timing, costs and process, and align to statutory requirements for HCS. Good practice supports the view that such prior learning should only be used once; double counting is not recommended. This process will be of particular relevance for apprentices who have previously achieved the Level 4 Diploma in HCS.[20]
20. **Progression, compensation, condonation:** Should a clinical placement or the employer in the case of apprentices not deliver the environment/learning that supports a learner in achieving the required learning outcomes, the HEI and employer will need to support the learner/apprentice appropriately. While it is

[13] https://www.ucas.com
[14] http://hee.nhs.uk/work-programmes/values-based-recruitment/
[15] In Scotland a 'full-time-equivalent' model is used to train clinical physiology practitioners who are NES employees, with their work-based learning being integral to the award. The programme timescale is identical to a full-time HEI learner (i.e. 4 years in Scotland).
[16] At the time of publication of the 2016 PTP curricula the Level 6 apprenticeship standard was awaiting publication. Once published it should be available via: https://www.gov.uk/government/collections/apprenticeship-standards#healthcare-standards (see Healthcare Science section)
[17] which will involve an AO for the EPA in the case of a non-integrated degree
[18] http://nshcs.org.uk/images/Accreditation/Proforma-BSc-accreditation-standards-July2014.pdf
[19] http://www.hpc-uk.org/aboutregistration/standards/sets/
[20] http://www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Higher-education-credit-framework-for-England-guidance-on-academic-credit-arrangements-in-higher-education-in-England-Augu.aspx http://www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Guidelines-on-the-accreditation-of-prior-learning-September-2004.aspx

recognised that HEIs are likely to have a wide portfolio of degree programmes that fall under a single set of regulations (ordinances), the following conditions are specific requirements of the PTP BSc (Hons) degree programme accreditation process, irrespective of the HEI's own academic regulations:

- all modules are mandatory;
- no condonation or compensation of marks between modules (although there is a measure of compensation within a module) or extended re-sits of modules marks is permitted;
- multiple assessment components in any single module cannot be aggregated to reach a final module mark;
- each assessment within a module should be mandatory and passed at the required level.

21. Where learners do not achieve the module requirements for progression they must follow a 'module retrieval plan', which supports them to recover the failed module(s) as soon as possible so that they can progress with minimum delay.
22. **Programme delivery and monitoring:** It is expected that all BSc (Hons) HCSP programmes should be an integral part of the faculty/school and that opportunities for interprofessional learning are maximised. There should be an appropriate balance between academic staff and visiting specialist staff to ensure teaching reflects current NHS practice, which must be evidenced as part of the programme accreditation by the NSHCS.

1.4 Purpose of the BSc (Hons) PTP Curriculum

23. There are three main purposes of this BSc (Hons) curriculum. It:
    i. clearly sets out the expectations of graduates from the programme, including the academic skills, knowledge and understanding, and attitudes and behaviours that each learner will be expected to gain, develop and apply during work-based training;
    ii. signals the importance to employers of the current structure, strategic direction and priorities of healthcare delivery in the UK, e.g. the *NHS Constitution* or equivalent frameworks across the UK, and the requirement to prioritise patients and their care, ensuring that the patient and service provided by HCS is at the centre of all learning, assessment and work-based practice;
    iii. introduces learning in relation to new scientific and technological developments as these become available.
24. **Curriculum development and maintenance:** The first BSc (Hons) curricula in HCS were published in 2010. Recently the NSHCS and the Council for HCS Education in Higher Education and its PTP Special Interest Group, professional bodies and other stakeholders have contributed to updating the scientific and professional content of the curriculum[21], resulting in this 2016 edition of the curricula. Led by the NSHCS, all MSC curricula will be subject to regular review, with all stakeholders given the opportunity to contribute to each review. Current and previous versions of the BSc (Hons) HCS programmes and work-based learning guides can be found on the NHS Networks website.[22]
25. BSc (Hons) HCS programmes leading to an academic award must be aligned to current NHS policy and strategy and equivalent policy documents for the devolved

[21] including taking into account external feedback on the curricula undertaken by the Institute of Education (IOE)
[22] http://www.networks.nhs.uk/nhs-networks/msc-framework-curricula and https://www.nshcs.hee.nhs.uk/

administrations and should be consistent with current professional body guidance. HEIs should ensure they keep abreast of future strategic direction and policy.

1.5 Programme Delivery

26. **Programme delivery:** HEIs and employers are expected to ensure that all teaching, learning and assessment is up-to-date and informed by research to ensure that at graduation HCSPs meet the Framework for Higher Education Qualifications (FHEQ) descriptor at level 6. By undertaking a research project learners should become aware of the major contribution the HCS workforce makes to research and innovation to benefit patients, patient outcomes and the delivery of healthcare.
27. Although HEIs will deliver the programme described in this curriculum according to their local requirements, the key principles of programme delivery that underpin the NSHCS accreditation process[23] involve:
    - programmes must deliver all of the BSc (Hons) PTP learning outcomes (and will, de facto, deliver the outcomes required by the Level 6 HCSP apprenticeship standard which maps to the curricula) and indicative content, which the HEE Education and Training Scrutiny Group (ETSG) has advised meets the requirements of *Modernising Scientific Careers: The UK Way Forward* and the Academy for HCS's *Good Scientific Practice;*
    - wherever possible, delivering the principles and knowledge underpinning practice should occur before the work-based learning;
    - ensuring programmes meet current NHS education quality metrics and current AHCS and HCPC Standards of Education and Training;
    - ensuring that employer host departments, patients and the public are involved in the design, implementation, delivery and review;
    - the use of fair, valid, reliable, and clearly articulated assessment programmes for all modules, and the timing and content of which should consider and complement the work-based assessment programme;
    - the provision of a robust learner support and mentoring system, together with clearly defined arrangements to identify and support learners in difficulty (including the support services in place) clearly defined;
    - delivery of the programme within a high-quality teaching and learning environment with appropriate resources and facilities to support teaching and research;
    - teaching staff who are research active with a track record of undertaking high-quality research of national and potentially international standing that is relevant to the practice of HCS and the NHS.
28. Good Scientific Practice (GSP) underpins the PTP and the Level 6 HCSP apprenticeship standard and spans both the academic and work-based programmes. Key professional practice learning outcomes are included in the BSc (Hons) programme through its GSP syllabus, thus embedding the standards of professionalism set out in GSP in all aspects of the delivery and assessment of the programme. Learners should be encouraged to develop a range of skills to support their professional life and CPPD spanning communication, leadership, personal reflection, duty of care, duty of candour, critical reflection, giving and receiving

[23] In Scotland NES is responsible for accreditation of PTP programmes.

feedback, career planning and commitment to lifelong learning, and show development and maturation in these areas through the degree programme.

29. HEIs should ensure that all staff involved in each BSc (Hons) programme have read and are aware of the requirements of *Good Scientific Practice* and the GSP syllabus in the PTP.
30. **Teaching and learning:** It is expected that a blended learning approach will be adopted, based on a model of learner-centred adult learning that balances and integrates face-to-face teaching, e-learning, etc., and considers the broader requirements of each BSc (Hons) programme. It is anticipated that a broad range of teaching and learning activities will be utilised, appropriate to the learning outcomes. Learners should be enabled to gain the skills necessary to manage their own learning, and to exercise initiative and personal and professional responsibility. The learning strategy matrix and proformas outlined in 'Liberating Learning'[24] describe a range of activities that may be appropriate to this BSc (Hons) programme. They are likely to include:
    - Case study/discussions
    - Debate
    - Discussion forums
    - Expert briefings
    - Interactive lectures
    - Individual tutoring
    - Learner-led and tutor-led seminars
    - Library study
    - Personal critical reflection and action planning
    - Problem-based learning
    - Role play
    - Self-assessment
    - Self-directed learning activities
    - Simulation
    - Skills teaching
    - Team projects
    - Tutor-led small group learning
31. It is also expected that e-learning and, where possible, m-learning[25] opportunities will be available to enable to be active participants in a range of learning activities. Work-based learning will also contribute to the academic educational experience of the learner through, for example, seminars, journal clubs, local and national scientific and education meetings.
32. All academic and NHS staff leading or contributing to the BSc (Hons) programme should be appropriately qualified to teach and assess within the academic and/or work-based environment and have up-to-date knowledge of the requirements of the programme, GSP and the Standards of Proficiency for HCSPs. Further details can be found in the Accreditation Guidance from the NSHCS.[26]

[24] Liberating Learning, The Report of the Conference of Postgraduate Medical Deans' ad hoc Working Group on the Educational Implications of the European Union Working Time Directive and the subsequent European Working Time Regulations: November 2002 (revised 2009).

[25] JISC TechDis: see **http://www.jisctechdis.ac.uk/technologymatters/mobilelearning** for further information with respect to mobile (m) learning.

[26] http://www.nshcs.org.uk/for-trainees/accreditation/134-accreditation-for- heis

33. **Interprofessional learning:** Opportunities to enable interprofessional and interdisciplinary learning, within and outside HCS, should be a fundamental part of each programme.
34. **Patient-centred care:** The delivery of high-quality, compassionate, patient-centred care should be an integral part of each degree programme, with the emphasis on the contribution of the HCS workforce to ensure that learners are aware that their actions have an impact on the patient and the patient's family. They should make clear and explicit links to new models of service delivery, care and patient pathways. The responsibility of all staff in the NHS to maximise quality, productivity and efficiency and to continually strive to improve services should be stressed. Equally important is the ability of graduates from the PTP to communicate with the general public with respect to HCS, leading to a better-educated public that is encouraged to take responsibility for its own health and wellbeing and have a greater understanding of the role that science plays in society.
35. **Patient and public involvement:** The HEI programme team must have mechanisms in place to ensure that there is meaningful patient and public involvement in the design, delivery, development and quality assurance of each programme. It is expected that patients will be represented on course committees at all levels and contribute to teaching, learning and assessment.
36. The participation of patients and the public in HCS in all aspects of education and training brings a number of benefits, including:
    - active, constructive lay involvement in the training of healthcare scientists;
    - assisting in the development, monitoring and evaluation of HCS training programmes and their outcomes;
    - operating as lay advisors to all professionals, academics, researchers and others involved in the teaching of healthcare scientist trainees (including the private and charity sector);
    - engaging with professionals, academics, researchers, patients/carers and the general public to promote education/publicity about the work and impact of healthcare scientists on the health of the community;
    - developing protocols and training opportunities that involve lay persons in the delivery, analysis and evaluation of training programmes;
    - initiating and supporting ideas/proposals/research questions about HCS and its impact on patients.

1.6 Introduction to Work-based Learning

37. The overall aim of the PTP is to prepare the learner to fulfil the function of a HCSP working in a clinical HCS setting. The programme combines and integrates both academic and work-based learning and has a strong patient and clinical focus. Within the first year it is expected that the experiential component will start broad with short 'tasters' across a theme, with some exposure to other aspects of patient pathways, for example a clinic, patient education programme, medical records, or other area of healthcare. This will give the learner a wide appreciation of the many specialisms and a more holistic view of the areas that contribute to high-quality care.
38. The work-based programme is divided into modules, all of which are focused on service need, patient/care and continuous service improvement. Each module follows a standard format. The aim and scope of each module is described followed by the:

- **Learning Outcomes** – high-level descriptors of the required work-based achievements for the module;
- **Clinical Experiential Learning** – the learning activities that will facilitate learning and achievement of the stated outcomes;
- **Competences** – further outcome-based statements for each learning outcome;
- **Knowledge and Understanding** - as applied to appropriate competences.

39. Both the curricula and the apprenticeship standard are based on GSP[27] and HCPC Standards[28], resulting in a direct relationship between the two, ensuring that the curricula deliver the underpinning knowledge, skills and professionalism required by the standard. The learning outcomes of the curricula are clearly focused on employer and service requirements, reflecting patient care and clinical pathways and continuous improvement in a given area of HCS.
40. The work-based training for all learners has three components, which correspond to the academic programme, all of which are underpinned by the professional practice curriculum:
    - induction;
    - theme training;
    - specialist training.
41. It is anticipated that all learners will have an induction period in each employer/host department at the beginning of the apprenticeship and/or of each placement. The duration and timing of work-based placements will vary, depending on the HEI in which the learner studies.

1.7 Employing and Training Departments

42. The training and work environment is vital for successful training in the BSc and in this context includes each of the employers, training departments and other healthcare settings facilitating work-based training. The success of the training and the learner experience requires the commitment and enthusiasm from employers and those in the work environment to provide high quality, well-supervised training, underpinned by work-based formative assessment and a close working relationship with the HEI.
43. Training departments and employers should therefore ensure that they are fully familiar with the components of the BSc (Hons) programme, including the work-based training programme, including the required learning outcomes, competences and assessment processes, and have been trained by the HEI in each work-based assessment method. Additionally, the responsibilities for mentoring and supervision, whilst the learner is on placement should be clear, including access to HEI learner support services.
44. **Induction**: At the start of the training programme learners should be provided with an induction programme by employers and training units. Initial work-based induction should include an overview of the:
    - hospital/employer/healthcare setting and local policies, including health and safety, confidentiality, data protection, etc., relevant to the employment;
    - range of services provided by the department;

[27] https://www.ahcs.ac.uk/wordpress/wp-content/uploads/2013/09/AHCS-Good-Scientific-Practice.pdf
[28] http://www.hcpc-uk.org/assets/documents/100004FDStandards_of_Proficiency_Biomedical_Scientists.pdf

- range of people who use the services provided by the department;
- function, operation, and routine and corrective maintenance requirements of equipment appropriate to the section(s) of the department in which the trainee will be working;
- host trust IT systems, including the library and knowledge service as required.

45. **Supervision**: At the core of successful work-based employer training is appropriate educational and clinical supervision, facilitation and feedback. It is recommended that each learner is allocated to a training officer[29] from within the host/employing department. Learners are advised to ensure that a planned schedule of meetings with their training officer is agreed early in training, commencing with a meeting during the first week.
46. BSc educational and clinical supervision should promote learning, reflective practice and action planning. It will need to ensure that the learner becomes proficient in the specific skills and competences required by the curriculum, helping them to develop self-sufficiency and self-awareness in the ongoing acquisition of skills and knowledge. At every stage, patient safety must be paramount.
47. The first supervision meeting should be set up during the first week of the training programme. At the first meeting the training officer should ensure that the learner is following the agreed induction programme. It is recommended that the following areas should be explored and agreement reached at the first meeting with respect to the:
    - expectations of the training officer and learner;
    - responsibilities of the training officer and learner;
    - confidentiality;
    - boundaries between the training officer and learner;
    - frequency and duration of planned supervision meetings;
    - methods of communication and responsibility for arranging meetings;
    - level of support and arrangements for communications between meetings;
    - models of reflection and action planning;
    - record keeping;
    - content of the work-based training programme;
    - for apprentices, clarity between their employment responsibilities and their learning opportunities (i.e. formal training/learning time)
    - the approach to assessment;
    - sources of help and support.
48. The HEI and employers are responsible for ensuring that learners have access to training opportunities to enable the achievement of all the learning outcomes of the BSc (Hons) and where required, to meet the apprenticeship standard. In return learners are expected to take responsibility for:
    - ensuring that they fulfil their obligations to the HEI, to employers, to departments providing work base training and to patients (especially with regard to patient safety and confidentiality) as healthcare professionals;
    - engaging as active adult learners by initiating work-based assessments; contributing to learning activities; taking into account feedback received from their trainers and assessors; and giving considered and constructive feedback on their experience of their training.

[29] For the purposes of this document training officer has been used; however, the title may vary between departments and may be subject to a title change in England as part of developments for the whole of the professional healthcare workforce.

1.8 Assessment

49. **Purpose of assessment:** The purpose of assessment is to enable the learner to demonstrate that they have the requisite knowledge, skills, values, behaviours and attitudes to work as a HCSP and meet standards of education and training, professional skills, conduct performance and ethics to provide reassurance to the public and the appropriate regulatory bodies. Given the integrated nature of this academic and work-based degree, each HEI's assessment programme must address both academic and work-based assessment (see Section 1.11 below) and must support assessment for learners undertaking the programme through an on-site academic programme or through an apprenticeship.
50. The full BSc (Hons) HCS assessment programme should support both assessment *for* and assessment *of* learning, and in particular:[30]
    - help clarify what good performance is (goals, criteria, standards);
    - encourage 'time and effort' on challenging learning tasks;
    - deliver high-quality feedback information that helps learners to self-correct;
    - encourage positive motivational beliefs and self-esteem;
    - encourage interaction and dialogue around learning (peer and teacher–learner);
    - facilitate the development of self-assessment and reflection in learning;
    - involve learners in decision making about assessment policy and practice;
    - support the development of learning communities;
    - integrate and complement the work-based assessment programme:
    - help teachers adapt teaching to learner needs;
    - for apprentices, facilitate and ensure readiness for the synoptic EPA.
51. The HEI must have in place a clear, overarching strategic and systematic approach to assessment that fits with the curriculum and delivers assessment methods that are valid, reliable/generalisable, feasible, fair, acceptable and defensible, and is led by assessment experts. The approach to the assessment of the BSc (Hons) HCS should also be cognisant of and complement the work-based assessment programme, which is defined by the NSHCS and which is part of all NSHCS accredited BSc (Hons) programmes. In addition, where an integrated degree is offered, enabling those undertaking the degree through an apprenticeship route, the end-point assessment (EPA) must conform to Department for Education (DfE) requirements.[31]
52. The assessment programme should be designed to enable the learner to obtain regular and constructive feedback on progress and achievement. It should encourage critical reflection and action planning, identifying both strengths and areas for development and improvement.
53. The approach to assessment should include and be overseen by a central co-ordinating leadership group or assessment-focused group in the HEI. The role of this group is to advise and scrutinise assessment across modules and years in order to build a consistent approach to assessment across the whole programme, involving module/programme leaders as appropriate. The HEI's overall assessment

[30] Nicol DJ (2007) Principles of good assessment and feedback. REAP International Online Conference. www.reap.ac.uk/public/Papers/Principles_of_good_assessment_and_feedback.pdf (accessed 2.12.09).

[31] At the time of publication of the 2016 PTP curricula the Level 6 EPA was awaiting publication. Once published it should be available via: https://www.gov.uk/government/collections/apprenticeship-standards#healthcare-standards (see Healthcare Science section)

strategy should be documented in a clear and accessible manner with accountabilities clearly allocated. The strategy should also demonstrate how the approach is based on a sound understanding of the evidence base, academic literature and good practice in assessment.

54. Key areas that are required for NSHCS accreditation and which must be covered by an HEI's Assessment Strategy include:
    - a clear statement of accountabilities, including the governance structure for assessment;
    - the balance between academic and work-based assessment;
    - the balance between formative and summative assessment;
    - clarity on the EPA programme for apprentices and preparation for it;
    - the assessment of each module, including the contribution of individual assessments and examinations within the module;
    - progression criteria;
    - the range of valid, reliable and appropriate assessment techniques that will be utilised across the programme and for each module;
    - the process for providing clear and timely information for learners;
    - how all examiners will be selected and trained (including refresher training) and the guidelines that will be given;
    - the mechanisms in place to ensure comparability of standards and to share good practice, including external examiners;
    - how standard setting is undertaken;
    - how opportunities for learner feedback will be maximised, including time lines and importance of developing learners-centred feedback;
    - the arrangements for assessment of learners with a disability, which should be consistent with the ability to undertake this modified practice in the workplace setting;
    - an assessment blueprint demonstrating the relationship between each assessment and the learning outcomes of the programme;
    - exemplar criteria and marking scheme, including critical reflective writing;
    - the process of appointing external examiners;
    - a defined role for external examiners that includes contributing to the review and development of assessment strategies and providing advice from an overarching perspective;
    - the role and contribution of patients and the public to the assessment programme.
55. The on-programme assessment of the degree modules will include a range of formative and summative assessment approaches, for example essays, reports, completion of practical tasks and work-based projects as well as formal summative examinations as the degree progresses. In addition, a programme of formative work-based assessments will support progression through the degree, ensuring that for apprentices, there is adequate opportunity to practise scientific skills, and to gain feedback, as preparation for the EPA for apprentices.
56. For those undertaking the degree through an apprenticeship, the learner must achieve the award of the BSc (Hons) and pass the EPA. HEIs will be required to be on the SFA's RoATP and RoAAO. Where the EPA is not integrated as part of the degree programme, the EPA will be delivered following completion of the degree by an organisation on the RoAAO. In the event of failure to pass either the degree course or the EPA, completion of the apprenticeship cannot be achieved. Employers should be assured that HEIs have robust and well-established assessment and

quality assurance processes, incorporating internal moderation and external examiners to ensure independence across the degree programme and consistency between HEIs and that these Honours degrees are all approved by the QAA.

1.9 On-programme (work-based) Assessment

57. **Formative assessment** is used to support learners in the workplace by ensuring regular, structured checks on developing competence. The formative assessment tools detailed in Table 1are used by all workplaces to capture evidence of the skills, knowledge, behaviours, attitudes and values required by the apprentice in the workplace, in their enactment of their practitioner role and in their interactions with colleagues, peers, patients and the public (where and as appropriate). Formative assessment helps to uncover performance issues or concerns and the HEI and employer will be able to support the learner and provide extra guidance where such issues might arise to ensure that the learner is fully supported in meeting the outcomes of the degree and the apprenticeship for those required to do so. The delivery of that support is likely to differ across HEIs and workplaces.
58. For apprentices, completion of the formative assessment programme is essential preparation for the synoptic EPA near the end of the programme that is designed to capture evidence of the apprentice's mastery of the skills, knowledge, behaviours and values defined in the standard (see section below for more detail). Table 1 also sets out the arrangements for the summative work based employer assessment competency log that encapsulates the performance of the HCSP learner in the demonstration of competences that have been achieved.
59. The high level learning outcomes and clinical experiential learning required in each of the areas of HCS are set out in the PTP curricula for HCSPs.[32] These detail the work-based learning outcomes that form an integral part of the degree programme for HCSPs should be used to guide the selection of formative assessments. The curricula also provide the templates for each of the work-based assessment tools to ensure assessment standardisation across the work-based programme (see appendices).
60. This formative work-based assessment programme should find a balance between what is realistic and achievable for employers and learners and what provides sufficient evidence of progress/competence. It is therefore recommended that learners, in consultation with their clinical supervisor, undertake work-based assessments as set out in the table below:

Recommended number of assessments per academic year

Year 1	Year 2	Year 3
2 DOPs 1 CBD Competence	4 DOPs 1 CPD 1 OCE Competence	4 DOPs 2 CBDs 2 OCEs Competence

[32] and in the Institute of Biomedical Science's (b) Registration Portfolio for those undertaking this degree programme

Table 1 Summary of On-Programme (work-based) formative assessment methods and the Employer based Competency Log[33]

Assessment tool	Direct Observation of Practical skills (DOPs)	Observed Clinical Event (OCE)	Case-based Discussion (CbD)	Work-based/employer based Competency Log
Purpose	Assessment of a practical skill or procedure, including, where relevant, interaction with a patient through direct observation. Learner and assessor feedback is generated, learning needs identified and an action plan agreed	Observation and assessment of a clinical encounter or interaction with colleagues with respect to an aspect of patient care. The format and approach is similar to DOPs but takes place with a patient present or when the learner is working with clinical colleagues	A clinical case is used as the basis for a discussion to assess the learners application of knowledge and understanding of an aspect of an activity they have been part of, e.g. professional practice, communication, leadership, science, the role of healthcare science in patient care	A record of attainment which demonstrates achievement of each work-based competence and clinical experiential learning (CEL) activity, reflecting the performance of the learner, including the demonstration of achievement of aspects of the apprenticeship standard where this is appropriate
Method	The assessor observes a practical activity and facilitates learner- centred feedback either during or immediately following the observation. The learner generates an action plan and agrees this with the assessor.	The assessor observes a clinical activity and facilitates learner-centred feedback either during or immediately following the observation. The learner generates an action plan and agrees this with the assessor.	A discussion between the learner and assessor with respect to any aspect of a case, including professional practice/*Good Scientific Practice*	An assessor reviews the evidence provided by the learner to support achievement of each competence and CEL. The expectation is that as the learner progresses the competency log will demonstrate an evidential base of achievement/progression.

[33] Whilst each individual assessment is formative review of the log as a whole forms part of the summative assessment of the degree and of the EPA.

1.10 Work-based/employer based Competency Log

61. All learners will also be required to provide evidence to demonstrate that they have successfully achieved the competences set out in the curriculum and for apprentices, those competences specifically reflected in the apprenticeship standard, through success in the EPA. The learner is expected to provide evidence to demonstrate achievement of each competence, which should then be reviewed and signed off by the trainer in the competency log. Learners will gain competence at their own pace, but in line with the overall delivery of the relevant modules. Each competence will link directly to a specific work-based learning outcome in the curriculum and some competences may be linked to more than one learning outcome. Successful completion of the curriculum and, for an apprentice the standard, cannot therefore be achieved until achievement of *all* work-based learning outcomes have been demonstrated.
62. On-going completion of a competency log (the high level requirements are set out in Table 1 above) is therefore essential for progression within the programme and as a requirement for achievement of the degree and completion of the apprenticeship. The expectation is that as the learner progresses the competency log will demonstrate an evidence base of their achievement. The achievement of each competence and a record of all on-programme work-based assessments must be recorded using a written log, or the HEI's own electronic system. For those in HCS programmes this should be presented within a Portfolio of Evidence that is accumulated by the learner to demonstrate learning, competence and insight into practice and professionalism.[34]

1.11 End Point Assessment for apprenticeships

63. All apprentices will have to pass the EPA that is designed as a final check on the apprentice's workplace competence and ability to integrate their learning across all elements of the PTP.
64. Where the EPA has been integrated into the degree programme, the degree obtained will provide verification that both the academic part of the standard and the required synoptic assessment have been met and graded. As described above, some HEIs may choose to deliver a non-integrated degree, which will not include the EPA. If an employer chooses to use such a non-integrated degree programme for an apprenticeship, then it will be required to ensure that the synoptic assessment described below is delivered by an appropriately accredited organisation that is on the SFA's RoAAO. In addition the employer will be responsible for the costs attached to the EPA which is delivered by the AO. Although a funding cap for this degree apprenticeship standard has not yet been allocated, employers and HEIs should be aware that if the full amount is used for

[34] For those learners studying to become healthcare science practitioners through biomedical science degrees, the IBMS Registration Portfolio provides the framework for education and training. This Portfolio enables biomedical science learners to demonstrate their fitness to practice through evidence of competence that can be independently verified against the HCPC Standards of Proficiency. This supports the biomedical science graduate in registering with the HCPC. A combined portfolio reflecting this Registration Portfolio and the HCS Portfolio of Evidence for those undertaking the PTP programme in the Life Sciences is currently under development.

the delivery of the degree programme, employers will be required to fund the EPA outwith the apprenticeship levy which will be an additional cost to the overall apprenticeship. For integrated degrees, HEIs are likely to have to pay a small fee to the AHCS to help support and maintain standardisation of the EPA assessment tools (Situational Judgment Test; Professional Discussion and Research evaluation templates).

65. The formative work-based assessment programme described above supports apprentices in acquiring and building the skills, knowledge, behaviours and values defined in the apprenticeship standard. Underpinned by the academic learning and summative assessment provided by the HEI, this will ensure that the learner is prepared and ready to understanding the synoptic assessment, demonstrating these.
66. All apprentices will therefore have to pass the EPA that is designed as a final check on the apprentice's workplace competence and ability to integrate their learning across all elements of the PTP. In integrated degrees, the EPA is delivered towards the end of the three-year programme; in non-integrated degrees, the EPA is undertaken after the degree is achieved and is administered by a registered AO.
67. The EPA is conducted with an independent assessor towards the end of the degree programme and takes approximately two hours. It consists of the following three components, each of which must be passed independently:
    i. one hour written Situational Judgment Test (SJT) set by the HEI;
    ii. face-to-face Professional Discussion, taking approximately 40 minutes, between the apprentice and the trained independent assessor (who has not been involved in the education or training of the apprentice) and based on questions arising from the assessor's scrutiny of the apprentice's portfolio of workplace-based assessments, experiences and critical reflection;
    iii. a presentation of up to 10 minutes to the assessor, in which the apprentice describes the research project undertaken as part of their degree programme. The presentation is followed by a 15 minute question and answer session with the independent assessor on issues raised by the research.

The link to the full version of the Level 6 HCSP Apprenticeship EPA was not available at the time of publication of the 2016 curricula but should be available via: https://www.gov.uk/government/collections/apprenticeship-standards#healthcare-standards

1.12 Learner Support and Mentoring

68. The learner supervision, support and mentoring systems will span the academic and work/employer-based elements of the programme, and the relationship between the two systems must be clear to learners, employers work-based staff and HEI staff. The learner supervision, support and mentoring system must be designed to encourage safe and effective practice, independent adult learning, appropriate professional conduct of the learner, the safety of the patient and quality assurance of all work activities of each learner. Those undertaking the role of supervisor or mentor must have relevant qualifications and experience and have undertaken appropriate and up-to-date training. The HEI will be

expected to have an academic supervisory, support and mentoring scheme in place and to provide access to learner support services.

69. **Fitness to practise:** The HEI must have a clear policy with respect to fitness to practice (FtP), which must clearly articulate how staff and learners are made aware of the policy and how the policy is implemented. The HEI's FtP policy should reflect and be aligned to the FtP policy of the AHCS and the HCPC (for Life Sciences). Alongside this must be a clear policy on how learner whistleblowers are supported. Breaches of professional practice and behaviour identified by the HEI or during HEI activities must be reported and investigated in accordance with this FtP policy and accurate records maintained within the HEI.

1.13 Annual Monitoring of Progress and Equality and Diversity

70. **Annual monitoring of progress:** All on-site academic learners will usually be expected to complete the requirements for the BSc (Hons) HCS award within three years after initial registration, in accordance with the regulations of each HEI. For those undertaking the degree through an apprenticeship, employers and the HEI should ensure that good progress is made, although through agreement between the employer, the apprentice and the HEI, the duration of the degree may take longer than 3 years.
71. Programme governance must include annual monitoring of progress that considers the outcome of the review of each module (including learner and patient evaluation) and the handling and consideration of the external examiner's report. This process should enable the programme leaders to identify and propose changes to the programme in response to feedback.
72. **Equality and diversity:** HEE, the AHCS, HEI's, scientific professional bodies and employers are committed to the principle of equality and diversity in employment, membership, academic activities, assessment, examinations and training.
73. As part of this ethos these groups are committed to inspire and support all those who work, train and provide training in HCS to operate in a fair, open and honest manner. The approach taken is a comprehensive one and reflects all areas of diversity, recognising the value of each individual. This means that no one is treated less favourably than another on the grounds of ethnic origin, nationality, age, disability, gender, sexual orientation, race, or religion, in accordance with the Equality Act 2010[35]. This reflects not only the letter but also the spirit of equality legislation, taking into account current equality legislation and good practice.

1.14 Critical Reflection and Learning

74. **Critical reflection**: Critical reflection on progress and performance is an integral part of both the BSc and of being a professional. Learners should therefore be taught the theoretical models underpinning reflection and required to regularly

[35] Equality Act 2010. http://www.legislation.gov.uk/ukpga/2010/15/contents

critically reflect on their progress and performance, enabling them to develop skills in self-evaluation and action planning.

75. This should be used to support the learner as they learn from experiences gained in the workplace. Reflection should help the learner to understand and learn from work-based situations/experience, bridging the gap between theory and practice. Each learner should be taught about the underpinning evidence for the use of reflection and encouraged to reflect regularly on their progress and performance, developing their skills in self-assessment and action planning.
76. Learners should be encouraged to think about what they are doing as they do it (Reflection *in* Action) and retrospectively to reflect on practice (Reflection *on* Action). The reflective practitioner should describe and analyse experience, considering how the situation might have been handled differently and what other knowledge would have been helpful. When critically reflecting on an experience, learners should use a recognised model of reflection.

1.15 Relationships and Partnerships

77. **The National School of Healthcare Science:** The NSHCS is hosted by HEE, West Midlands Local Team. The NSHCS provides a national co-ordinating and oversight function to support the delivery of work-based training for HCS training and education programmes. With respect to the PTPs it is responsible for:
    - holding HEIs to account for the quality, integration, co-ordination and delivery of both the academic programme and work-based training through the accreditation process, ;
    - identification of programme issues that may need to be addressed and resolved and reporting these as part of agreed governance arrangements;
    - liaising with LETBs on local issues and problems and their resolution;
    - providing advice and support to accredited PTP programmes as necessary;
    - overarching review to ensure common standards of delivery and content and recommending ongoing training activities to support the CPD of work-based trainers.

    The School can be contacted at www.nshcs.org.uk

78. **The Academy for Healthcare Science:** The AHCS provides the professional voice for the HCS workforce and quality assurance of HCS training and education.[36] Included in its functions are to:
    - act as a strong and coherent professional voice;
    - be able to influence and inform a range of stakeholders on all matters relating to HCS and scientific services;
    - act as the overarching body for professional issues related to education, training and development in the UK health system, including the provision of UK-wide quality assurance across education and training arrangements[37];

[36] http://www.ahcs.ac.uk/wordpress/wp-content/uploads/2014/08/18th-Feb-2016-AHCSQA-Framework-pdf.pdf

[37] The Institute of Biomedical Science (IBMS) also has a role in approving laboratories for training and accrediting healthcare science degrees in the Life Sciences.

- provide the infrastructure to support the professional regulation/registration of the HCS workforce, including:
  - a system of professional accreditation of education and training programmes for the regulation/registration of the HCS workforce;
  - setting the professional standards for the delivery of accredited registers as required by the PSA's for Health and Social Care to ensure consistency and coherence across all HCS education and training programmes;
  - taking the central role in the sponsorship of the registers to achieve 'accredited' status as set out by the PSA;
  - being a HCPC education provider for the statutory regulation of Clinical Scientists;
  - offering a system for equivalence across the HCS workforce to enable those who can demonstrate evidence of training, experience and qualifications equivalent to the required outcomes of HCS training programmes to support entry on to the PSA accredited ACHS register www.academyforhealthcarescience.co.uk/

1.16 Programme Outcomes

79. On completion of the BSc (Hons) all graduates should be able to demonstrate the following outcomes that align to QAA level 6, extended and contextualised to the NHS job role for HCSP.

Professional Practice

i. Professional practice that meets the professional standards of conduct, performance and ethics defined by *Good Scientific Practice*[38] and is safe, lawful and effective, and within the scope of practice for the role undertaken, while maintaining fitness to practice.
ii. Personal qualities that encompass communication skills, self-management, self-awareness, acting with integrity and the ability to take some responsibility for self-directed learning, maintaining their own health and wellbeing, critical reflection and action planning to maintain and improve performance.
iii. The ability to be an independent self-directed learner acting autonomously in a non-discriminatory manner when planning and implementing tasks at a professional level.
iv. The ability to work, where appropriate, in partnership with other professionals, often as part of a multidisciplinary team (MDT), supporting staff, service users and their relatives and carers while maintaining confidentiality.
v. The ability to work with the public, service users, patients and their carers as partners in their care, embracing and valuing diversity.
vi. A range of transferable generic academic skills and capabilities to the exercise of initiative and personal responsibility, decision making in complex and unpredictable contexts spanning study skills, independent

[38] and the HCPC in the Life Sciences

learning, reflective practice, communication, team working, research and leadership skills.

vii. A conceptual understanding that enables the learner to devise and sustain arguments and/or to solve problems, using ideas and techniques, some of which are at the forefront of a specialism of HCS.

viii. The ability to apply problem-solving skills, evaluate evidence, arguments and assumptions, to reach sound judgements and to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

Scientific and Clinical Practice

ix. An understanding of a complex body of knowledge, some of it at the current boundaries of an academic discipline, and the ability to apply the scientific principles, method and knowledge to HCS.

x. The ability to apply scientific method and approaches to analytical techniques, HCS research, development and innovation.

xi. The ability to perform technical investigations/skills and technical reporting of quality assured tests, investigations and interventions on patients/samples safely and skillfully, adhering to applicable legislation and in compliance with local, national and international guidelines.

xii. The ability to provide therapeutic interventions, some of which may be specialist, in a number of specialisms.

xiii. A systematic understanding of key aspects of their field of study, including acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of defined aspects of HCS.

xiv. High-quality clinical and scientific practice that applies core scientific knowledge, skills and experience in a healthcare setting, places the patient/public at the centre of care, prioritising patient safety and dignity and reflecting NHS/health service values and the NHS Constitution.

Research, Development and Innovation

xv. An appreciation of the uncertainty, ambiguity and limits of knowledge, the ability to manage their own learning, and to make use of scholarly reviews and primary sources (for example refereed research articles and/or original materials appropriate to HCS).

xvi. To apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge and understanding, and to initiate and carry out projects.

xvii. An understanding of the strengths, weaknesses and opportunities for further development of healthcare and HCS as applicable to their own clinical practice, research, audit, innovation and service development, which either directly or indirectly leads to improvements in patient experience, clinical outcomes and scientific practice.

Clinical Leadership

xviii. Scientific and clinical leadership appropriate to the HSCP job role based on the continual advancement of their knowledge, skills and understanding through the independent learning required for CPPD.

1.17 Transferable Skills

80. It is expected that all BSc (Hons) HCS programmes will meet the descriptors for a higher education qualification at level 6 (Bachelor's degree with honours) outlined by the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (FHEQ) and the Scottish Credit and Qualifications Framework (SCQF) Level 10. On graduation all will have gained a range of transferable generic academic skills and capabilities, including study skills, independent learning, problem solving, reflective practice, communication skills, team working, research, innovation and leadership skills. These transferable skills should be embedded in the curriculum developed by each HEI. For those undertaking the apprenticeship programme, employers will be further assured that apprentices have gained the transferable skills required, given the successful completion of the EPA as part of or in addition to the degree programme.

SECTION 2: BSc (Hons) IN CLINICAL PHOTOGRAPHY

2.1 Details of the PTP Curriculum in Clinical Photography

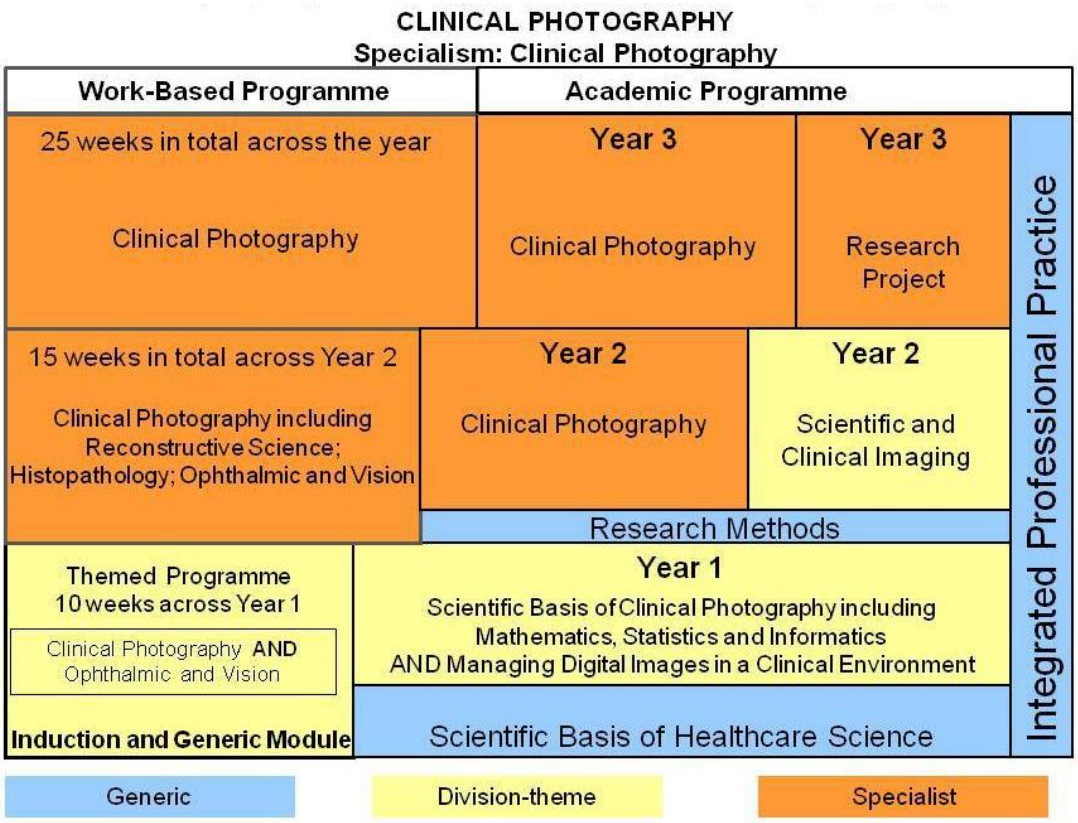
The BSc (Hons) in Healthcare Science for the Practitioner Training Programme will begin with an induction programme provided by the academic provider. All HCS students will then complete a generic introductory module entitled 'Scientific Basis of Healthcare Science' and will begin to develop their knowledge and understanding of professional practice and patient-centred care. In the later stages of Year 1, students will be introduced to the scientific and mathematical basis of Clinical Photography in the context of high-quality, safe, patient-centred services and care. During Year 1, students will undertake a minimum of 10 weeks of work-based learning.

In Year 2, the students will continue to develop their learning in areas some of which are common across other specialisms within healthcare science but may be applied differently in Clinical Photography. They will continue to apply their knowledge in the clinical environment, undertaking a minimum of 15 weeks of work-based training. They will also develop and build their professional practice and complete the generic Research Methods module.

Mid-way through Year 2 and throughout Year 3, they will specialise in Clinical Photography and undertake a further minimum of 25 weeks of work-based learning. As they near the end of the programme there will be the opportunity to explore and evaluate a range of issues, legal and moral frameworks that influence the production and use of clinical photographs, and the perception of the subject within society. Continuing to build their professional practice in line with *Good Scientific Practice*, they will also develop their research skills, including the completion of a research project in their chosen specialism. The 40 weeks of work-based learning across Years 2 and 3 will emphasise and support the development and building of knowledge. Students will be expected to learn and gain competence in a range of skills appropriate to the role of a newly qualified graduate in Clinical Photography as they move through the programme, consistently demonstrating the requisite attitudes, behaviours and skills, and treating patients with care and compassion.

The diagram overleaf summarises the framework for programme for Clinical Photography.

Modernising Scientific Careers: Practitioner Training Programme (PTP): Diagrammatic representation of the full-time, three-year, pre-registration, integrated academic and work-based BSc (Hons) in Healthcare Science



This programme can be delivered part-time through employment.

2.2 List of Modules

Year	Module Title	Credits
1	Professional Practice	10
1	Scientific Basis of Healthcare Science – integrated module across body systems	60
1	Introduction to Clinical Photography, including **10 weeks** of work-based training	20
2	Professional Practice	10
2	Research Methods	10
3	Professional Practice	10
	CLINICAL PHOTOGRAPHY	
1	Mathematics, Statistics and Informatics	10
1	Managing Digital Images in a Clinical Environment	20
2	Scientific and Clinical Imaging	30
2	Imaging Practice and Production	30
2	Work-based training	10
2	Clinical Photography Theory and Practice	30
3	Current Debates in Clinical Photography	30
3	Non-clinical Photography and Design	30
3	Work-based training	20
3	Practice-based Research Project in Clinical Photography	30

SECTION 3: GENERIC GOOD SCIENTIFIC PRACTICE SYLLABUS

Introduction

The Academy for Healthcare Science (AHCS) has set out the principles, values and the standards of behaviour and practice for the HCS workforce in the document *Good Scientific Practice* (GSP). These standards and values must be achieved and maintained in the delivery of work activities, the provision of care and personal conduct. In addition, the AHCS holds a Professional Standards Authority accredited register for Healthcare Science Practitioners (HCSP) not covered by statutory regulation.[39] The Health and Care Professions Council (HCPC) sets out the Standards of Proficiency, which must be achieved for statutory registration as a Biomedical Scientist on completion of the Life Sciences Practitioner Training Programme (PTP).

Key professional practice learning outcomes are included in the BSc (Hons) programme through its GSP syllabus, thus embedding the standards of professionalism set out in GSP in all aspects of the delivery and assessment of the programme. The GSP syllabus is a common component of all PTP curricula and must be followed throughout the whole training period, with engagement at the appropriate level, depending on the stage of training.

The syllabus is divided into five domains. These align with the five domains of *Good Scientific Practice* (GSP):

- Domain 1: Professional Practice
- Domain 2: Scientific Practice
- Domain 3: Clinical Practice
- Domain 4: Research, Development and Innovation
- Domain 5: Clinical Leadership

Each domain contains an overall learning objective, which is described by a number of competence statements. These are presented as:

- knowledge to be acquired and applied;
- practical skills to be demonstrated;
- attitudes and behaviours to be consistently displayed.

[39] Practitioners who have completed an HCPC-approved PTP course in Life Sciences are eligible to apply for Statutory Regulation as Biomedical Scientists.

As students progress through the three-year programme they are expected to critically reflect on their performance as they build on and extend the depth and complexity of the knowledge, skills and experience (spiral learning) that underpins professional practice as a HCSP.

Domain 1: Professional Practice

Topic	Professional Practice	GSP reference
Learning objective	By the end of the course the student will be able to practise as an autonomous professional, usually within the context of the multidisciplinary team, applying their knowledge appropriately, exercising their own professional judgement, practising within the legal and ethical boundaries of the role of a HCSP and critically reflecting on, and developing their professional practice.	
High-level learning outcome(s)	By the end of the course, the student will be able to: • Demonstrate verbally, in written form and in practice, the knowledge and understanding of the professional requirements of a HCSP in the provision of patient-centred care and health care service(s) as described in GSP.	
Knowledge	By the end of the course students will know, comprehend and apply their knowledge and will be able to: 1. Discuss the standards of proficiency of the AHCS and the HCPC and the role of regulation for healthcare professions. 2. Explain the importance of placing the patient at the centre of care and consider services from a user's point of view. 3. Explain the importance of keeping professional knowledge and skills up to date, working within the limits of personal competence. 4. Analyse the ethical, legal and governance requirements arising from working as a HCSP across a range of situations. 5. Summarise and evaluate the evidence to support the high levels of probity required when working at the level of HCSP. 6. Justify the importance of personal health and wellbeing in order to ensure that personal performance and judgement are not affected by their own health. 7. Analyse NHS organisation, policy, values and practice as it affects the provision of healthcare, healthcare science, and the patients and populations it serves. 8. Discuss theories of teaching and learning to underpin the role of the HCS workforce in education as a learner, teacher or trainer, according to the best contemporary clinical and educational standards. 9. Explain a range of strategies to ensure that the voice of patients and the public is embedded in all	1.1.1 1.1.4 1.1.5 1.1.6 1.1.7 1.2 1.2.5 1.4.1 1.4.2 2.3.2

Topic	Professional Practice	GSP reference
	aspects of healthcare, healthcare science and healthcare science education in the academic and work-based setting. 10. Understand the need, where appropriate, to hold indemnity insurance.	
Technical procedures and clinical skills	By the end of the course, the student will be expected to apply in practice a range of professional, technical and clinical skills, and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS and for Biomedical Scientists, the HCPC. They will be able to: 1. Work within their agreed scope of practice. 2. Apply their understanding of professional practice with conduct that places the patient at the centre of care in a manner that promotes patient wellbeing and self-care in all academic and work-based activities. 3. Apply their understanding of the role and importance of Continuing Personal and Professional Development (CPPD) to ensure that their professional knowledge and skills are kept up to date. 4. Respond to the ethical, legal and governance requirements arising from working at the level of a HCSP, applying and accruing knowledge and evidence. 5. Work in a manner that demonstrates probity in every aspect of professional practice at all times. 6. Make appropriate judgements to ensure they limit their work or stop practising if their performance or judgement is affected by their health, and raise any concerns about the performance of colleagues with their supervisor. 7. Maintain records accurately, comprehensively and comprehensibly in accordance with applicable legislation, protocols and guidelines. 8. Raise concerns through appropriate channels if they have evidence to believe that the practice or judgements of colleagues are impaired and are a matter of concern in relation to patient safety. 9. Work in accordance with relevant current NHS policy, guidelines and practice.	1.1.1 1.1.2 1.1.3 1.1.4 1.1.5 1.1.6 1.1.7 1.1.8 1.1.10 1.2.2 2.2.3 2.2.6 2.2.7 2.3.2 3.2.2 4.1.2
Attitudes, values and behaviours	By the end of the course, the student will be expected to demonstrate the attitudes, values and behaviours of a HCSP and will be able to: 1. Apply evidence-based personal and team professional practice that places the patient at the centre of care.	1.1.1–1.1.10 1.2 1.3.1

Topic	Professional Practice	GSP reference
	2. Apply knowledge, experience and critical reflection to identify personal development needs using a range of tools, and develop and update action plans to ensure that they keep skills and knowledge up to date. 3. Display a professional commitment to ethical practice, consistently operating within national and local ethical, legal and governance requirements. 4. Apply the principles of GSP and its professional standards, performing to the highest standards of personal behaviour in all aspects of professional practice. 5. Consistently operate in accordance with relevant current NHS policy and practice. 6. Operate consistently within a sphere of personal capability and level of authority, managing personal workload and objectives to achieve quality of care.	2.2.3 2.2.6 2.2.7 2.2.8 4.1.2 4.1.6

Domain 2: Scientific Practice

Topic	Scientific Practice	GSP reference
Learning objective	By the end of the course, the student will establish and maintain a safe environment in which healthcare science is delivered, drawing on the knowledge, skills, attitudes and behaviours required for safe and effective practice. They will be able to deliver high quality scientific services in a safe and secure working environment. They will also be able to reflect on their performance or situations and record their action plans as they continually evaluate, review and improve their practice.	
High-level learning outcome(s)	By the end of the course, the student will be able to: • Explain and apply the knowledge, skills, values and behaviours required of a HCSP in the delivery of high-quality, evidence-based and patient-centred services in a safe and secure working environment to which they effectively contribute.	
Knowledge	By the end of the course, the student will know, comprehend and apply the key concepts of the knowledge base relevant to healthcare science and will be able to: 1. Describe information and communication technologies appropriate to the HCS specialism. 2. Explain the principles and practice of quality control, external quality assessment and quality management as applied to relevant areas of healthcare science. 3. Explain the role of audit and the audit cycle and how it is used as a tool to facilitate continuous quality improvement. 4. Discuss and justify relevant health and safety legislation and guidance for the workplace.	1.4.5 2.2.2 2.2.7 2.2.9 2.3.1-2.3.4 3.1.17 3.2.1 4.1.2
Technical procedures and clinical skills	By the end of the course, the student will be expected to apply in practice a range of professional, technical and clinical skills, and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS and for Biomedical Scientists, the HCPC. They will be able to: 1. Apply evidence-based practice, both current and new/emerging, in determining the use of scientific investigations and methods. 2. Apply the appropriate HCS knowledge and skills required for safe and effective practice.	1.1.5 1.4.5 2.1.2 2.1.3 2.2.2 2.2.3

Topic	Scientific Practice	GSP reference
	3. Perform a range of routine technical and clinical skills relevant to the HCS division and theme in which they are training. 4. Master the use of information and communication technology (ICT) in relevant areas of healthcare science. 5. Apply and maintain quality standards and related quality control, assessment and management techniques to assure the validity of scientific and technical investigations routinely and assure the quality of personal practice. 6. Participate in scientific and technical audit to determine that investigations and methods are fit for purpose. 7. Practise and promote the importance of health and safety standards in the workplace, prioritising patient safety and the safety of all those working in or accessing the specialism, and identify actions that will improve health and safety, including reducing the risk of infection.	2.2.4 2.2.6 2.2.7 2.2.8 2.2.9 2.3 3.1.5 3.2.1 4.1.2 4.1.6
Attitudes, values and behaviours	By the end of the course, the student will be able to: 1. Consistently practise in accordance with the values described in *Good Scientific Practice* and the NHS Constitution to ensure high-level, safe, effective and compassionate patient-centred care.	1.1.1-1.1.11 1.2

Domain 3: Clinical Practice

Topic	Clinical Practice	GSP reference
Learning objective	By the end of the course, the student will be able to deliver high-quality, effective and safe technical clinical services, performing a range of clinical and/or laboratory skills consistent with the required roles, responsibilities and values of a HCSP within their scope of practice.	
High-level learning outcome(s)	By the end of the course, the student will be able to: • Explain and demonstrate the need for and the ability to deliver high-quality technical and clinical services in the investigation and management of patients as part of a multidisciplinary team. • Apply and demonstrate those skills, attitudes, values and behaviours, in a variety of settings and with regard to a variety of political, social, technical, economic, organisational and professional contexts required of a HCSP delivering consistently high-quality technical and clinical services that are targeted to meet the needs of the individual and group needs of patients.	
Knowledge	By the end of the course, the student will know, comprehend and apply their knowledge and be able to: 1. Describe the pathophysiology of common diseases that result in a referral to HCS services in a specific area of practice. 2. Evaluate the contribution of the multidisciplinary team (MDT) to patient care, patient safety and quality outcomes and consider barriers to effective MDT working. 3. Describe the key roles of the healthcare professions that contribute to the MDT in their area of practice. 4. Discuss their role within the MDT and evaluate the clinical effectiveness of the team, reflecting and suggesting as appropriate areas for improvement. 5. Describe typical behaviours of team members and evaluate the clinical effectiveness of the team and suggest areas for improvement as appropriate. 6. Discuss and evaluate the principles and practice of clinical audit as a tool to evaluate the effectiveness of services.	1.1.4 1.1.5 1.3.2 1.3.6 2.2.2 2.3.4 4.1.2 4.1.10
Technical procedures	By the end of the course, the student will be expected to apply in practice a range of professional, technical and clinical skills and critically reflect on and develop their performance, working within the	1.3.2 1.3.6

Topic	Clinical Practice	GSP reference
and clinical skills	Standards of Proficiency set by the AHCS and for Biomedical Scientists, the HCPC. They will be able to: 1. Deliver high-quality technical clinical procedures in the investigation and management of patients. 2. Apply in practice consistently high standards in the technical skills required in the investigation and management of patients and critically reflect on their performance. 3. Assist and, where appropriate, perform a range of equipment management skills, e.g. preventative maintenance, fault finding and calibration. 4. Attend and, if appropriate, actively participate in MDT meetings. 5. Assist in the design, data collection, data analysis and reporting within the clinical audit cycle.	2.1.3 2.1.4 2.1.5 2.1.6 2.2.1-2.2.4 2.2.6-2.2.9 4.1.10
Attitudes, values and behaviours	By the end of the course, the student would be expected to demonstrate the attitudes and behaviours necessary for the role of a HCSP and will be able to: 1. Commit to the provision of high standards of technical clinical services, taking account of the political, social, technical, economic, organisational and professional environment, and act as a positive role model. 2. Promote the importance of active participation of HCSPs in MDT meetings. 3. Advocate clinical audit as a tool to evaluate and optimise clinical services and communicate ideas and aspirations.	1.1.4 1.1.5 1.1.6 1.1.11 1.2.5 1.3.2 2.3 4.1.10

Domain 4: Research, Development and Innovation

Topic	Research, Development and Innovation	GSP reference
Learning objective	By the end of the course, the student will be able to justify the need for evidence-based practice, audit and innovation to support the development and improvement of patient services and patient safety, and will demonstrate the necessary knowledge, skills, attitudes, values and behaviours in relation to research, development and innovation in the pursuit of improved patient safety and care.	
High level learning outcome(s)	By the end of the course, the student will be able to: • Explain the need for evidence-based practice, audit and innovation, within appropriate governance and ethical frameworks, in the delivery, development and improvement of patient-centred services. • Undertake or participate in personal or collaborative research, audit, development (professional or service) and innovation, applying the knowledge, skills, attitudes, values and behaviours required of a HCSP.	
Knowledge	By the end of the course, the student will know, comprehend and apply their knowledge and be able to: 1. Know the principles and applications of scientific enquiry, including the evaluation of treatment efficacy, the research process and research methodologies. 2. Know the value of research to the critical evaluation of practice research. 3. Describe and justify how and why research and development is undertaken within governance and ethical frameworks. 4. Explain ways in which the individual HCSP can support the wider healthcare team in the spread and adoption of innovative technologies and practice.	1.1.5 4.1.1 4.1.2 4.1.3 4.1.6 4.1.7 4.1.8 4.1.9 4.1.10
Technical procedures and clinical skills and procedures	By the end of the course, the student will be expected to apply in practice a range of professional, technical and clinical skills and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS and for Biomedical Scientists, the HCPC. They will be able to: 1. Apply research methods and techniques to initiate and complete a research project, development or innovation project. 2. Evaluate research and other evidence to inform own practice.	4.1.3 4.1.6 4.1.8 4.1.9

Topic	Research, Development and Innovation	GSP reference
Attitudes, values and behaviours	By the end of the course, the student would be expected to demonstrate the attitudes and behaviours necessary for the role of a HCSP and will: 1. Work with appropriate research and development governance, legal and ethical frameworks. 2. Promote the need for evidence-based practice to support the provision of high-quality care. 3. Be flexible and adaptable to the introduction of new scientific, technical, diagnostic, monitoring, treatment and therapeutic procedures into routine practice. 4. Keep up to date as part of a commitment to CPPD.	1.1.4 1.1.5 4.1.1 4.1.2 4.1.4 4.1.6

Domain 5: Clinical Leadership

Topic	Clinical Leadership	GSP reference
Learning objective	The NHS Leadership Academy states that: '*The Healthcare Leadership Model is to help those who work in health and care to become better leaders. It is useful for everyone – whether you have formal leadership responsibility or not, if you work in a clinical or other service setting, and if you work with a team of five people or 5,000.*' By the end of this course the student should therefore begin to develop an understanding of the key concepts of leadership; the skills, qualities and abilities of effective leaders and how their personal qualities affects the experiences of patients and service users, the organisation, the quality of care provided, and the reputation of the organisation itself. They will be introduced to assessment tools to measure their personal qualities and critically reflect on performance to identify their own personal qualities, including values, principles and assumptions, developing action plans to adapt personal behaviour as necessary.	
High level learning outcome(s)	By the end of the course, the student will: • Understand the principles underpinning the current NHS clinical leadership frameworks[40] and the associated personal qualities and the impact of personal qualities on the culture and climate within which the student, their colleagues and teams work.	
Knowledge	By the end of the course, the student will know, comprehend and apply their knowledge and be able to 1. Explain the difference between leadership and management. 2. Discuss the skills, qualities and abilities of effective leaders. 3. Describe the impact of personal qualities on the culture and climate the student, their colleagues and teams work in. 4. Discuss how what the student does and how they behave affects the experiences of patients/service users, the organisation, the quality of care provided, and the reputation of the organisation itself.	5.1.1-5.1.6 5.1.10 5.1.12
Technical procedures	By the end of the course, the student will be expected to apply in practice a range of professional, technical and clinical skills and critically reflect on and develop their performance, working within the	

[40] http://www.leadershipacademy.nhs.uk/wp-content/uploads/dlm_uploads/2014/10/NHSLeadership-LeadershipModel-colour.pdf

Topic	Clinical Leadership	GSP reference
and clinical skills	Standards of Proficiency set by the AHCS and for Biomedical Scientists, the HCPC. They will be able to: 1. Identify and develop skills in listening, observing and using feedback. 2. Identify conflict style and develop skills in negotiating and mediating conflicts.	
Attitudes, values and behaviours	By the end of the course, the student would be expected to demonstrate the personal qualities that underpin the practice of a HCSP, namely self-awareness, e.g. self-confidence; self-control; self-knowledge; personal reflection; resilience and determination. Students should be aware of their strengths and limitations in these areas and how these will have a direct effect on how they behave and interact with others. Students will be expected to critically reflect on performance to identify their own personal qualities, including values, principles and assumptions, developing action plans to adapt personal behaviour as necessary.	1.3.1 1.3.2 1.3.3 1.3.4 1.3.5 1.3.6

SECTION 4: GENERIC PROFESSIONAL, SCIENTIFIC AND TECHNICAL MODULES

This section covers the three generic modules that will be studied by all students undertaking an MSC accredited BSc (Hons) Healthcare Science integrated degree.

- Year 1–3: Professional Practice [10 credits per year developing learning at Level 4, Level 5 and Level 6]
- Year 1: Scientific Basis of Healthcare Science [60 credits]: Level 4
- Year 2: Research Methods [10 credits]: Level 5
- Year 3: Research Project [30 credits]: Level 6

GM(i): Professional Practice (Years 1, 2 and 3)

Topic	Professional Practice [10 credits per year]	GSP reference
Learning objective	The overall aim of this module is to ensure that the student has the underpinning knowledge, understanding and skills and consistently demonstrates the values, attitudes and behaviours to perform a range of technical and clinical skills working within the Standards of Proficiency set by the AHCS and for Biomedical Scientists, the HCPC. Professional practice should be embedded in every aspect of the three-year programme to enable the student to develop and build their professional practice as they progress through the programme. In line with the concept of a spiral curriculum, students will encounter the same subject in different parts of the curriculum, but across the three-year programme the complexity will increase and the student will reinforce previous learning, gradually increasing their knowledge, skills and confidence.	
Knowledge	On successful completion of this programme the student will: **Professional practice** 1. Describe the values and principles that underpin the shared UK NHS and Social Care services culture, including the HEE five key workforce characteristics and the NHS Constitution, especially the values relating to compassion, transparency, candour, openness and leadership.[41,42] 2. Describe the role of the HCSP and how HCSPs contribute to the delivery of high-quality healthcare. 3. Explain the importance of placing the patient at the centre of care and discuss how this translates into practice. 4. Discuss the impact of culture, equality and diversity on practice. 5. Discuss how HCS services can work in partnership with patients and service users to ensure the views of patients are central to delivering, develop and maintaining high-quality, safe services.	1.1 1.2 1.3 2.3.4 4.1.1 5.1.2 5.1.4

[41] Investing in People – Workforce Plan for England
[42] Maps to Francis Report, Recommendation 2 – also to The Speaking Up Charter

Topic	Professional Practice [10 credits per year]	GSP reference
	Legal and ethical boundaries of practice 6. Analyse the ethical, legal and governance requirements arising from working at the level of a HCSP across a range of situations. 7. Discuss the principles, guidance and law with respect to medical ethics, patient confidentiality (the limits of the concept of confidentiality), informed consent, equality and diversity, safeguarding, use of chaperones. 8. Summarise the procedures to follow if cautioned, charged with a criminal offence, suspended, or have restrictions placed on personal scientific, clinical or professional practice. 9. Justify the importance of personal health and wellbeing to ensure personal performance and judgement is not affected by their own health. **Patient safety and quality** 10. Explain the importance of protecting patients from risk or harm presented by another person's conduct, performance or health, and what to do when concerns are identified or raised. 11. Discuss how to how to share information appropriately with patients, carers, colleagues and other services to support the quality of care. 12. Explain the common causes of error and understand the critical incident reporting process, recognising the importance of promoting a no-blame culture. 13. Explain approaches to procedures for identifying and reporting critical incidents and receiving and responding to complaints. 14. Explain current national and local policy issues as they affect the service provided by HCSPs and the HCS workforce. 15. Discuss their role in healthcare science and its contribution to the delivery of high-quality healthcare. 16. Explain why it is important that the HCS workforce takes reasonable care of health and safety at work for themselves, members of their team and others. **Communication skills** 17. Explain the principles that underpin effective verbal and written communication within their role,	

Topic	Professional Practice [10 credits per year]	GSP reference
	including those who do not have English as a first language and communication with people with sensory and cognitive impairments. **Leadership** 18. Explain the concept of shared leadership and the associated personal qualities and behaviours that promote shared leadership and apply this knowledge within the work-base. **Continuing personal and professional development** 19. Explain the importance of keeping professional knowledge and skills up to date and working within the limits of their personal competence. 20. Justify the rationale for engaging in CPPD and critical reflective practice, and evaluate methods for recording, learning, developing and evaluating action plans.	
Technical skills and procedures	By the end of the course, the student will be expected to apply in practice a range of professional, technical and clinical skills and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS and for Biomedical Scientists, the HCPC.	1.1 1.2 1.3

GM(ii): Scientific Basis of Healthcare Science (Year 1)

Topic	Scientific Basis of Healthcare Science [60 credits]	GSP reference
Learning objective	The overall aim of this introductory module is to provide all students with a broad knowledge and understanding of clinical science and scientific knowledge, contextualised to the practice of healthcare science and the services provided by their HCS division/specialism. Central to this is the contribution of healthcare science to patient care, patient safety, service delivery, research and innovation, often at the cutting edge of science, for example genomics, personalised medicine and clinical bioinformatics. All members of the HCS workforce must understand the impact of their work on patients and patient care and remember that their work has a direct or indirect impact on patient care. As an introductory module it will provide an overview and reinforcement of key concepts with respect to the organisation, structure and function of the body, and important areas such as the psychosocial aspects of health and disease, clinical pharmacology and therapeutics, genomics, personalised/precision medicine and clinical bioinformatics. Achievement of each learning outcome provides the building blocks for the division- and specialism-specific learning to follow, ensuring a common starting point for all students. This module is designed to provide students with broad scientific knowledge to underpin their future practice to provide the foundations for study in any area of healthcare science.	
Knowledge	On successful completion of this module the student will: 1. Describe the structural, chemical, cellular and tissue organisation of the body and explain the cellular, tissue and systems responses to diseases. 2. Explain the structure and function of all body systems and the effects of common diseases. 3. Explain the principles and core concepts of clinical genetics, genomics and personalised/precision medicine and discuss in the context of patients referred to HCS services. 4. Explain the basis of epidemiology, public health, health prevention and health protection and discuss in relation to the role of the public health function and HCS services. 5. Explain the principles of clinical pharmacology and therapeutics and discuss in relation to patients referred to HCS services.	1.1.4 1.1.5 1.1.6 2.1.6

Topic	Scientific Basis of Healthcare Science [60 credits]	GSP reference
	6. Explain the principles and core concepts of the sociology of health and illness and discuss those relevant to patients typically referred to HCS services. 7. Explain the basic principles of physics and clinical engineering that underpin HCS and discuss in relation to patients referred to HCS services. 8. Explain the principles of clinical bioinformatics and health informatics and discuss their impact on healthcare, health and HCS services. 9. Explain a range of mathematical and statistical techniques that underpin the practice of healthcare science. 10. Keep up to date with developments in healthcare and healthcare science, identifying new and innovative scientific and technical developments and their application in healthcare science.	
Technical skills and procedures	By the end of this module the student will be expected to apply in practice a range of technical and clinical skills and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS and for Biomedical Scientists, the HCPC. Students will be expected to apply and develop their knowledge as they progress through the programme in their academic and work-based learning. They will also be expected to develop a range of study skills, including time management, organisational skills, using the library, search engines, self-directed learning, critical analysis and avoiding plagiarism.	1.1.4 1.1.5 1.1.6 2.2.4

GM(iii): Research Methods (Year 2)

Topic	Research Methods [10 credits]	GSP reference
Learning objective	The overall aim of this module is to ensure that the student has the knowledge, skills and experience of the place of research, development and innovation in the NHS in improving patient care, including prevention, diagnostics, treatment and service delivery. On completion of this module and the research project, students should be able to generate ideas; assess, plan, conduct, evaluate, interpret and report research and innovation projects, which includes original research; and disseminate the findings and, where appropriate, the adoption of the findings. Students will extend their knowledge and application of mathematics, statistics and data presentation techniques gained in Year 1. This module will provide the underpinning knowledge to support the final year research project.	
Knowledge	On successful completion of this module the student will: 1. Explain and justify the process and importance of research, innovation and audit to the NHS and healthcare science. 2. Explain the current UK ethical, legal and governance frameworks within which human and animal research can be conducted. 3. Explain the principles of evidence-based medicine, literature and systematic review, and the development of clinical guidelines. 4. Describe a range of study designs and discuss the appropriate use of each method. 5. Describe and justify the use of statistical techniques to analyse data and a range of dissemination methods to share research findings.	4.1.1 4.1.7

GM(vi): Research Project (Year 3)

Topic	Research Project [30 credits]	GSP reference
Learning objective	The overall aim of this module, building on the Research Methods module, is for the student to apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge and understanding as they initiate and complete a research project. The research project may span scientific or clinical research, translational research, operational and policy research, clinical education research, innovation, service development, service improvement, or supporting professional service users. Research projects should be designed to take into account the current research programmes of the academic and/or work-based departments in which the research is to be conducted.	
Knowledge	By the end of this module the student will: 1. Discuss the range of research undertaken in health and healthcare science and how these are applied in the specialism in which the student is based. 2. Describe the ethical and governance approval processes required to undertake the planned research project.	1.1.4 1.1.5 4.1.1 4.1.2
Technical skills and procedures	On successful completion of this module and working within legal and ethical frameworks the student will be able to: 1. Work with a supervisor to design, plan and undertake a research project to test a hypothesis from conception to completion/archiving in accordance with ethical and research governance regulations, drawing on expert advice where necessary and involving patients and service users. 2. Analyse the data using appropriate methods and statistical techniques and interpret, critically discuss and draw conclusions from the data. 3. Prepare a project report that describes and critically evaluates the research project, clearly identifying the strengths and weaknesses. 4. Present a summary of the research project, responding to questions appropriately. 5. Prepare a summary of the research project suitable for non-specialist and lay audiences.	4.1.1 4.1.2 4.1.3 4.1.6 4.1.8 4.1.9
Technical	On successful completion of this module and working within legal and ethical frameworks the student	2.1.6

Topic	Research Project [30 credits]	GSP reference
skills and procedures	will be able to: 1. Undertake an evidence-based literature review, critically appraise the output, draw appropriate conclusions and prepare a written report the findings, and where appropriate, use the findings to inform the 3rd year research project. 2. Present the outcome of the literature review to a non-scientific and scientific audience.	2.2.4 4.1.1 4.1.2 4.1.7 4.1.9

SECTION 5: CLINICAL PHOTOGRAPHY SYLLABUS

Clinical Photography Syllabus

5.1 Attitudes, Behaviours and Values

The student will be expected to critically reflect on their professional practice and consistently demonstrate the professional attributes and insights required of a HCSP.

The following learning outcomes should be achieved, as appropriate to the modules within the Clinical Photography syllabus:

- Work within the Standards of Conduct, Performance and Ethics set by the AHCS in *Good Scientific Practice*.
- Show respect and behave in accordance with *Good Scientific Practice*.
- Treat patients, carers and their families with respect, kindness and compassion, putting them at their ease.
- Show understanding of the patient's anxiety and be sympathetic and kind, respecting and understanding individuals' beliefs and ways of coping with illness.
- Appreciate the impact of clinical photography services on the patient pathway and outcome.
- Act in a calm, controlled and reassuring manner.
- Behave in a professional manner in matters of attendance and appearance.
- Recognise the limits of professional competence, seeking help and support and referring to colleagues appropriately.
- Maintain confidentiality of patient information and data.
- Value social diversity and its relationship to service provision in healthcare.
- Work effectively within a multidisciplinary team, developing and maintaining professional relationships.
- Develop a balance between reflective practice and active exploration in personal learning and take responsibility for personal learning.
- Develop, maintain and improve personal knowledge and skills.
- Consistently work safely, demonstrating being precise and paying attention to detail.
- Communicate effectively within the healthcare environment and clinical team, adapting communication to meet varying needs and overcoming barriers to understanding.
- Communicate scientific information at a level appropriate to the audience, including the public.
- Use correct terminology appropriate to Clinical Photography and the specialist areas where work placements are undertaken.
- Listen and extract relevant information.

- Encourage feedback from the public, patients and staff, welcome it and use it to improve services.
- Establish and influence the culture of health and safety in the workplace.
- Recognise, where necessary, the urgency of a situation and seek help and advice.
- Show a positive attitude to lifelong learning and professional development.
- Bring the highest levels of knowledge and skill at times of basic human need when care and compassion are what matters most.
- Make appropriate use of chaperones.
- Recognise the cultural aspects of Clinical Photography.
- Use interpersonal and communication abilities to set up and maintain an appropriate atmosphere where patients can be photographed effectively.
- Apply emotional intelligence, compassion and empathy in the management of patients.
- Critically evaluate and apply relevant theoretical knowledge to clinical practice.
- Reflect on own practice and put lessons learnt into practice.
- Reference medical texts and literature and develop ease in the use of clinical terminology.

The PTP syllabus for Clinical Photography follows.

5.2 Division-theme modules

The following modules will be studies by all students undertaking the Clinical Photography programme:

MP(i): Mathematics, Statistics and Informatics (Year 1)
CPH(i): Introduction to Clinical Photography including 10 weeks work-based training (Year 1)
CPH(ii): Managing Digital Images in a Clinical Environment (Year 1)
CPH(iii) Scientific and Clinical Imaging (Year 2)
CPH(iv): Imaging Practice and Production (Year 2)

5.3 Modules for Clinical Photography

Interpretation of the high-level framework for Clinical Photography

Year 3 *Application to Practice*	Professional Practice [10]	Current Debates in Clinical Photography [30]	Non-clinical Photography and Design [30]	Practice-based Research Project [30]	Work-based Training 25 weeks [20]	
	Generic	Specialist				
Year 2 *Techniques and Methods*	Professional Practice [10]	Research Methods [10]	Scientific and Clinical Imaging [30]	Imaging Practice and Production [30]	Clinical Photography Theory and Practice [30]	Work-based Training 15 weeks [10]
	Generic		Division-theme		Specialist	
Year 1 *Scientific Basics*	Professional Practice [10]	Scientific Basis of Healthcare [60]	Introduction to Clinical Photography including **10 weeks** work-based training [20]	Mathematics, Statistics and Informatics [10]	Managing Digital Images in a Clinical Environment [20]	
	Generic		Division-Theme			

[xx] = credits

Generic modules: common to all divisions of healthcare science

Division-theme modules: Shared by a group of specialisms, usually within a Healthcare Science division

Specialist modules: specific to a specialism

Year 1

MP(i): Mathematics, Statistics and Informatics
[10 credits]

Topic	Mathematics, Statistics and Informatics [10 credits]	GSP reference
Learning objective	The overall aim of this module is to ensure that the student has the underpinning knowledge of mathematics, statistics and informatics required for their role.	
Knowledge	By the end of this module the student will be able to: 1. Explain the need to apply the appropriate mathematical and statistical tools for tasks they are required to perform within the clinical environment. 2. Explain the need for data security and confidentiality within their clinical environment. 3. Discuss the essential issues associated with computing technologies and their management as appropriate to either Clinical Engineering, Medical Physics or Clinical Photography.	2.1.2 2.1.5 3.1.6 3.1.9
Technical skills	By the end of this module, the student will be expected to apply in the academic setting a range of technical skills and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS and will be able to: 1. Analyse and interpret data within a work-based context. 2. Manipulate, analyse and present technical and clinical information appropriately, using spreadsheets, databases and presentation software. 3. Solve problems by applying appropriate mathematical and statistical techniques to clinical data, e.g. algebra, trigonometry, exponential, graphs and linear relationships. 4. Use data securely, respecting confidentiality and maintaining consent in the use of data. 5. Present data appropriately and communicate effectively.	2.2.1 2.2.9 4.1.9

Year 1

CPH(i): Introduction to Clinical Photography
[20 credits]

Topic	Introduction to Clinical Photography (including 10 weeks of work-based training) [20 credits]	GSP reference
Learning objective	The aim of this module is to introduce students to the scientific, technical and creative concepts that underpin the use of photographic image making as a tool for visual communication in the clinical setting. The module includes both the theoretical study and practical application of elements common across photography practice, including: lighting, exposure, camera controls; lenses, optics and basic digital image formation and processing; composition, design and visual communication. In this module students will begin to develop and demonstrate the knowledge, skills, behaviours and attitudes needed to work safely as a HCSP, promoting patient-centred, high-quality care as defined in *Good Scientific Practice*.[43] Students will have the opportunity to build on and apply their learning from the academic environment, including practical sessions, clinical skills/studio sessions, reflecting on each experience as part of continual personal development.	
Knowledge	By the end of this module the student will be able to: 1. Discuss the role of Clinical Photography in healthcare science and the wider healthcare setting, including the guidance and legislation with respect to informed consent, patient confidentiality and patient-centred care. 2. Describe the key historical innovations in photographic technologies and discuss their influence on the development of imaging in support of healthcare science, clinical practice and contemporary culture. 3. Describe the properties of the electromagnetic spectrum and discuss the nature of visible light, the human visual system, the formation of colour and the effect of variations in light sources on the photographic image. 4. Describe the principles by which images are formed through an optical pathway and discuss the influence on the image of commonly utilised and specialist lenses.	1.1.1 3.1.1 3.1.2 1.1.4 3.1.5

[43] http://www.ipem.ac.uk/Portals/0/Documents/News/AHCS_Good_Scientific_Practice.pdf

Topic	Introduction to Clinical Photography (including 10 weeks of work-based training) [20 credits]	GSP reference
	5. Discuss the design, utilisation and appropriateness of the various digital camera formats available to the clinical photographer. 6. Describe the principles underpinning exposure in photography and discuss the creative and technical effects on image formation of the key components. 7. Discuss the elements of photographic composition commonly utilised to create meaning through denotation and connotation.	
Technical and clinical skills	By the end of this module, the student will be expected to apply in practice a range of technical and clinical skills and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS, and will be able to: 1. Perform, under direct supervision, a set of standardised rhinoplasty photographs of a patient in accordance with local health and safety regulations. 2. Observe and assist qualified staff during ophthalmic imaging in an ophthalmic and vision setting. 3. Perform, under direct supervision, the image workflow procedures from the point of receiving the request through to uploading the photographs. 4. Perform, under direct supervision, the procedures for ensuring accurate colour management throughout the image workflow. 5. Collect, analyse and interpret patient data within a work-based context. 6. Adhere to appropriate standards of professional practice as defined in *Good Scientific Practice*.	3.1.4 3.1.11 3.1.12 1.2.5

Year 1

CPH(ii): Digital Photography Image Management in a Clinical Environment
[20 credits]

Topic	Digital Photography Image Management in a Clinical Environment [20 credits]	GSP reference
Learning objective	This module introduces students to the theory and practices associated with the production and management of digital photographic images. This includes developing a core understanding of the nature of the digital image, how it is captured, stored and managed through a chain of processes to a variety of outputs. It also places this knowledge within the contexts of data protection, confidentiality and security associated with the healthcare environment.	
Knowledge	By the end of this module the student will be able to: 1. Describe the nature and structure of the digital photographic image. 2. Discuss the range of technologies associated with the capture, storage and retrieval, processing and output of digital images within the healthcare setting. 3. Discuss the range of file formats associated with digital images in the healthcare setting and their advantages and disadvantages. 4. Identify and discuss the range of options for managing the digital image workflow from capture to output. 5. Discuss the role of colour management, identifying the tools available to support its use in the healthcare setting. 6. Describe and explain the need for data security and confidentiality of clinical images, including encryption and distribution.	3.1.1 3.1.2 1.1.4 3.1.5 1.1.3 1.1.6
Technical and clinical skills	By the end of this module, the student will be expected to apply in practice a range of technical and clinical skills and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS, and will be able to: 1. Select, analyse and critique images. 2. Maintain structured, accurate records. 3. Handle images with respect for their privacy and confidentiality.	3.1.4 3.1.11 3.1.12 1.2.5 1.1.1 1.1.2

Year 2

CPH(iii): Scientific and Clinical Imaging
[30 credits]

Topic	Scientific and Clinical Imaging [30 credits]	GSP reference
Learning objective	This module builds on the theories of light, image formation and attributes, and management introduced in Year 1. It also introduces the student to the range of imaging technologies used to support diagnostics and patient care, teaching and research within the scientific and healthcare settings.	
Knowledge	By the end of this module the student will be able to: 1. Identify the regions of the electromagnetic spectrum commonly used in scientific and clinical imaging, evaluating the properties underpinning their use and value in these contexts. 2. Describe the technologies used in imaging science and medicine, and discuss their value to diagnosis, teaching and research. 3. Identify the technologies commonly used to manage the imaging process from capture through to display. 4. Describe the process of applied colour management, identifying the steps in the imaging chain where colour management plays a significant role. 5. Discuss the use of metadata in the management of digital images. 6. Identify the issues associated with image integrity, security, preservation and ownership, and discuss the importance of these within the HCS environment.	1.1.4 3.1.5 1.1.6 1.2.5
Technical and clinical skills	By the end of this module, the student will be expected to apply in practice a range of technical and clinical skills and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS and will be able to: 1. Actively seek and validate accurate information from all available sources. 2. Select and apply appropriate analysis or assessment techniques and tools. 3. Use and develop analytical skills. 4. Demonstrate problem solving. 5. Use clear written and verbal communication. 6. Communicate complex ideas in simple terms. **The Year 2 and 3 work-based learning outcomes can be found in module CPH(viii):**	3.1.11 3.1.12 3.1.10 3.2.4 2.2.3 2.2.9

Topic	Scientific and Clinical Imaging [30 credits]	GSP reference
	Specialist Module: Work-based Practice and the work-based syllabus.	

Year 2

CPH(vi): Imaging Practice and Production
[30 credits]

Topic	Image Practice and Production [30 credits]	GSP reference
Learning objective	This module develops the student's ability to adapt and apply the photographic knowledge and skills introduced in Year 1 to a range of technically challenging objects, settings and environments. It requires the student to integrate technical skills with visual research to produce contemporary work. It introduces the principles of design and desktop publishing in which non-clinical photography output is commonly presented. It also introduces concepts of narrative, linear and non-linear production.	
Knowledge	By the end of this module the student will be able to: 1. Discuss contemporary styling in image design in a range of settings. 2. Justify the selection of professional photographic techniques and equipment, applying these selections to the production of a range of assignments and critically appraising the results. 3. Explain the basic principles of graphic design and desktop publishing. 4. Discuss the fundamentals of video production from pre-production through to post-production. 5. Discuss linear and non-linear multimedia production in the contemporary digital media environment. 6. Explain the basis of a range of methods to deliver photographic outputs, including professional digital printing and screen media.	1.1.4 3.1.5 1.1.3 1.1.6 2.2.3 3.1.3 3.1.4
Technical and clinical skills	By the end of this module, the student will be expected to apply in practice a range of technical and clinical skills and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS and will be able to: 1. Use professional working practices. 2. Work with an ethos of independent working practice. 3. Work as part of a design/production team, respecting the roles of others within the team. 4. Critically analyse historical and contemporary imaging media. 5. Develop the practice of critical self-appraisal. 6. Discuss work and respond to criticism in an informed way.	1.1.11 1.2.5 1.3.1 1.3.2 1.3.5 2.2.2 2.2.3

Topic	Image Practice and Production [30 credits]	GSP reference
	The Year 2 and 3 work-based learning outcomes can be found in module CPH(viii): Specialist Module: Work-based Practice and the work-based syllabus.	5.1.2 5.1.4

Year 2

CPH(v): Clinical Photography Theory and Practice
[30 credits]

Topic	Clinical Photography Theory and Practice [30 credits]	GSP reference
Learning objective	The aim of this module is to enable the student to apply their photographic knowledge and skills to the clinical setting and introduce the specific techniques that underpin the value of photography in support of patient care, clinical teaching and research. It also builds on the student's knowledge of anatomy and physiology, introducing them to the pathophysiology of commonly photographed conditions and the clinical vocabulary.	
Knowledge	By the end of this module the student will be able to: 1. Identify the variables encountered in Clinical Photography in a range of settings. 2. Undertake a range of standardised clinical photography techniques in various simulated clinical settings, including in controlled studio and non-studio environments. 3. Identify the limitations of standardised representational photography and adapt strategies to manage occasions when a non-standardised approach may be required. 4. Describe the pathophysiological processes of a range of commonly photographed conditions, identifying the key signs the photographer needs to recognise. 5. Describe the specific requirements for photography of children and vulnerable adults, particularly in respect to cases of suspected abuse.	1.1.4 3.1.5 1.1.3 1.1.6 2.2.3 3.1.3 3.1.4 1.1.1 1.1.2 1.1.6 1.1.9 1.1.10 1.4.5
Technical and clinical skills	**The Year 2 and 3 work-based learning outcomes can be found in module CPH(viii): Specialist Module: Work-based Practice and the work-based syllabus.**	

Year 3

CPH(vi): Non-clinical Photography and Design
[30 credits]

Topic	Non-clinical Photography and Design [30 credits]	GSP reference
Learning objective	This module develops student's knowledge of design principles and practices for print, screen and multimedia production within the healthcare environment. It also allows the student the opportunity to develop the advanced techniques required to creatively fulfil non-clinical assignments in photography and multimedia production.	
Knowledge	By the end of this module the student will be able to: 1. Critically evaluate a client brief, research source materials and create appropriate photographic solutions to meet the client brief. 2. Critically evaluate a photography brief in order to produce non-clinical/PR images to a high technical standard suitable for use in clinical environments. 3. Discuss the strengths and weaknesses of different professional image media in meeting a client brief. 4. Produce and evaluate complex multimedia content, which conveys a healthcare or health education message.	1.1.1 1.1.4 1.1.5 2.1.1 2.2.3 2.2.4 2.3.2 3.1.3 3.1.4 3.1.6
Technical and clinical skills	By the end of this module, the student will be expected to apply in practice a range of technical and clinical skills and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS, and will be able to: 1. Use interpersonal and communication skills to discuss a client brief with the client and members of the design team. 2. Consider the appropriate choice of media to meet the client brief. 3. Use practical skills to enhance design for print, screen and video. 4. Accept and give feedback in order to ensure output meets professional standards and the client brief. 5. Critically evaluate and apply relevant theoretical knowledge to non-clinical/PR/promotional photography in the healthcare environment. 6. Reflect on their own practice and put lessons learnt into practice.	1.1.9 1.1.10 1.2.1 2.1.1 2.2.3 2.2.4 2.3.2 3.1.3 3.1.4 3.1.6 3.1.7

Topic	Non-clinical Photography and Design [30 credits]	GSP reference
	The Year 2 and 3 work-based learning outcomes can be found in module CPH(viii): Specialist Module: Work-based Practice and the work-based syllabus.	

Year 3

CPH(vii): Current Debates in Clinical Photography
[30 credits]

Topic	Non-clinical Photography and Design [30 credits]	GSP reference
Learning objective	This module aims to explore and evaluate a range of issues, legal and moral frameworks that influence the production and use of clinical photographs, and the perception of the subject within society.	
Knowledge	By the end of this module the student will be able to: 1. Discuss and analyse the major legal aspects of medical photographic practice within a clinical environment. 2. Discuss and justify the process and procedures to ensure effective image management within the legislative frameworks to ensure patient confidentiality. 3. Discuss the social, cultural and religious issues associated with Clinical Photography. 4. Identify and discuss some of the disease-related issues likely to impact on patient management in Clinical Photography.	1.1.3 1.1.4 1.1.5 3.1.2 3.1.4 3.1.7
Technical and clinical skills	**The Year 2 and 3 work-based learning outcomes can be found in module CPH(viii): Specialist Module: Work-based Practice and the work-based syllabus.**	

Years 2 and 3

CPH(viii): Specialist Module: Work-based Practice
[30 credits]

Topic	Specialist Module: Work-based Practice [30 credits]	GSP reference
Learning objective	The overall aim of this module is to ensure that the student has the underpinning knowledge to allow them to carry out a range of clinical photography procedures in the work base, both clinical and non-clinical. They will develop their technical and clinical skills and attitudes relevant to the HCSP, building on learning in the academic environment, including practical sessions, clinical skills sessions, reflection on development, etc. Additionally, the placements should help students learn in the context of practice and real-life experience and provide a motivational element as they work towards a career in the NHS. Central to all work-based learning is to ensure the student understands the concept of patient-centred care that is respectful of and responsive to individual patient preferences, needs and values, and ensures that patient values guide all they do. The student will be expected to demonstrate patient-centred care at all times.	
Knowledge	On successful completion of this module the student will be able to: 1. Discuss and justify the use of appropriate photographic techniques in a broad range of clinical settings. 2. Critically evaluate a range of specialist photographic techniques, including 3D photography and ophthalmic imaging. 3. Discuss and evaluate the production and manipulation of digital images. 4. Discuss and evaluate the production and editing of video. 5. Critically review and evaluate protocols in relation to the core skills, including Clinical Photography and digital image workflow, communication skills, management and quality assurance when delivering medical illustration services. 6. Produce a professional portfolio that cumulatively records/provides evidence of skills, knowledge and understanding, ability to use reflective practice, and personal and professional development. 7. Discuss the impact Clinical Photography on the clinical delivery of healthcare and resultant effect on patient outcomes so that effective and efficient planning of service delivery can be determined. 8. Critically review the ethical implications of legislation, regulations and guidance on the management of medical images, informed consent and data protection.	1.1.3 1.1.4 1.1.5 1.1.6 1.1.7 1.2.5 2.2.9 2.3.2 3.1.1 3.1.2 3.1.4 3.1.7

Topic	Specialist Module: Work-based Practice [30 credits]	GSP reference
	9. Critically review the use of ICT to store and manage images securely.	
Technical and clinical skills	By the end of this module, the student will be expected to apply in practice a range of technical and clinical skills and critically reflect on and develop their performance, working within the Standards of Proficiency set by the AHCS, and will be able to: **Standardised representational photography** 1. Make clinical photographic recordings of patients in a range of clinical settings, including adults and children.* 2. Demonstrate the correct procedure for storing, labelling and archiving clinical photographs. 3. Adhere to appropriate standards of professional practice as defined in *Good Scientific Practice*. * *Covers all body parts.* **Introduction to clinical specialties and locations** 1. Produce retinal photographs in a range of patients, including the use of mydriatic equipment. 2. Produce optical coherence tomography (OCT) recordings in a range of patients. 3. Produce photographs of morbid or surgical gross specimens. 4. Undertake intra-oral photography and produce photographs of the teeth in a range of patients. 5. Observe and assist during the photography of a surgical procedure. 6. Adhere to appropriate standards of professional practice as defined in *Good Scientific Practice*. **Non-clinical photography and design** 1. Photograph a cheque presentation for a newsletter or website. 2. Produce a studio portrait as a high-quality print. 3. Scan flat and transparent originals and produce high-quality, colour-corrected digital files and prints. 4. Photograph a small item of equipment in a studio setting, suitable for publication. 5. Photograph a large item of equipment on location in a clinical environment. 6. Design a scientific poster using a combination of text, photographs, graphs and scans. 7. Create a case report presentation for projection, describing a clinical condition that you have photographed. 8. Adhere to local and national moral, ethical and legal guidance in respect of copyright and consent. 9. Keep accurate records and adhere to data security principles, guidance and the law.	1.1.1 - 1.1.10 1.2.1 1.2.5 2.1.1 2.2.3 2.2.4 2.2.7 2.3.1 2.3.2 3.1.1 3.1.2 3.1.3 3.1.4 3.1.6 3.1.7 3.2.1 3.2.2 3.2.4

Topic	Specialist Module: Work-based Practice [30 credits]	GSP reference
	10. Adhere to appropriate standards of professional practice as defined in *Good Scientific Practice*. **Video production** 1. Record video of the dynamic aspects of a clinical condition with the consent of the patient. 2. Plan for more complex productions, taking on and assisting in a range of different production roles. 3. Shoot and edit clinical recordings. 4. Adhere to appropriate standards of professional practice as defined in *Good Scientific Practice*.	

SECTION 6: INDICATIVE CONTENT: KNOWLEDGE

6.1 Generic Professional Practice, Technical and Scientific Modules

GM(i): Professional Practice

Indicative Content

KNOWLEDGE

Professional Practice

- The role of regulation
- Regulation of the HCS workforce by the AHCS and HCPC
- NHS Constitution
- HEE five key workforce characteristics
- Values relating to compassion, transparency, candour, openness and leadership
- Current national NHS policies and practice, including policy relevant to the area of practice
- How service delivery aligns to current NHS policy and practice
- The HCS workforce
  - structure into four divisions and specialisms within each division
  - education and training programmes
  - leadership of the HCS profession (e.g. the role of the Chief Scientific Officer)
  - Modernising Scientific Careers (MSC)
  - the contribution of the HCS workforce to health and healthcare services
- The role of the HCSP
- Patient–professional partnerships, with the patient at the centre of care
- Patient and carer perspectives and the diversity of the patient experience
- Use of chaperones
- Current safeguarding regulations relevant to practice as a HCSP
- Culture, equality and diversity and how this can affect practice
- Disability, including learning disabilities
- Mental health
- Patient wellbeing and self-care, including how to support self-care
- How to work in partnership with patients and service users to ensure that the views of patients are central to delivering, developing and maintaining high-quality, safe services

- The role of patient support groups
- The importance of the patient voice in education and training for the healthcare science workforce, including the structures within each BSc programme to promote the patient voice

Legal and Ethical Boundaries of Practice

- Sharing of information and advice between peers in order to encourage a consistent approach to the implementation of NHS policy
- Ethical, legal and governance requirements arising from working at the level of HCSP
- Principles, guidance and law with respect to medical ethics
- Principles, guidance and law with respect to patient confidentiality
- Principles, guidance and law with respect to informed consent and how to gain informed consent
- The limits of the concept of confidentiality
- The importance of introducing yourself and explaining your role to every patient
- Principles, guidance and law with respect to equality and diversity
- Principles, guidance and law with respect to safeguarding, including the use of chaperones
- The procedures to follow if cautioned, charged with a criminal offence, suspended, or have restrictions placed on personal scientific, clinical or professional practice
- The importance of personal health and wellbeing to ensure personal performance and judgement is not affected by their own health
- Information governance and be aware of the safe and effective use of health and social care information
- The need to manage records and all other information in accordance with applicable legislation, protocols and guidelines

Patient Safety and Quality

- NHS Constitution
- The wider context of safety in the NHS, including the culture of an organisation
- How effective communication underpins high-quality and safe patient services/patient care, including shared decision making
- The role of national organisations, e.g. NHS England; NHS Improving Quality
- Definition of terms:
  - Quality management
  - Quality control
  - Quality assurance
  - Quality improvement

    - Quality methodologies
    - Quality processes and procedures
- Principles of Quality Management Systems (QMS):
    - Quality management; quality assurance; quality control
    - The role of the United Kingdom Accreditation Service
    - Current HCS accreditation programmes, e.g. Improving Quality in Physiology Sciences
- British, European and International Standards that govern and affect pathology laboratory practice
- Safety – prioritisation of patient safety in practice
- Safety – team working and patient safety
- Safety – equipment management
- Calibration, action levels
- Infection control
- Equipment life cycle, including specification, procurement commissioning, preventative maintenance, fault finding and repair, calibration, safety testing and decommissioning for equipment relevant to the specialism
- Strategies to improve patient safety
- Critical incident reporting, review and action
- 'Never' events and strategies to reduce them
- Improving quality of life
- Improving quality of the patient experience of healthcare
- Processes for the distribution of documentation, e.g. Department of Health (DH), Central Alerting System (CAS), Medical Device Alerts (MDA)
- Quality, risk and audit
- Regulatory frameworks such as EU directives and MHRA requirements.
- Standard operating procedures, guidelines and protocols
- The contribution to the delivery of high-quality healthcare of the:
    - HCS workforce
    - HCS student
    - HCSP
- Why it is important to monitor and evaluate the quality of practice and the value of contributing to the generation of data for quality assurance and improvement programmes

Communication Skills

- Principles of effective verbal communication

- Principles of effective written communication
- Communication with those who do not have English as a first language
- Communication with people with sensory and cognitive impairments
- When and how to adapt communication methods
- Communication with patients across the age spectrum
- Use of patient leaflets and other appropriate media methods to engage with patients, donors, carers and the public

Leadership

- The concept of leadership and its application to practice
- The NHS Leadership Framework
- Leadership within the NHS, healthcare science, HCS teams and the multiprofessional team

Teaching and Learning

Students should be introduced to key theories of teaching and learning, including teaching and learning practical skills to begin to support their personal development and provide a base for their future career.

Continuing Personal and Professional Development (CPPD)

- The role and importance of CPPD to ensure that their professional knowledge and skills are being kept up to date

ATTITUDES, BEHAVIOURS AND SKILLS

Professional Practice

- Develop and maintain appropriate professional and patient–professional relationships in practice
- Treat patients with compassion and promoting patient wellbeing and self-care
- Work with colleagues, patients and carers in a respectful and non-discriminatory manner
- Provide safe, high-quality care at all times and in all settings
- Consistently bring the highest levels of knowledge and skill at times of basic human need when care and compassion are what matters most
- Create and justify open and non-discriminatory professional working relationships with colleagues, using critical reflection to review personal behaviour and responses to challenging issues
- Develop and maintain appropriate coping mechanisms for a range of potential issues, including stress, and seek help if appropriate and evaluate the impact of an intervention

- Support and contribute to a culture in which innovation and developments are identified, discussed, evaluated and potentially introduced to improve service delivery
- Recognise and exploit learning opportunities in the workplace
- Act in accordance with the principles and practice of patient-centred care, regularly reflecting on their personal practice and revising judgements and changing behaviour in the light of new evidence
- Practise as an autonomous professional, applying knowledge appropriately and exercising their own professional judgement within their scope of practice and with support from the team
- Promoting professional attitudes and values at all times
- Recognise the need to be truthful and to admit to and learn from errors
- Seek advice in the event of ethical dilemmas, including disclosure and confidentiality
- Accept and comply with the requirements for professional regulation

Legal and Ethical Boundaries of Practice

- Consistently operate in accordance with relevant current NHS policy and practice and recognise the limits of their own competence and scope of practice in order to make safe, informed and reasonable decisions about their practice
- Respond to the ethical, legal and governance requirements arising from working at the level of a HCSP, applying accrued knowledge and evidence
- Recognise the factors influencing ethical decision making, including religion, personal and moral beliefs, cultural practices, and make informed decisions, taking these into account
- Share information in accordance with the regulations, encouraging such behaviour in other members of the healthcare team and taking action where breaches of the guidelines may occur
- Ensure confidentiality is maintained, e.g. removal of patient names where appropriate, reviewing and analysing published literature, and considering the impact of such measures on the clinical service
- Recognise the problems posed by disclosure without consent of the patient, in the public interest
- Ensure patients, relatives and carers are aware of the need for appropriate information distribution within members of the immediate healthcare team
- Use appropriate methods of ethical reasoning to justify a decision where complex and conflicting issues are involved, calling on the support of others where needed
- Act in a manner that demonstrates probity in all aspects of professional practice
- Act in accordance with GSP at all times so that their conduct justifies the trust of patients and colleagues and maintains public trust in healthcare science

- Ensure that personal practice is always provided in line with the legal framework, acting with integrity at all times
- Apply appropriately the principles, guidance and laws regarding medical ethics and confidentiality and demonstrating the ability to gain informed consent
- Complete any/all documentation honestly and accurately and sign appropriately
- Apply honesty and accuracy about personal qualifications, experience and position in the scientific community
- Act honestly with respect to written and verbal information provided to any formal or legal enquiry, including recognition of the limits of scientific knowledge and experience
- Keep records in accordance with current best practice requirements, including accuracy of information recording within patient records and the framework that underpins data security practice in the NHS

Patient Safety and Quality

- Respond in an open, constructive and timely manner to critical incidents or complaints about their own or team performance, influencing the response, and using self-reflection to review personal behaviour and response to challenging issues
- Take appropriate action if it is suspected that they or a colleague may not be fit to practise, always putting patient safety at the forefront of practice
- Practise within the Standards of Proficiency set by the AHCS and for Biomedical Scientists, the HCPC
- Make appropriate judgements to ensure they limit work or stops practising if performance or judgement is affected by their health
- Recognise when personal health takes priority over work pressures, seeking appropriate advice and support, and taking appropriate action.
- Co-operate with employers to ensure compliance with health and safety requirements

Leadership

- Recognise the importance of leading by example in setting high standards of personal behaviour, and in acting with openness, candour, fairness and integrity, listening and respecting the views of others

Continuing Personal and Professional Development (CPPD)

- Contribute to a culture that values CPPD in recognising strengths and identifying areas for improvement, and supporting others to do the same
- Continue to develop their own learning and reflective practice by maintaining personal records of CPPD, providing evidence of critical reflection, including action planning, with respect to technical and clinical practice and professional development in a form suitable for audit by a professional body or regulator, and demonstrate continuing fitness to practise

- Apply knowledge, experience and critical reflection to identify personal development needs using a range of tools, and develop and update action plans
- Act as a self-motivated professional HCSP, being willing to learn from self-reflection and others, responding positively to constructive and meaningful feedback
- Record critically reflective notes demonstrating how participation in CPPD has contributed to learning and led to improvements in personal and service performance
- Monitor their own performance by a variety of methods
- Respond constructively to feedback and provide feedback when asked to support personal development and the development of others
- Prioritise and organise academic and work-based tasks in order to optimise their own work and the work of the department.

Communication Skills

- Effective verbal communication
- Effective written communication
- Frameworks underpinning communication
- Adapting communication skills
- Giving and receiving feedback, including feedback frameworks

Teaching and Learning

- Introduction to how people learn
- Teaching and learning practical skills
- Transforming experience into knowledge and skills by reflection and action and linking this to the skills of feedback (see above) and work-based learning

GM(ii): Scientific Basis of Healthcare Science (Year 1)

Students should be introduced to every subject area described by each learning outcome and associated indicative content to provide a broad foundation of scientific and HCS knowledge on which to build their knowledge, skills and professional practice. Following the broad overview, learning should then being developed in the context of individual BSc (Hons) Healthcare Science programme providing the flexibility to study specific areas in more depth.

1. Introduction to the organisation of the human body

- Structural
- Chemical
- Cellular
- Tissue
- Skin
- Cellular, tissue and systems responses to disease:
  - cell death
  - inflammation
  - neoplasia, e.g. carcinoma
  - hypertrophy
  - hyperplasia
  - tissue responses to injury and repair
- How the body changes from birth to old age

2. Introduction to the structure and function of body systems: embryology, anatomy, physiology, pathology

- Embryology
- Skeletal system
- Nervous system:
  - spinal cord and spinal nerves
  - brain and cranial nerves
  - sensory and motor systems
- Endocrine system
- Vision, hearing and equilibrium
- Cardiovascular system, including blood and blood vessels
- Respiratory system
- Lymphatic system
- Immune system
- Gastrointestinal tract, including digestion and absorption of food, nutrition, the liver and liver function tests
- Renal system
- Electrolyte and acid-base balance
- Hormonal mechanisms and control
- Metabolism

- Reproductive system
- Abdomen, pelvis and perineum
- Histology and cytology
- Microbiology, including infection control
- Treatment regimens including antibiotics and antibiotic resistance
- Virology
- Biochemistry
- Haematology
- Immunology and histocompatibility

3. Introduction to clinical genetics, genomics and personalised medicine

- Meiosis and Mendelian inheritance
- Nucleic acid structure and function
- Chromosome structure and function
- Nomenclature used to describe the human genome
- Common genetic disorders
- Impact of genetic disorders on the patient and their families
- Genomic technology and role of the genome in the development and treatment of disease
- The role of genomic counselling

4. Introduction to epidemiology and public health

- Local, national and international role of the public health function, e.g. Public Health England and related UK organisations
- Infectious disease services
- International partnership working for control of infection
- Principles of epidemiology
- Basis of health protection:
  - principles of surveillance
  - infectious disease control and emergency planning
- Screening:
  - screening programmes: purpose, design, outcomes
  - screening programmes: typical screening programmes in healthcare science
- Using epidemiological data to plan health services

- Factors affecting the health of the population
- Strategies and methods to improve health
- Factors affecting health and their contribution to inequalities in health between populations
- Changes in population demographics, including ageing

5. Introduction to clinical pharmacology and therapeutics

- Difference between pharmacology, clinical pharmacology, therapeutics, and prescribing and medicine management
- Principles of pharmacology, pharmacokinetics and therapeutics:
  - drug names
  - classifications
  - definitions of terms and basic mechanisms
- Role of the pharmacist in primary and secondary care

6. Sociology of health and illness

- Patients' responses to illness and treatment:
  - the impact of psychological and social factors, including culture, age, ethnicity, gender, socioeconomic status and spiritual or religious beliefs on health and health-related behaviour
- Health belief models
- Diversity of the patient experience
- Disability, including learning disabilities
- Mental health
- Potential health inequalities
- Self-care
- Impact of life-threatening and critical conditions
- Patient involvement in decisions regarding their healthcare

This topic area should include the underpinning theoretical foundations and models, e.g. Health Belief Model, World Health Organization (WHO) model of activity limitation (disability)

7. Introduction to medical physics and clinical engineering

- Structure of matter (atomic and nuclear models)
- Radiation: nature and its measurement and radiation safety
- Radiation dosimeters – personal dosimetry
- Basic physics and mathematics of image formation

- Imaging Techniques
  - Ultrasound
  - Magnetic Resonance Imaging (MRI)
  - Computerised Tomography (CT)
  - Positron Emission Computed Tomography (PET)
  - Single Photon Emission Computed Tomography (SPECT)
- Basic electricity and magnetism as it relates to the measurement of physiological signals
- Viscous and inertial flow of simple liquids
- Use of radiotherapy

8. Introduction to clinical bioinformatics and health informatics

Clinical bioinformatics brings together the disciplines of computer science, mathematics, statistics and physics/engineering to influence, analyse and inform clinical and biological practice, so helping to maintain patient safety and the integrity and security of data. Students should be introduced to the three specialisms of clinical bioinformatics within healthcare science (genomics; health informatics science and physical sciences) in the context of: (i) innovation, translation and interpretation of complex genomic data, optimising the benefits this brings to patient care, including personalised medicine; (ii) the development and adoption of technology solutions and biomedically motivated methods for the collection, management, movement, analysis and use of health information in line with government legislation to improve the quality and safety of healthcare practice and delivery; and (iii) devices that may have therapeutic, diagnostic or patient monitoring functions and they generate ever-increasing amounts of data that contribute to patient management. Teaching should be tailored to the student group using examples relevant to health and healthcare science.

- Contribution of clinical bioinformatics genomics, health informatics sciences and physical sciences to:
  - patient safety
  - patient care
  - health care
  - healthcare science
- Governance and ethical frameworks
- Storage and sharing of images, DICOM
- PACS
- Clinical information systems and applications
- Clinical information systems and applications, e.g. HL7

- Database management
- Direct patient access to test results

9. **Introduction to mathematical and statistical techniques**
   - Data interpretation, including the variability of biological data and application of statistics
   - Generation of reference ranges and their limitations
10. **Introduction to innovation in health and healthcare science**
   - Identifying, reading and evaluating the literature
   - Innovation in the NHS
   - Using innovation to improve services
   - Scientific and technical developments and their application in healthcare science
   - The role of the HCS workforce in innovation

GM(iii): Research Methods (Year 2)

1. **Research, innovation and audit**
   - Process and importance of research, innovation and audit to the NHS and healthcare science
   - Role of healthcare science in research, innovation and audit
   - NHS Research and Innovation Strategy
   - Difference between research, audit and service improvement
   - User/patient involvement
   - Peer review
   - Role of statutory, advisory regulatory bodies and funding bodies, including:
     - National Institute for Health and Care Excellence (NICE)
     - National Institute for Health Research (NIHR)
   - Evidence-based practice.
   - Clinical guideline development
   - Quality assurance frameworks:
     - quality improvement
     - patient care
     - patient safety

    - improved treatments
- The role of the HCS workforce in undertaking research and innovation and applying findings
- Use of research and audit to interpret and apply new knowledge in the NHS and healthcare science

2. Current ethical and legal frameworks

- Good Clinical Practice (GCP)
- Health and safety
- Risk assessment
- Human research
- Animal research
- Innovation
- Audit
- Ethical frameworks, including informed consent
- Legal frameworks
- Confidentiality
- Archiving
- Research governance framework for health and social care research
- Data Protection Act
- Intellectual property regulations
- Informed consent
- Roles and responsibilities of the research team

3. Principles of literature searching

- Evidence-based practice
- Principles of a literature search
- Process of literature searching
- Critical review of literature
- Systematic review
- Publication impact factor
- Reference manager systems

4. Introduction to study design

- Cohort studies

- Qualitative
- Quantitative
- Case control
- Systematic review
- Meta-analysis
- Sampling techniques
- Clinical trials (pre-clinical to translational)
- Epidemiological studies
- Hypothesis generation and testing
- Clinical trials

5. **Data analysis, statistical techniques and dissemination**
   - Data validity, reliability and appropriateness
   - Application and interpretation of statistical techniques:
     - parametric
     - non-parametric
   - Power calculations/sample size
   - Methods to disseminate research output
   - Impact factor
   - Scientific poster design
   - Writing for scientific journals
   - Writing scientific abstracts
   - Preparing research presentations for time-limited scientific meetings

GM(iv): Research Project (Year 3)

1. **Research in health and healthcare science, including:**
   - Scientific or clinical research
   - Translational research
   - Operational and policy research
   - Clinical education research
   - Innovation, service development

- Service improvement
- Supporting professional service users

2. Ethical and governance approval process

- The student must know the ethical approval and governance process required to undertake the proposed project, including initial approval; monitoring; reporting; data storage and archiving

6.2 Division-specific Modules

Year 1

Mathematics, Statistics and Informatics

Mathematics and Statistics

- *Numerical representation and scientific calculator use*: standard form, negative numbers, percentages, accuracy and precision, conversion of units of measure
- *Algebra*: review of basic concepts
- *Graphs*: linear and non-linear graphs in the x-y plane, plotting a graph of the function, solving equations using graphs, solving simultaneous equations graphically
- *Logarithmic expressions*: indices, laws of indices, laws of logs, combinations of logs, natural logs and base 10 logs, solving equations with logarithms, properties and graph of ln and Log function
- *Angles and trigonometry*: degrees, radians, trigonometry ratios (sine, cosine, tangent), solving trigonometric equations, maxima and minima, graphs and waves generated by trigonometry
- *Exponential functions*: exponential expressions, exponential function and its graph, solving equations involving exponential terms using a graphical method
- Determinants, matrices and vectors
- *Differentiation*: gradient function, rules for differentiation, higher derivatives, maximums, minimums, points of inflection, differentiation of sums, differentiation of differences
- *Advanced differentiation*: products, quotients, exponential functions, logarithmic functions, function of a function
- *Indefinite Integration*: indefinite integration, some rules for indefinite integration, constant of integration
- *Definite integration*: areas under curves, areas bounded by lines and curves, finding areas where some or all lie below the x-axis
- *Types of data*: discrete and continuous data
- *Summarising data graphically*: dot plot, stem and leaf, box and whisker, grouped frequency distribution, histogram, cumulative frequency distribution, cumulative frequency polygon, bar chart, one and two
- *Summarising data numerically*: mean, median, mode, samples, when to use various averages, standard deviation, error, inter-quartile range, box and whisker plots, variance, range, measures of skewness
- *Normal distribution*: mean, standard deviation, areas under the curve, standard normal transformation, solution of problems
- *Simple probability, samples and population distributions*: reasons for sampling sample size, random sampling, biased sampling, quota sampling, systematic sampling and stratified sampling, relationship to normal distribution, primary and secondary data

Informatics

- Informatics and clinical practice
- Basics of databases
  - Create a database
  - Understand the basic principles of database
  - Interrogate and produce reports
  - Evaluate and amend the database
- Interpreting and presenting data using spreadsheet software
- Presentation software
  - Create a short presentation
  - Apply appropriate techniques and slides for presentation
  - Evaluate and amend the presentation

Essential issues associated with computing technologies and their management as appropriate to either Clinical Engineering, Medical Physics or Clinical Photography

- Networking of medical devices
- Effective system management
- Patient safety and confidentiality

Year 1

CPH(i): Introduction to Clinical Photography
[20 credits]

- Role of Clinical Photography in healthcare science and the wider healthcare setting
- Ethical issues:
  - informed patient consent
  - additional and subsequent use of images
- National standards and guidelines and protocols/procedures in medical photography
- The use of chaperones
- Any additional relevant issues at the time of module delivery
- Historical developments in photographic technologies from the camera obscura, through the invention of colour photography to the transition to digital technology

- The history of photography and its role in clinical practice
- Cameras, their construction, mechanisms, formats and key features appropriate to Clinical Photography
- Light and the electromagnetic spectrum, principles of colour photography, spectral sensitivity in scientific photography
- The human visual system and the formation of images, including lens optics, simple and complex lenses and their selection and appropriateness, perspective, speed and distortion
- Light sources and their properties, including daylight, tungsten, flash and mixed lighting situations, colour temperature and colour balance
- Exposure, principles of calculating, shutter speed/sensitivity/aperture relationships, depth of focus and depth of field
- Communication through the photographic image; composition and framing; line, tone and colour; form, space and timing; connotation and denotation
- Introduction to the cultural aspects of photography and clinical photography

CPH(ii): Digital Photography Image Management in a Clinical Environment

- Structure of the digital image
- Sensors, scanners and camera settings
- Understanding histograms
- File formats (including DICOM) and compression
- Image quality, resolution, image size, artefacts
- Colour management, colour spaces, profiling and colour workflow
- Image processing and post-production, principles, practice and software options
- Image workflow, including: database options, indexing, Exchangeable Image File (EXIF) data and metadata management, storage, retrieval and electronic access
- Data integrity, confidentiality and security in the clinical setting
- Encryption and distribution of clinical images

6.3: Clinical Photography (Years 2 and 3)

Year 2

CPH(iii): Scientific and Clinical Imaging
[30 credits]

- Introduction to clinical, paramedical and forensic photography and imaging

- The properties of illumination/radiation systems and their use in applied photography and medical imaging; aspects of health physics
- Applied imaging techniques using non-visible and ionising radiation:
  - infrared photography and thermography; photomacrography, photomicrocrography and microscopical techniques; scanning electron microscopy; confocal microscopy
  - 3D photography and stereo photography
  - ophthalmic imaging: fundus cameras, optical coherence tomography, scanning laser ophthalmoscopy, scanning laser polarimetry, ultrasonography, imaging of the anterior segment, measurement of ocular structures
  - introduction to medical imaging systems, including radiography, computed tomography (CT), magnetic resonance imaging (MRI), ultrasonography, endoscopy
  - specialist optical systems for data capture, including extreme wide angle and telephotography
  - photogrammetry and remote sensing

Imaging technologies

- Properties of light
- Geometric optics and lenses
- Image sensors and image formation
- Sampling and quantisation
- Sampling theory
- Digital image representation
- Transfer characteristics of devices
- Colour management in the digital imaging chain
- Cameras and scanners
- Output technologies
- Calibration of digital devices
- Tone reproduction in digital systems
- Image storage devices and file formats
- Introduction to image processing:
  - image compression
  - image integrity
  - image security
  - image registration, including 3D photography with medical imaging data sets

Year 2

CPH(iv): Image Practice and Production
[30 credits]

- Visual research: contemporary image design and production with references to commercial and art practice
- Photographic equipment and selection:
  - cameras in a range of formats
  - lenses, prime, variable focal length, wide and telephoto
  - lighting, studio and location
  - background control, studio and location
- Lighting techniques addressing issues of:
  - materials
  - form
  - mood, atmosphere
  - human and inanimate subjects
- Graphic design and desktop publishing:
  - design principles and practice for print, screen and digital media
  - principles of scientific poster design and printing
  - working in the design team and working with art direction
- Video:
  - equipment selection
  - pre-production planning, scripting and storyboarding
  - production – utilising photographic skills
  - audio recording
  - post-production techniques and editing
- Narrative constructions and non-linear story-telling:
  - techniques
  - programs

Students are required to utilise visual research, married to technique to produce a coherent portfolio of work.

Year 2

CPH(v): Clinical Photography Theory and Practice
[30 credits]

- Standard representational photography
- Medical photography within the specialities of:
  - dermatology
  - paediatrics
  - ophthalmology
  - surgery
  - dentistry
- Clinical photography both within the studio and on location in wards/clinics; non-clinical
- Accurate recording of photographic sessions:
  - image quality procedures and control
  - image storage and management
- Location; positioning and lighting techniques for different parts of the body; photographic techniques for the major specialities (e.g. dermatology, ophthalmology, dental, paediatrics, surgery); photography of surgical procedures; control of backgrounds
- Issues for the photography of children:
  - non-accidental injury photography
- Use of scales
- Specimen photography
- Anatomy and physiology applicable to medical photography
- The language of medical science, the roots of words, descriptive metaphors and synonyms
- Clinical symptoms and pathogenesis of selected diseases
- Person-to-person communications, including empathy, congruence and unconditional positive regard
- Application and development of communication in a practice setting: facilitation skills, consultation skills, compassion, emotional intelligence
- Reflecting on practice
- Professional codes of conduct, boundaries, negligence and co-operation

Year 3

CPH(vi): Non-clinical Photography and Design
[30 credits]

- Photography and design for different healthcare settings, including:
  - patient information
  - teaching literature for patients, students, healthcare professionals and the public
  - non-clinical/PR/promotional material/corporate image
  - computer-based learning
  - internet
  - video
- Project management:
  - defining the client brief
  - the design process
  - documentation
  - time management

Year 3

CPH(vii): Current Debates in Clinical Photography
[30 credits]

- Safeguarding
- Ethical theory
- Declaration of Helsinki and the Belmont Report
- Moral and legal rights
- Social, cultural and religious issues relating to photography and disease
- Impact of pathophysiological processes on patient management
- Informed consent, patient confidentiality, access to patient information
- Policy for the management of medical images
- Sharing clinical photographs with other services, e.g. police
- Medicolegal photography
- Implications of raw formats and image manipulation
- Management of cameras in the clinical environment
- Research and development processes in the NHS with respect to medical imaging

- Data protection, Caldicott
- Copyright and intellectual property
- Social media and the use of the internet

SECTION 7: WORK-BASED SYLLABUS: CLINICAL PHOTOGRAPHY

*This section describes the Learning Frameworks for the **Generic and Theme Components** of work-based learning covering the Learning Outcomes, Clinical Experiential Learning, Competence, and Applied Knowledge and Understanding.*

DIVISION	Physical Sciences and Biomedical Engineering
THEME	Medical Physics
SPECIALISM	Clinical Photography

Students are expected to spend a minimum of 10 weeks in Year 1 undertaking work-based learning in the work base

Section 7.1: Generic Introduction to Work-Based Learning

MODULE TITLE	Introduction to Work-based Learning	COMPONENT	Generic Year 1
AIM	The aim of this module is to introduce the student to the workplace and enable them to apply and contextualise the knowledge and skills they have gained in the module 'Scientific Basis of Healthcare Science' and the Year 1 modules in each healthcare science theme. Students will be expected to perform some routine skills and develop and build their professional practice in accordance with *Good Scientific Practice*.		
SCOPE	On completion of this module the student will be able to perform basic life support and infection control techniques and use effective communication skills in the context of patient-centred care and recognising the role of the specialism in patient care. They will also be expected to adhere to health and safety procedures and work safely in the workplace, adhering to the trust procedures and governance, including patient confidentiality and the Data Protection Act.		

LEARNING OUTCOMES

On successful completion of this module the student will:

1. Perform a range of generic skills, including infection control, basic life support, communication and team working, adhering to health and safety regulations, and behaving in a professional manner in accordance with *Good Scientific Practice*.

CLINICAL EXPERIENTIAL LEARNING

The clinical experiential learning for this module is:

- Observe how staff in the workplace communicate with patients and reflect on the importance of effective communication in the workplace with respect to patient-centred, compassionate care.
- Shadow a qualified healthcare science practitioner and discuss the role of the practitioner in Clinical Photography and their contribution to healthcare and multiprofessional teams.

All of these experiences should be recorded in your e-portfolio.

The following section details the competence and knowledge and understanding each student must gain. Each competence is linked to the relevant learning outcomes and students must demonstrate achievement of each competence for each linked learning outcome.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
1	Control infection risks in accordance with departmental protocols, always washing hand in accordance with the six-stage hand-washing technique when necessary.	• Protocols and requirements for hygiene and infection control related to the relevant range of investigations, including preparation, conduct and completion of investigation. • Protocol for hand washing and how effective hand washing contributes to control of infection and local trust requirements.
1	Perform basic life support in accordance with current Resuscitation Council (UK) guidelines.	• Current Resuscitation Council (UK) guidelines.
1	Use effective communication skills within the healthcare environment.	• The principles of effective communication, including written and electronic, verbal and non-verbal. • The importance of introducing yourself and your role as a student healthcare science practitioner as part of the process of introduction and consent. • Patient-centred care and the importance of informed consent and involving patients in decisions about their healthcare. • The importance of ensuring the patient is aware of the role of the member of the HCS workforce. • The way effective communication can assist in identifying problems accurately, increase patient satisfaction, enhance treatment adherence and reduce patient distress and anxiety. • The importance of some key ideas, for example sign posting, listening, language, non-verbal behaviour, ideas, beliefs, concerns, expectations and summarising in communication.
1	Adhere to safe working practice in the workplace.	• The relevant health and safety regulations specific to the workplace and investigations undertaken, the potential hazards and risks and the actions to be taken to minimise these.
1	Work professionally in the workplace at all times.	• *Good Scientific Practice*.

7.2: Introduction to Clinical Photography

MODULE	Introduction to Clinical Photography	COMPONENT	Year 1 Division-Theme
AIM	This module will provide a foundation from which students will build their knowledge, skills, experience and attitudes throughout the three-year programme of study and enable them to transfer these skills to employment in healthcare science. It is expected that this period of initial work-based training will provide the opportunity to apply their learning from the modules 'Scientific Basis of Clinical Photography' and 'Professional Practice' and begin to integrate and embed many of the professional practice learning outcomes, and enable students to practise safely in the workplace.		
SCOPE	This module will enable students to gain skills and experience of Clinical Photography through introduction to the range of services provided in the specialism and the interaction with patients and patient-centred practice. On completion of this module the student will be able to perform some routine standardised representational photography of patients and will also apply knowledge and develop and build their professional practice safely.		

LEARNING OUTCOMES

On successful completion of this module, in routine patients, the student will:

1. Perform, under direct supervision, a set of standardised rhinoplasty photographs of a patient in accordance with local health and safety regulations.
2. Observe and assist qualified staff during ophthalmic imaging in an ophthalmic and vision setting.
3. Perform, under direct supervision, the image workflow procedures from the point of receiving the request through to uploading the photographs.
4. Perform, under direct supervision, the procedures for ensuring accurate colour management throughout the image workflow.
5. Collect, analyse and interpret patient data within a work-based context.
6. Adhere to appropriate standards of professional practice as defined in *Good Scientific Practice*.

It would usually be expected that a workplace should have Institute of Medical Illustrators (IMI) Quality Assurance Standard Level 1.

CLINICAL EXPERIENTIAL LEARNING

The clinical experiential learning for this module is:

- Shadow a qualified clinical photographer and observe the range of non-invasive and invasive clinical photography undertaken by the department; identify examples of good practice with respect to professionalism and patient-centred care; and discuss the role of the practitioner with respect to communications with patients, the public, colleagues and other healthcare partners.
- With permission, and in the context of Clinical Photography, observe a patient journey, reflect on the positive aspects of that journey and identify where improvements could be made.
- Observe the image workflow from initially receiving a request to uploading the photographs, reflect on the positive examples of practice and identify where improvements could be made.
- Observe the procedures to ensure image integrity throughout the workflow, produce a short summary of the strengths, and discuss any potential areas for improvement with respect to patient confidentiality and data management.
- Follow a patient pathway to identify the contributions of healthcare scientists and other health professions and discuss how Clinical Photography contributes to patient care.
- Shadow a qualified clinical photographer and observe the range of non-clinical photography procedures and techniques, including public relations work, reprography and scanning.

All of these experiences should be recorded in your e-portfolio.

The following section details the competence and knowledge and understanding each student must gain. Each competence is linked to the relevant learning outcomes and students must demonstrate achievement of each competence for each linked learning outcome.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
1, 2	Control infection risks in accordance with departmental protocols when performing routine clinical photography.	• Protocols and requirements for hygiene and infection control related to the relevant range of investigations, including preparation, conduct and completion of investigation. • Protocol for hand washing and how effective hand washing contributes to control of infection and local trust requirements. • The working environment and standard operating procedures when photographing patients in the studio, wards and operating theatre.
1, 2	Minimise risks and hazards in compliance with health and safety policies, using facilities with a clear and measured understanding of health and safety procedures when performing routine clinical photography.	• The relevant health and safety regulations specific to routine clinical photography. • Potential hazards and risks and the actions to be taken to minimise these.
1, 2	Use effective communication skills within the healthcare environment, adapting communication style and language to meet the needs of the listener.	• The principles of effective communication, including written and electronic, verbal and non-verbal. • The way effective communication can assist in identifying problems accurately, increase patient satisfaction, enhance treatment adherence, and reduce patient distress and anxiety. • The importance of some key ideas, for example sign posting, listening, language, non-verbal behaviour, ideas, beliefs, concerns, expectations and summarising in communication.
1, 2	Obtain a suitably completed request form, greet the patient and check patient identification for routine clinical photography.	• Referral routes for clinical photography. • Requirements for correct completion of request forms and how to validate. • The importance of checking and confirming the patient identity and the implications of not doing so.
1, 2	Obtain informed consent for each	• The importance of explaining the procedure for each

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	procedure under supervision.	photography session to the patient, including your role as a student healthcare science practitioner, and obtaining informed consent. • The clinical photographer's role in ensuring that appropriate consent has been recorded. • The relevant procedures and requirements for patient capacity to give informed consent. • When and how to refer consent questions to a referring clinician. • Principles, guidance and law with respect to informed consent.
1, 2	Prepare the environment, set up and calibrate equipment ready for use for routine clinical photography.	• Range of equipment used, relative merits and principles of standard representational clinical photography. • Requirements for the environment to ensure privacy, dignity and comfort of the patient. • Recognition of the errors or potential risks of using defective equipment in clinical practice and the implications of use. • Identification of common faults and remedial action. • Current safety standards, including safety testing, routine maintenance and calibration of equipment.
1, 2	Evaluate the technical quality of the clinical photograph.	• How to identify clinical photographs that are substandard. • When and how to refer to senior colleagues.
1, 2	Treat the patient in a way that respects their dignity, rights, privacy and confidentiality while undertaking routine clinical photography.	• The rights of the patient with regard to consent for treatment and confidentiality of consultation and medical records. • Key factors influencing dignity, rights, privacy and confidentiality, including age, gender, culture and beliefs. • Correct position of the patient ensuring comfort, co-operation and optimal results. • The impact of incorrect positioning or non-co-operation on

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
		photographic results.
1, 2	Analyse and discuss a range of visual work.	• Balancing objective and subjective considerations in assessing clinical photographs. • Fitness for purpose of clinical photographs – varying technique for clinical assessment, audit, teaching, publication, research and patient information. • The value of standardisation and its limitations.
1	Reproduce a set of standardised photographs of a rhinoplasty patient, conforming to national guidelines.	• How to photograph a rhinoplasty patient in accordance with the Institute of Medical Illustrators (IMI) National Guidelines. • How a trained member of staff explains the procedure to the patient, including introducing themselves and their role and gains informed consent. • The importance of explaining the procedure for each investigation to the patient and gaining informed consent. • The relevant procedures and requirements for patient conformance. • Principles, guidance and law with respect to informed consent.
1	Prepare the studio for photography of a rhinoplasty patient.	• How to prepare the seating and lighting in the photographic studio for a rhinoplasty patient.
1	Photograph a series of standard rhinoplasty views.	• Selection of camera, lens and lighting to meet the needs of the request. • Correct positioning of the patient to ensure accurate standard representational views. • Apply knowledge of the characteristics of lenses to control the appearance of images. • Apply knowledge of objective measurement of selected image quality attributes in the analysis of images.
2	Observe and assist, under direct	• Observe a range of different types of imaging modalities used to

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	supervision, during ophthalmic imaging.	investigate, diagnose and monitor ophthalmic diseases. • The rationale for each type of imaging modality and how the structures of the eye are represented. • How to ensure consistent and reproducible image measurements are obtained.
2	Document the results from ophthalmic imaging.	• How images will be retrieved for review by clinician (e.g. print or through server database). • Correct annotation of recordings and other patient documentation and the importance of accuracy, legibility and completeness. • Information needs of the patient following investigation.
3	Manage the security and confidentiality of clinical images from initial capture through to final delivery.	• Policies and protocols relating to image capture, consent procedures, confidentiality, storage and distribution.
3	Transfer clinical photographs to a secure environment and delete from the camera memory card.	• Importance of timely transfer of images to a secure, password-protected environment. • The impact of leaving images on an unsecured camera memory card. • The importance of naming folders using a standard format as defined in the image workflow protocol.
3	Use an image workflow protocol to ensure that consent procedures, confidentiality, storage and distribution are adhering to trust policies and data protection principles.	• Policies and procedures relating to image capture, consent procedures, confidentiality, storage, distribution and data protection. • Correct naming convention of files and folders to ensure confidentiality of patient data. • Cropping, sizing and colour balancing of clinical photographs to ensure consistency and repeatability of images. • Uploading images to a secure database that adheres to

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
		Caldicott guidelines and data protection principles.
4	Assist in the production of a range of clinical photographs to ensure colour management of clinical photographs is consistent and accurate throughout the image workflow.	• Monitor colour calibration principles. • Reasons for ensuring consistent and accurate colour management of clinical photographs. • Accurate colour management of all output devices, including monitors and printers.
5	Collect, analyse and present data in written form within a work-based context.	• Data analysis techniques. • Standard formats for the communication of data. • Best practice requirements for record keeping within the NHS, including accuracy of information recording within patient records. • The framework that underpins data security practice in the NHS.
5	Interpret data within a work-based context.	• Implications of data to practice. • The impact of changing practice on outcomes and how that may be reflected in the data collected.
6	Reflect on your practice during this period of work-based training and generate a reflective diary that demonstrates how you take responsibility for your learning and utilise the skills required of an independent learner.	• Personal values, principles and assumptions, emotions and prejudices, understanding how these may influence personal judgement and behaviour. • The role of critical reflection and reflective practice and the methods of reflection that can be used to maintain or improve knowledge, skills and attitudes. • How continuous personal development can improve personal performance.

SECTION 8: WORK-BASED LEARNING SYLLABUS: CLINICAL PHOTOGRAPHY

*This section describes the Learning Framework for the **Specialist Component** of work-based learning covering the Learning Outcomes, Clinical Experiential Learning, Competence, and Applied Knowledge and Understanding.*

DIVISION	Physical Sciences and Biomedical Engineering
THEME	Medical Physics
SPECIALISM	Clinical Photography

MODULE	Standardised Representational Photography	COMPONENT	Specialist Year 2
AIM	The aim of this module is to ensure that the student develops their skills with respect to patient-centred safe care, and performs and interprets the results from Standardised Representational Photography (SRP). During this period of work-based training students will apply their learning from the modules Scientific and Clinical Imaging, Image Practice and Production, Clinical Photography Theory and Practice.		
SCOPE	On completion of this module the student will be able to perform routine adult and paediatric clinical photography competently. They will be expected to build their professional practice and to practise safely in the workplace. Students will be expected to use critical reflection to review and improve their performance in the workplace and develop skills to promote continuous professional development.		

LEARNING OUTCOMES

On successful completion of this module the student will:

1. Make clinical photographic recordings of patients in a range of clinical settings, including adults and children.*
2. Store, label and archive clinical photographs.
3. Adhere to appropriate standards of professional practice as defined in *Good Scientific Practice*.

** Covers all body parts.*

CLINICAL EXPERIENTIAL LEARNING

The clinical experiential learning for this module is:

- Critically apply the scientific principles covered in the academic modules to this work-based module and specifically appraise the evidence base underpinning the use of SRP in clinical assessment.
- Observe the care pathway for a common adult and paediatric condition and discuss with your supervisor the role of SRP in clinical audit.

All of these experiences should be recorded in your e-portfolio.

The following section details the competence and knowledge and understanding each student must gain. Each competence is linked to the relevant learning outcomes and students must demonstrate achievement of each competence for each linked learning outcome.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
1, 3	Control infection risks in accordance with departmental protocols when undertaking standardised photography (SP).	• Protocols and requirements for hygiene and infection control related to the relevant range of photographic techniques, including preparation, conduct and completion of photography. • Protocol for hand washing and how effective hand washing contributes to control of infection and local trust requirements.
1, 3	Minimise risks and hazards in compliance with health and safety policies when undertaking SP.	• The relevant health and safety regulations specific to clinical photography in the studio and other clinical environments, the potential hazards and risks and the actions to be taken to minimise these. • Barrier and reverse barrier nursing. • Non-touch technique and how it applies to clinical photography. • Equipment sterilisation. • Cleaning and sterilisation of equipment and surfaces following a photographic procedure. • Safe retraction techniques for eyes and oral cavity.
1, 3	Use effective communication skills within the healthcare environment, adapting communication style and language to meet the needs of the listener when undertaking SP.	• The principles of effective communication, including written and electronic, verbal and non-verbal. • The way effective communication can assist in identifying problems accurately, increase patient satisfaction, enhance treatment adherence, and reduce patient distress and anxiety. • The importance of some key ideas, for example sign posting, listening, language, non-verbal behaviour, ideas, beliefs, concerns, expectations and summarising in communication.
1, 3	Obtain a suitably completed request form, greet the patient and check patient ID when undertaking SP.	• Referral routes for clinical photography. • Requirements for correct completion of request forms and how to validate. • The importance of checking and confirming the patient identity and the implications of not doing so.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
		• Child protection and the use of chaperones.
1	Prepare the environment, set up and prepare equipment ready for SP.	• Range of equipment used, relative merits and photographic principles. • Requirements for the environment in which photography takes place to ensure privacy, dignity and comfort of the patient. • Recognition of the errors or potential risks of using defective equipment in clinical practice and the implications of use. • Identification of common faults and remedial action. • Current safety standards, including safety testing and routine maintenance. • Preparation and set up of equipment. • Manufacturers' and local protocols for equipment used.
1, 3	Treat patients referred for photography in a way that respects their dignity, rights, privacy and confidentiality.	• The rights of the patient with regard to consent for treatment and confidentiality of consultation and medical records. • Key factors influencing dignity, rights, privacy and confidentiality, including age, gender, culture and beliefs. • Correct position of the patient ensuring comfort, co-operation and optimal investigation results. • The impact of incorrect positioning or non-co-operation on investigation results.
1, 3	Ensure the patient understands the consent procedure and what their images are to be used for.	• Principles, guidance and law with respect to informed consent. • The importance of explaining the procedure for each photography session to the patient, including your role as a student healthcare science practitioner, and obtaining informed consent. • The clinical photographer's role in ensuring that appropriate consent has been recorded. • The relevant procedures and requirements for patient capacity

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
		to give informed consent. • When and how to refer consent questions to a referring clinician.
1	Identify a set of standardised views using an IMI National Guideline to determine patient position, lighting and scale.	• How to identify standardised photography sets in line with current IMI guidelines to achieve an optimum standardised photographic record.
1	Set up a clinical photography studio, checking the positions, and intensity of lighting units and correct camera exposure.	• How to prepare the studio for photography. • Correct studio set-up to ensure reproducible, standardised lighting and background appropriate to each patient. • Use of an 18% grey card and exposure histogram to set a correct exposure level and white balance. • Choice of lenses and exposure level to optimise depth of field.
1, 3	Make clinical photographic recordings of a range of medical conditions and patients, including adults and children, ensuring that an accurate, correctly exposed set of photographs is produced. Confirm that the scale and patient positioning is consistent throughout each set of photographs.	• IMI National Guidelines, as appropriate to speciality. • Clinical photography in the protection of children and vulnerable adults and an awareness of the Vulnerable Adults/Mental Capacity Act 2005. • The use of chaperones. • Interpretation of a clinical photography request, including diagnosis, anatomical descriptions and purpose of photographic record. • Selection of equipment and settings to meet needs of referral/request. • Correct operation of camera and lighting equipment. • How to review photographs and make adjustments to optimise results. • Routine maintenance and set-up procedures. • Choice of patient positioning appropriate to the photographic

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
		recording requested/required. • Identification and rectification of equipment faults/defects. • How to check and annotate photographs to ensure accuracy, completeness, consistency and suitability for clinical assessment and review.
1, 2, 3	Take repeat photographs of patients on different dates, ensuring that they are consistent, standardised and adhere to the relevant IMI National Guideline.	• Principles of standardisation. • The relationships between focal length, distance and scale of reproduction. • IMI National Guidelines and other clinical standards. • Clinical audit.
1, 2	Evaluate the technical quality of clinical photographs, identify suboptimal photographs and sequences and re-shoot where necessary, knowing when to refer to senior colleagues.	• How to identify photographs that are of substandard quality. • When and how to refer to senior colleagues.
2	Produce a standardised set of colour photographic prints of a preoperative patient.	• Image processing hardware and software. • Colour management. • Density, contrast, saturation and hue. • File size and resolution in relation to print specifications. • Workflow.
2	Process and output standardised sets of photographs for screen delivery.	• Image processing hardware and software. • Colour management. • Density, contrast, saturation and hue. • File size and resolution in relation to on-screen delivery and viewing conditions. • Workflow.
2	Add metadata to a set of clinical	• Image and data security.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	photographs, to include name, date of photography, hospital number, diagnosis and consultant name.	• Medical record systems. • Data storage and cataloguing principles. • File-naming logic, hierarchy and protocols.
2	Upload images to a secure environment linked to an image database**.**	• Image and data security. • Network and server IT infrastructure. • Image distribution, storage, cataloguing and retrieval.
1, 3	Clean equipment and studio surfaces following a clinical photography session.	• Safe practice and local protocols for the maintenance of equipment and clinical photography environment.
2, 3	Keep accurate records in accordance with current guidelines and the legal framework for data security.	• Best practice recommendations for record keeping and data security. • The current Data Protection Act, key guidelines and the legal framework for data security.
3	Reflect on your practice and generate a reflective diary that demonstrates how you take responsibility for your learning. Utilise the skills required of an independent learner and your commitment to your continuing professional development.	• Personal values, principles and assumptions, emotions and prejudices, understanding how these may influence personal judgement and behaviour. • The role of critical reflection and reflective practice and the methods of reflection that can be used to maintain or improve knowledge, skills and attitudes. • How continuous personal development can improve personal performance.

3	Comply with relevant guidance and laws to include those relating to:
	• your scope of practice
	• research ethics and governance
	• patient confidentiality
	• data protection
		• Principles, guidance and law with respect to:
		  • medical ethics
		  • confidentiality
		  • information governance
		  • informed consent
		  • equality and diversity
		  • child protection

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	• equality and diversity • use of chaperones • informed consent.	• elder abuse • use of chaperones • probity • fitness to practise.
3	Work constructively and effectively as a member of a multidisciplinary team.	• The underpinning principles of effective teamwork and working within and across professional boundaries.

MODULE	Introduction to Clinical Specialties and Locations	COMPONENT	Specialist Years 2 and 3
AIM	The aim of this module is to ensure that the student develops their skills in scientific and specialist photography, working in different clinical environments and for a range of specialities. During this period of work-based training students will apply their learning from the modules Clinical Photography Theory and Practice, and Scientific and Clinical Imaging.		
SCOPE	On completion of this module the student will be able to photograph the retina, teeth and buccal cavity, and morbid or surgical specimens competently. They will be expected to build their professional practice and practise safely in the workplace. Students will be expected to use critical reflection to review and improve their performance in the workplace and develop skills to promote continuous professional development.		

LEARNING OUTCOMES

On successful completion of this module the student will:

1. Produce retinal photographs in a range of patients, including the use of mydriatic equipment.
2. Produce optical coherence tomography (OCT) recordings in a range of patients.
3. Produce photographs of morbid or surgical gross specimens.
4. Undertake intra-oral photography and produce photographs of the teeth in a range of patients.
5. Observe and assist during the photography of a surgical procedure.
6. Adhere to appropriate standards of professional practice as defined in *Good Scientific Practice*.

CLINICAL EXPERIENTIAL LEARNING

The clinical experiential learning for this module is:

- Visit an ophthalmic clinic or ward and observe the clinical pathway/clinical care of patients with eye disease and discuss how ophthalmic imaging contributes to the diagnosis and management of patients with eye disease.
- Visit a maxillofacial unit and observe the clinical pathway/clinical care of patients referred to the clinic and discuss how intra-oral photography contributes to the diagnosis and management of patients.
- Critically apply the scientific principles covered in the academic modules to this work-based module and specifically appraise the evidence base underpinning at least one of the routine photographic procedures and one treatment plan.
- Prepare a portfolio containing ophthalmic images (anonymised) from a series of patients that you have photographed, demonstrating the normal appearance of retinal anatomy and a range of pathology, together with your report on each set of photographs.
- Observe and assist a qualified photographer in the capture of invasive ophthalmic imaging techniques, e.g. fundus fluorescein angiography (FFA) and indocyanine green angiography (ICG), discuss with the photographer the additional challenges of these tests and effects that the patient may experience.
- Prepare a portfolio containing pre- and postoperative intra-oral photographs (anonymised) from a series of patients that you have photographed, demonstrating the normal appearance of dental anatomy and a range of pathology, together with your report on each set of photographs are produced.
- Attend theatres during surgery and observe while a series of photographs is produced. Adhere to infection control protocols and procedures and assist where necessary with equipment handling and cleaning.
- Photograph morbid or surgical specimens to demonstrate colour, texture, shape of the tissue and any pathology, using a linear scale correctly orientated.
- Attend a multiprofessional team meeting to observe how photography contributes to the diagnosis and treatment of patients, or teaching or research, and reflect on the importance and role of the clinical photographer in clinical care.
- Discuss the use of clinical photography for bereavement support purposes, including ethical, consent, confidentiality, religious and cultural considerations in photography for bereavement support and the range of professionals and patient groups in the support of bereaved patients with your training officer.
- Discuss the current and future contribution of genomics and clinical bioinformatics to healthcare with your training officer.

All of these experiences should be recorded in your e-portfolio.

The following section details the competence and knowledge and understanding each student must gain. Each competence is linked to the relevant learning outcomes and students must demonstrate achievement of each competence for each linked learning outcome.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
1, 2, 6	Control infection risks in accordance with departmental and manufacture protocols when taking ophthalmic images.	• Protocols and requirements for hygiene and infection control related to the equipment used, including preparation, conduct and completion of photography. • Protocol for hand washing and how effective hand washing contributes to control of infection and local trust requirements. • Safe retraction of eyelids.
1, 2, 6	Minimise risks and hazards in compliance with health and safety policies when taking ophthalmic images.	• The relevant health and safety regulations specific to the clinical environment and equipment used. The potential hazards and risks and the actions to be taken to minimise these.
1, 2, 6	Use effective communication skills within the healthcare environment, adapting communication style and language to meet the needs of the listener when imaging the eye.	• The principles of effective communication, including written and electronic, verbal and non-verbal. • The way effective communication can assist in identifying problems accurately, increase patient satisfaction, enhance co-operation, and reduce patient distress and anxiety. • The importance of some key ideas, for example sign posting, listening, language, non-verbal behaviour, ideas, beliefs, concerns, expectations and summarising in communication.
6	Obtain a suitably completed request form, greet the patient and check patient identification when taking ophthalmic images.	• Referral routes for ophthalmic imaging. • Requirements for correct completion of request forms and how to validate. • The importance of checking and confirming the patient identity and the implications of not doing so.
1, 6	Prepare the environment for ophthalmic imaging, set up and calibrate equipment ready for use for each imaging investigation.	• Range of equipment used, relative merits and principles of type of ophthalmic imaging technique. • Requirements for the clinical photography environment to ensure privacy, dignity and comfort of the patient. • Recognition of the errors or potential risks of using defective

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
		equipment in clinical practice and the implications of use. • Identification of common faults and remedial action. • Current safety standards, including safety testing and routine maintenance. • Preparation and calibration of equipment. • Manufacturers' and local protocols for equipment used.
6	Treat the patient in a way that respects their dignity, rights, privacy and confidentiality during an ophthalmic imaging session	• The rights of the patient with regard to consent for treatment and confidentiality of consultation and medical records. • Key factors influencing dignity, rights, privacy and confidentiality, including age, gender, culture and beliefs. • Correct position of the patient ensuring comfort, co-operation and optimal image results. • The impact of incorrect positioning or non-co-operation on images produced.
1, 6	Explain the procedure for retinal photography to the patient and obtain informed consent.	• The importance of explaining the procedure for retinal photography to the patient and obtaining informed consent. • The relevant procedures and requirements for patient participation in the procedure. • Clinical indications for and contraindications to dilation of the pupil. • The importance of ensuring that patients understand the hazards of driving and operating machinery after dilation of the pupil. • Principles, guidance and law with respect to informed consent.
1	Take colour photographs of the macula, optic disc and peripheral areas of the retina to record pathology appropriately, re-taking if	• Patient positioning to obtain a clear view of the retina safely and comfortably for the patient. • Correct operation of a retinal camera. • IMI National Guidelines Ophthalmic Imaging.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	necessary and consult senior staff if required.	• Importance of correct dilation. • Retinal anatomy. • The correct use of a target light to position the eye for photography. • Avoidance of artefacts by correct positioning and focusing.
2, 6	Explain the procedure for OCT to the patient and obtain informed consent.	• The importance of explaining the procedure for OCT to the patient and obtaining informed consent. • The relevant procedures and requirements for patient participation in the procedure. • Principles, guidance and law with respect to informed consent.
2, 6	Make OCT scans of the retina to record pathology appropriately.	• Patient positioning to obtain a high-quality scan of the retina safely and comfortably for the patient. • Correct operation of an OCT machine. • IMI National Guidelines Ophthalmic Imaging. • Retinal anatomy.
2, 6	Evaluate the technical quality of ophthalmic images, identify poor quality images and re-record where necessary, knowing when to refer to senior colleagues.	• How to identify ophthalmic images that are of poor quality, qualitative measurement on device and quantitative factors. • Reasons for poor quality, patient/operator considerations. • When and how to refer to senior colleagues.
4, 6	Obtain a suitably completed request form, greet the patient and check patient ID when photographing the teeth and oral cavity.	• Referral routes for intra-oral photography. • Requirements for correct completion of request forms and how to validate. • The importance of checking and confirming the patient identity and the implications of not doing so.
4, 6	Prepare the environment for intra-oral photography, set up and	• Range of equipment used, relative merits and principles of intra-oral photography.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	calibrate equipment ready for use for each photographic investigation.	• Requirements for the clinical photography environment to ensure privacy, dignity and comfort of the patient. • Recognition of the errors or potential risks of using defective equipment in clinical practice and the implications of use. • Identification of common faults and remedial action. • Current safety standards, including safety testing and routine maintenance. • Preparation and calibration of equipment. • Manufacturers' and local protocols for equipment used.
4, 6	Take a full set of anterior and lateral views of the face and intra-oral Begg views of the teeth in adults and children, using retractors and mirrors safely and appropriately, re-taking if necessary and consult senior staff if necessary.	• IMI National Guidelines Orthodontic Photography and Paediatric Photography. • Dental notation and anatomy. • Interpretation of request, including diagnosis, treatment stage and dental/orthodontic terminology. • Correct positioning of the patient for standardised facial views. • Choice of equipment for dental and intra-oral photography. • Preparation of retractors and mirrors for photography. • Correct positioning and use of retractors, mirrors and tongue depressors. • Standardisation of images, including scale, positioning and lighting • Focusing techniques and control of depth of field.
4, 6	Control infection risks in line with department protocols when undertaking intra-oral photography.	• Sterilisation techniques for retractors and mirrors. • Hand washing and use of gloves.
6	Minimise risks and hazards in compliance with health and safety	• IMI National Guidelines Orthodontic Photography. • Local policies.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	policies when taking intra-oral photographs.	• Regional and national audit processes.
4, 6	Explain the procedure to the patient and obtain informed consent. Where necessary, demonstrate use of retractors and any other intra-oral instruments required.	• Verbal communication skills. • The importance of explaining the procedure for dental and intra-oral photography to the patient and gaining informed consent. • The relevant procedures and requirements for patient capacity. • Principles, guidance and law with respect to informed consent. • Safety issues with respect to cheek retractors and any other intra-oral instruments used, e.g. buccal/palatal mirrors..
4, 6	Evaluate the technical quality of dental photographs, identify suboptimal images and re-record where necessary, knowing when to refer to senior colleagues.	• How to identify images that are substandard. • When and how to refer to senior colleagues.
3, 6	Prepare the environment for specimen photography, set up and calibrate equipment ready for use for each photographic session.	• Range of equipment used, relative merits and principles of specimen photography. • Identification of common faults and remedial action. • Current safety standards, including safety testing and routine equipment maintenance. • Specimen preparation factors affecting the appearance of fixed specimens.
3, 6	Photograph morbid or surgical specimens of internal organs safely and appropriately, re-taking if necessary and consulting senior staff if necessary.	• Local and national procedures for handling human tissue. • Principles, guidance and law in respect of retention and handling of human tissue. • Correct anatomical orientation of organs. • Control of lighting, specular reflection, scale, perspective and background.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
		• Correct use of linear scales.
3, 6	Minimise risks and hazards in compliance with health and safety policies when taking specimen photographs.	• Infection control policy and procedure. • Chemical and biological hazards. • Laboratory procedures and restrictions. • Use of protective personal equipment (PPE) where necessary.
3, 6	Evaluate the technical quality of specimen photographs, identify suboptimal images and re-record where necessary, knowing when to refer to senior colleagues.	• How to identify images that are substandard. • When and how to refer to senior colleagues.
3, 6	Control infection risks in accordance with departmental protocols when undertaking, observing, or assisting photography of surgical procedures.	• Protocols and requirements for hygiene and infection control related to the theatre environment, the relevant range of surgical procedures, including preparation, conduct and completion of photography. • Protocol for hand washing and how effective hand washing contributes to control of infection and local trust requirements. • Protocol for dress and use of PPE where necessary.
5, 6	Minimise risks and hazards in compliance with health and safety policies when undertaking, assisting or observing surgical photography.	• The relevant health and safety regulations specific to surgical photography, the potential hazards and risks, and the actions to be taken to minimise these.
5, 6	Use effective communication skills within the healthcare environment, adapting communication style and language to meet the needs of the listener when undertaking surgical photography.	• The principles of effective communication, including written and electronic, verbal and non-verbal. • The way effective communication can assist in gaining the trust and co-operation of the surgical team, obtaining optimal results and meeting the surgeon's requirements.
5, 6	Obtain a suitably completed request	• Requirements for correct completion of request forms and how

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	form, and check the diagnosis and patient identification when undertaking surgical photography.	to validate. • The importance of checking and confirming the patient identity and the implications of not doing so.
5, 6	Treat patient in a way that respects their dignity, rights, privacy and confidentiality when undertaking surgical photography.	• The rights of the patient with regard to consent for photography and confidentiality of surgical treatment and medical records. • Key factors influencing dignity, rights, privacy and confidentiality, including age, gender, culture and beliefs. • The clinical photographer's role in safeguarding patients.
5, 6	Choose and prepare equipment for theatre photography, including lenses, batteries, lighting equipment and storage devices.	• Planning, preparation and communication. • The importance of routine equipment maintenance and preparation.
5, 6	Process and save the images in a standardised format suitable for viewing by clinicians and according to department protocols.	• Use of computer software. • IMI National Guidelines Orthodontic Photography. • Integrity of the clinical image.
6	Upload images to a secure image database or catalogue and archive original images.	• Local systems and procedures.
6	Keep accurate records in accordance with current guidelines and the legal framework for data security.	• Best practice recommendations for record keeping and data security. • The Data Protection Act and current key guidelines, and the legal framework for data security.
6	Reflect on your practice and generate a reflective diary that demonstrates how you take responsibility for your learning. Utilise the skills required of an independent learner and your	• Personal values, principles and assumptions, emotions and prejudices, understanding how these may influence personal judgement and behaviour. • The role of critical reflection and reflective practice and the methods of reflection that can be used to maintain or improve knowledge, skills and attitudes.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	commitment to your continuing professional development.	• How continuous personal development can improve personal performance.
6	Take responsibility for keeping your professional, technical and scientific knowledge and skills up to date.	• Identify and evaluate the potential role for new and innovative technologies and scientific advances.
6	Meet commitments and goals in your professional practice using a range of organisational and planning tools.	• Different methods of planning, prioritising and organising and how they can enhance personal effectiveness.
1, 2, 3, 4, 5, 6	Comply with relevant guidance and laws to include those relating to: • your scope of practice • research ethics and governance • patient confidentiality • data protection • equality and diversity • use of chaperones • informed consent.	• Principles, guidance and law with respect to: • medical ethics • confidentiality • information governance • informed consent • equality and diversity • child protection • elder abuse • use of chaperones • probity • fitness to practise.
6	Work constructively and effectively as a member of a multidisciplinary team.	• The underpinning principles of effective teamwork and working within and across professional boundaries.

MODULE	Non-clinical Photography and Design	COMPONENT	Specialist Year 3
AIM	The aim of this module is to ensure that the student develops their skills with respect to non-clinical photography and their understanding of the design and production processes for print and digital media. During this period of work-based training students will apply their learning from the modules Scientific and Clinical Imaging, Imaging Practice and Production, Non-clinical Photography and Design, and Professional Practice.		
SCOPE	On completion of this module the student will be able to produce non-clinical images suitable for a range of print and digital media. The student will gain experience of working with designers and clients to define the requirements for a range of communication purposes, including patient and public information, medical teaching and charity or fundraising activities. Students will be expected to use personal judgement and critical reflection to select suitable equipment and techniques as well as devising creative treatments. Students will develop technical and creative skills and an ability to work in collaboration with other professionals in the hospital environment.		

LEARNING OUTCOMES

On successful completion of this module the student will:

1. Photograph a cheque presentation for a newsletter or website.
2. Produce a studio portrait as a high-quality print.
3. Scan flat and transparent originals and produce high-quality, colour-corrected digital files and prints.
4. Photograph a small item of equipment in a studio setting, suitable for publication.
5. Photograph a large item of equipment on location in a clinical environment.
6. Design a scientific poster using a combination of text, photographs, graphs and scans.
7. Create a case report presentation for projection, describing a clinical condition that you have photographed.
8. Adhere to local and national moral, ethical and legal guidance in respect of copyright and consent.
9. Keep accurate records and adhere to data security principles, guidance and the law.
10. Adhere to appropriate standards of professional practice as defined in *Good Scientific Practice*.

EXPERIENTIAL LEARNING

The experiential learning for this module is:

- Plan and prepare for photography, liaising with a client and/or graphic designer to decide on the best approach.
- Take a range of non-clinical photographs in different settings and produce prints and digital files, critically appraising the output and identifying areas for improvement.
- Review your photography together with your supervisor and a client or graphic designer and identify areas of good practice and those where improvements could be made.
- Incorporate your photographs and scans in a scientific poster layout. Create a case report presentation and invite your supervisor and peers to review and feedback on your work, using the feedback to improve your practice.

All of these experiences should be recorded in your e-portfolio and print portfolio.

The following section details the competence and knowledge and understanding each student must gain. Each competence is linked to the relevant learning outcomes and students must demonstrate achievement of each competence for each linked learning outcome.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
1	Photograph a cheque or award presentation on location for a hospital charity fundraising newsletter and produce a file suitable for four-colour reproduction.	• Choice of equipment. • Set dressing. • Positioning and guiding participants. • Lighting, colour balance, exposure, depth of field and composition. • Image processing and output.
2	Produce a studio portrait for publication and as a print.	• Choice and preparation of equipment. • Positioning and communicating with the subject. • Lighting and background. • Exposure, depth of field and colour balance. • Framing and composition. • Image processing.
3, 8	Scan colour and monochrome documents to produce files for use in a scientific paper and a projection slide.	• Use of scanners and software for copying flat originals. • Manipulation of equipment and software to minimise the effects of interference between scanner and printing screens.
3, 8	Scan a negative or slide and produce a colour file suitable for projection.	• Use of scanners and software for copying transparencies. • Manipulation of software to optimise exposure, contrast, colour balance, saturation and removal of artefacts.
2, 8	Keep records of copyright authorisation, ensuring that copyright permission has been obtained prior to copying any works that are subject to copyright law.	• Copyright law. • Fair use principles. • The management of usage rights. • Communication and negotiation with service users and third parties.
4	Photograph a small item of medical equipment and produce a file suitable for a scientific poster or journal publication.	• Choice of equipment. • Studio lighting, colour balance, exposure, depth of field and composition. • Image processing and output.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
5	Photograph a large item of equipment on location in a clinical environment.	• Location lighting, colour balance, exposure, depth of field and composition. • Client communication. • Set dressing. • Image processing and output. • Consent.
6, 8	Using photographs that you have taken of a patient, research and prepare an anonymised case report. Ensure that any photographs or patient information is consented according to national and local guidance and the law.	• Research study methods. • Copyright law. • IMI National Guidelines Consent to Clinical Photography. • Local policy and procedures for consent and copyright. • Communication with clinical staff and patients. • Organisational skills.
6, 8	Design a scientific poster of your case report suitable for printing to size A0, incorporating photographs, graphs, tables and text. Print the poster to size A3 to keep in your portfolio.	• Scientific poster design conventions. • Basic typography, use of industry standard design software and use of layout grids. • Proofreading and accuracy. • Consent and confidentiality guidance and copyright law. • Local policy and procedures for consent and copyright. • Written and verbal communication skills.
7, 8	Produce a five-minute presentation of your case report using your photographs and scans, together with text, graphs and tables, as appropriate to the subject. Keep the presentation file in your e-portfolio.	• Presentation software. • Slide design and layout. • Proofreading and accuracy. • Consent and confidentiality guidance and copyright law. • Local policy and procedures for consent and copyright. • Written and verbal communication skills.
9	Keep a log of the equipment and software you have used.	• Best practice recommendations for record keeping and data

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
9	Keep accurate records in accordance with current guidelines and the legal framework for data security. Reflect on your practice and generate a reflective diary that demonstrates how you take responsibility for your learning. Utilise the skills required of an independent learner and your commitment to your continuing professional development.	security. • The Data Protection Act and current key guidelines and the legal framework for data security. Personal values, principles and assumptions, emotions and prejudices, understanding how these may influence personal judgement and behaviour. • The role of critical reflection and reflective practice and the methods of reflection that can be used to maintain or improve knowledge, skills and attitudes. • How continuous personal development can improve personal performance.
10	Take responsibility for keeping your professional, technical and scientific knowledge and skills up to date.	• How to identify and evaluate the potential role for new and innovative technologies and scientific advances.
10	Meet commitments and goals in your professional practice using a range of organisational and planning tools.	• Different methods of planning, prioritising and organising and how they can enhance personal effectiveness.
10	Comply with relevant guidance and laws to include those relating to: • your scope of practice • research ethics and governance • patient confidentiality • data protection • equality and diversity • use of chaperones • informed consent.	• Principles, guidance and law with respect to: • medical ethics • confidentiality • information governance • informed consent • equality and diversity • child protection • elder abuse • probity • fitness to practise.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
10	Work constructively and effectively as a member of a multidisciplinary team.	• The underpinning principles of effective teamwork and working within and across professional boundaries.

MODULE	Video Production	COMPONENT	Specialist Years 2 and 3
AIM	The aim of this module is to ensure that the student develops their skills with respect to video production for both clinical and non-clinical purposes. The student will gain an understanding of both processes and techniques, taking a simple production from planning through to completion and the requirement to gain the permission of the patient. During this period of work-based training students will apply their learning from the modules Image Practice and Production, Photographic Theory and Practice, Non-clinical Photography and Design.		
SCOPE	On completion of this module the student will be able to shoot and edit a simple production, and assist in a range of roles with more complex productions. They will be expected to build their professional practice and practise safely in the workplace. Students will be expected to use critical reflection to review and improve their performance in the workplace and develop skills to promote continuous professional development.		

LEARNING OUTCOMES

On successful completion of this module the student will:

1. Record video of the dynamic aspects of a clinical condition with the consent of the patient.
2. Plan for more complex productions, taking on and assisting in a range of different production roles.
3. Shoot and edit clinical recordings.
4. Adhere to appropriate standards of professional practice as defined in *Good Scientific Practice*.

EXPERIENTIAL LEARNING

The experiential learning for this module is:

- Record clinical video with sound of clinical cases to illustrate the dynamic aspects of disease, ensuring that appropriate consent has been sought and given for the intended purpose of the recording, discuss the experience of the patient and identify your learning from this experience.
- Make simple edited sequences of clinical recordings, suitable for clinical review and medical or surgical teaching and training, and gain feedback from the users of the clinical recording, identifying the positive aspect of the video and areas that could be improved.

All of these experiences should be recorded in your e-portfolio.

The following section details the competence and knowledge and understanding each student must gain. Each competence is linked to the relevant learning outcomes and students must demonstrate achievement of each competence for each linked learning outcome.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
1, 4	Control infection risks in accordance with departmental protocols when undertaking clinical video recording.	• Protocols and requirements for hygiene and infection control related to the relevant range of conditions, including preparation, conduct and completion of video recording. • Protocol for hand washing and how effective hand washing contributes to control of infection and local trust requirements.
1, 4	Minimise risks and hazards in compliance with health and safety policies when undertaking video recording.	• The relevant health and safety regulations specific to clinical video in the studio and other clinical environments, the potential hazards and risks and the actions to be taken to minimise these. • Barrier and reverse barrier nursing. • Non-touch technique and how it applies to clinical video. • Equipment sterilisation. • Cleaning and sterilisation of equipment and surfaces following a video recording procedure.
1, 4	Use effective communication skills within the healthcare environment, adapting communication style and language to meet the needs of the listener when undertaking video recordings.	• The principles of effective communication, including written and electronic, verbal and non-verbal. • The way effective communication can assist in identifying problems accurately, increase patient satisfaction, enhance co-operation and reduce patient distress and anxiety. • The importance of some key ideas, for example sign posting, listening, language, non-verbal behaviour, ideas, beliefs, concerns, expectations and summarising in communication.
1, 4	Obtain a suitably completed request form, greet the patient and check patient identification when undertaking clinical video recording.	• Referral routes for video recording. • Requirements for correct completion of request forms and how to validate. • The importance of checking and confirming the patient identity and the implications of not doing so.
1, 4	Prepare the environment, set up and	• Range of equipment used, and the relative merits and principles

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	prepare equipment ready for video recording.	of moving image and sound recording. • Requirements for the environment in which video recording takes place to ensure privacy, dignity and comfort of the patient. • Recognition of the errors or potential risks of using defective equipment in clinical practice and the implications of use. • Identification of common faults and remedial action. • Current safety standards, including safety testing and routine maintenance. • Preparation and set-up of equipment. • Manufacturers' and local protocols for equipment used.
1, 2, 3, 4	Evaluate the technical quality of clinical video, identify suboptimal recordings and sequences and re-shoot where necessary, knowing when to refer to senior colleagues.	• How to identify recordings that are substandard. • When and how to refer to senior colleagues.
1, 4	Treat patients referred for video recording in a way that respects their dignity, rights, privacy and confidentiality.	• The rights of the patient with regard to consent for filming and confidentiality of consultation and medical records. • Key factors influencing dignity, rights, privacy and confidentiality, including age, gender, culture and beliefs. • Correct positioning, support and movement of the patient, ensuring comfort, co-operation and optimal recordings. • Identifying signs of fatigue and the limits of physical ability in order to ensure that patients' comfort and safety are not compromised. • The impact of incorrect positioning or non-co-operation on recordings.
4	Explain clinical video recording to the patient and gain informed	• The importance of explaining the procedure for each recording session to the patient and gaining informed consent.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	consent.	• The clinical photographer's role in ensuring that appropriate consent has been recorded. • The appropriateness of consent wording to explain to a patient the purpose for which recordings will be made. • The relevant procedures and requirements for patient compliance. • When and how to refer consent questions to a referring clinician. • Principles, guidance and law with respect to informed consent.
1, 4	Identify a set of standardised activities to determine patient position, movement, lighting and scale to illustrate the dynamic aspects of a disease condition.	• How to identify standardised sequences to achieve an optimum standardised video record.
1, 4	Set up a clinical photography studio for video recording, checking the positions and levels of lighting units and correct camera exposure. Arrange furniture and floor space appropriate to the patient and their clinical condition.	• How to prepare the studio for video recordings, including those where a patient is asked to move around in the studio and taking into account technical, clinical and safety concerns. • Correct studio set-up to ensure reproducible, standardised lighting and background appropriate to each patient. • Use of camera settings and exposure aids to set a correct exposure level and white balance. • Manipulation of lenses and exposure level to optimise depth of field.
1, 4	Make clinical video recordings in a range of patients, including adults and children, ensuring that an accurate, correctly exposed video sequence is produced. Confirm that the scale, patient positioning and	• Interpretation of a clinical video request, including diagnosis, anatomical descriptions and purpose of video recording. • Selection of equipment and settings to meet the needs of referral/request. • Correct operation of camera lighting and sound recording

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	movement instructions given to the patient are consistent throughout each sequence.	equipment. • How to review recordings and sequences and make adjustments to optimise results. • Routine maintenance and set-up procedures. • Choice of patient positioning and patient communication appropriate to the video recording requested/required. • Identification and rectification of equipment faults/defects. • How to check and annotate recordings to ensure accuracy, completeness, consistency and suitability for clinical assessment and review.
1,4	Make a video recording of a patient speaking or being interviewed for clinical purposes.	
1, 4	Take standardised recordings of a patient on different dates, ensuring that they are consistent and clinically informative. Produce a reflective log.	• Principles of standardisation as applied to clinical video recordings. • The relationships between focal length, distance and scale of reproduction, and the importance of consistency. • Camera operation, including smooth pan and tilt camera movements appropriate to the subject. • IMI National Guidelines and other clinical standards. • Clinical audit. • Colour temperature control.
3, 4	Upload and review footage of your clinical recording and create an edit decision list.	• Hardware, software and techniques for ingestion of video recordings. • Shot selection.
3, 4	Produce a video sequence illustrating a clinical recording in a controlled and standardised manner.	• Video editing hardware and software. • Creative decision making, continuity, pace, narrative sequencing, transitions. • Workflow.
3, 4	Encode an edited video sequence to a format suitable for delivery via	• Video encoding hardware and software. • The management of quality and data rate.

KEY LEARNING OUTCOMES	COMPETENCES	KNOWLEDGE AND UNDERSTANDING
	data projection and/or a website. Check that it plays smoothly in the final delivery medium.	• File size and resolution in relation to on-screen delivery and viewing conditions. • Workflow.
3, 4	Add metadata to an edited clinical video sequence, to include name, date of photography, hospital number, diagnosis and consultant name.	• Video and data security. • Medical record systems. • Video data storage and cataloguing principles. • File-naming logic, hierarchy and protocols.
1, 2, 3, 4	Reflect on your practice and generate a reflective diary that demonstrates how you take responsibility for your learning.	• The role of critical reflection and reflective practice and the methods of reflection that can be used to maintain or improve knowledge, skills and attitudes.

SECTION 9: APPENDICIES

Appendix 1: Contributor List

Development of the PTP curriculum for the BSc Healthcare Science (Hons) for Clinical Photography has been co-ordinated by the Modernising Scientific Careers team and the National School of Healthcare Science, working with NHS, Institute of Medical Illustrators and higher education colleagues.

Clinical Photography curriculum working group since first publication:

The professionals who have contributed to the development of this PTP Programme since 2011 include:

David Bishop	University College London
Jason Candlin	Heatherwood and Wexham Park Hospitals, Berkshire
Paul Crompton	Cardiff and Vale University Local Health Board
Carol Fleming	Bradford Teaching Hospitals NHS Foundation Trust
Andrew Johnson	Birmingham Children's Hospital
Marie Jones	Salisbury District Hospital
Kathy McFall	NHS Greater Glasgow and Clyde
Jerry Naylor	Addenbrookes Hospital, Cambridge
Becky Smith	Moorfields Hospital NHS Foundation Trust, London
Jane Tovey	University Hospitals Birmingham NHS Foundation Trust
Nick White	Royal Sussex County Hospital NHS Trust
Barbara Wood	Patient Representative, London

Professional bodies and societies were invited to review the BSc (Hons) Healthcare Science (Clinical Photography) and their feedback has shaped the final publication:

Institute of Medical Illustrators

Appendix 2: BSc (Hons) Healthcare Science Amendments

March 2016

Generic Changes

The BSc (Hons) curriculum has been amended and is now presented in a single document which includes both the BSc syllabus and the work-based syllabus.

The Introduction (Section 1) has been updated and amended to reflect the totality of the curriculum. A background to the Modernising Scientific Career (MSC) programme has been added and the importance of *Good Scientific Practice* (GSP) in setting the standards of practice in healthcare science has been emphasised. There has been additional information and emphasis in areas such as: entry routes, progression, patient and public involvement, accreditation through the National School of Healthcare Science, programme delivery and monitoring, student support and mentoring, and clarity about a number of issues around programme delivery.

Key professional practice learning outcomes have been added through the GSP syllabus (Section 3), which embeds the standards of professionalism set out in GSP in all aspects of the delivery and assessment of the programme. The GSP syllabus is a common component of all PTP curricula and must be followed throughout the whole training period, with engagement at the appropriate level, depending on the stage of training.

The Professional, Scientific and Technical modules (Section 4) have been revised.

Clinical Photography
There has been no change to the Divisional or Clinical Photography content.

April 2017

The recommended number of assessments per year on p.18 was clarified and a table added to illustrate this. The new version of the curriculum is PTP Clinical Photography Version 1.01 2016.

For any queries regarding this change please email: nshcs@wm.hee.nhs.uk

Appendix 3: Abbreviations

Generic abbreviations

AHCS	Academy for Healthcare Science
AO	Assessment Organisation
APL	Accreditation of Prior Learning
BSc	Bachelor of Science
CAS	Central Alerting System
CBD	Case Based Discussion
CEL	Clinical Experiential Learning
COSHH	Control of Substances Hazardous to Health
CPD	Continuing Professional Development
CPPD	Continuing Personal and Professional Development
CSO	Chief Scientific Officer
CT	Computer Tomography
DH	Department of Health
DICOM	Digital Image and Communications in Medicine
DfE	Department for Education
DOPs	Direct Observation of Practical skills
EPA	End-point Assessment
ETSG	Education and Training Scrutiny Group
ETWG	Education and Training Working Group
EU	European Union
FHEQ	Framework for Higher Education Qualifications
FtP	Fitness to Practise (FtP)
GCP	Good Clinical Practice
GM	Generic Module (Professional, Scientific and Technical)
GSP	Good Scientific Practice
HCPC	Health and Care Professions Council
HCS	Healthcare Science

HCSP	Healthcare Science Practitioner
HEE	Health Education England
HEI	Higher Education Institutions
HL7	Health Level 7
IBMS	Institute of Biomedical Science
ICT	Information and Communication Technologies
IOE	Institute of Education
IT	Information Technology
LETB	Local Education and Training Board
MDA	Medical Device Alerts
MDT	Multidisciplinary Team
MHRA	Medicines and Healthcare products Regulatory Agency
MRI	Magnetic Resonance Imaging
MSC	Modernising Scientific Careers
NES	NHS Education for Scotland
NICE	National Institute for Health and Care Excellence
NIHR	National Institute for Health Research
NHS	National Health Service
NSHCS	National School of Healthcare Science
OCE	Observed Clinical Event
OLAT	Online Assessment Tool
PACS	Picture Archiving and Communications Systems
PSA	Professional Standards Authority
PTP	Practitioner Training Programme
QA	Quality Assurance
QAA	Quality Assurance Agency
QC	Quality Control
QMS	Quality Management System
RoAAO	Register of Apprenticeship Assessment Organisations
RoATP	Register of Apprenticeship Training Providers
SCQF	Scottish Credit and Qualifications Framework

SFA	Skill Funding Agency
SJT	Situational Judgement Test
SPECT	Single Photon Emission Computed Tomography
UCAS	The Universities and Colleges Admissions Service
UK	United Kingdom

Programme Specific Abbreviations (Clinical Photography)

3D	3 Dimensional
CPH	Clinical Photography
FFA	Fundus Fluorescein Angiography
EXIF	Exchangeable Image File
ICG	Indocyanine Green Angiography
IMI	Institute of Medical Illustrators
OCT	Optical Coherence Tomography
PPE	Protective Personal Equipment

Appendix 4: Glossary

Term	Definition
Clinical experiential learning	The cyclical process linking concrete experience with abstract conceptualisation through reflection and planning.
Clinical experiential learning outcomes	The activities that the student will undertake to enable and facilitate their learning in the workplace.
Competence	The ability of an individual to perform a role consistently to required standards, combining knowledge, understanding, skills, attitudes, behaviour and values.
Competence statements	Active and outcome-based statements that provide a further breakdown of the work-based Learning Outcomes – reflecting what the student will be able to do in the workplace at the end of the programme. Each competence should be linked back to the numbered Learning Outcomes.
Component	An indication of the type of module within the curriculum, i.e. Generic, Theme or Specialist.
Curricula	An outline of the expected educational outcomes across a subject area. The learning that is expected to take place during the Practitioner Training Programme described in terms of knowledge, skills, attitudes, behaviours and values.
Division	A high-level description of an area of practice within healthcare science. There are four divisions: Life Sciences, Physical Sciences, Physiological Sciences and Clinical Bioinformatics.
Domains of learning	Cognitive (knowledge and intellectual skills), affective (feelings and attitudes), interpersonal (behaviour and relationships with others) and psychomotor (physical skills).
Feedback	Specific information about the comparison between a student's observed performance and a standard, given with the intent of improving the student's performance (van de Ridder JMM, Stokking KM, McGaghie WC and ten Cate OT. What is feedback in clinical education? *Medical Education* 2008: 42: 189–197).
Good Scientific Practice	Non-statutory guidance on the minimum requirements for good practice for the healthcare science workforce.
Job	A specific definition of the work activities, requirements and skills required to undertake work activities within a local context. This differs from a role – see below.
Key learning outcome	A defined learning outcome linked to relevant competence(s) within the work-based Learning Framework.

Term	Definition
Learning framework	The specification for work-based learning contained within the work-based syllabus.
Learning outcome	A high-level, outcome-based statement that describes what a student will be able to do at the end of the module.
Mentoring	Mentoring is *a process in which a trainer (mentor) is responsible for overseeing the career and development of the student.* The emphasis is therefore on the relationship (rather than the activity).
Module aim	The overall objective of a module – defining the intended learning achievements of the student. The aim works together with the 'Scope' statement to define the overall objectives and scope of the module.
Module scope	A statement within a module that defines the range/limits of the learning undertaken by the student in a module – patients/investigations/equipment/modalities, etc.
National Occupational Standards	Nationally recognised standards of expected workplace performance and level of competence for a role. The standards are outcome based, defining what the role holder should to be able to do, as well as what they must know and understand to demonstrate competent work performance. National Occupational Standards are supported by nationally agreed frameworks of expected attitudes, behaviours and skills.
Practical skill	A cognitive, psychomotor, physical, or communicative ability that supports performance of the required role.
Programme	The package of learning, teaching assessment and quality assurance leading to an award.
Provider	An organisation that delivers required training and learning activities to specified quality assurance requirements.
Role	A collection of functions undertaken in the workplace that represent the main broad areas of work for all similar workers at national level. A role differs from a job, the latter being defined specifically for a local context.
Specialism	A focused area of practice within a division of healthcare science.
Trainer	A qualified individual who provides learning and development support for students.
Theme	A group of related specialisms usually within a division of healthcare science.
Work-based learning	Learning that takes place in a real work setting and involves the application of academic learning to real work activities.
Work performance	The requirements of satisfactory and consistent demonstration of competence in specified functions for a work role.
Workplace	A real work setting in which the student can apply learning.

Appendix 5: Assessment Proformas

A5.1: Direct Observation of Practical/Procedural Skills Template

Student identification data			
Procedure			
Clinical context	**Insert module title**	**Insert module title**	**Insert module title**

Assessor's name					
Assessor's position				**Insert**	**Insert**

Difficulty of the procedure		**Low**	**Average**	**High**
Number of times procedure performed by student		**1–4**	**5–9**	**>10**

Please grade the following areas using the scale below	**Below expectations**	**Borderline**	**Meets expectations**	**Above expectations**	**Unable to comment[1]**
1. Understands scientific principles of procedure, including basic science underpinning it					

Please grade the following areas using the scale below	Below expectations	Borderline	Meets expectations	Above expectations	Unable to comment[1]
2. Has read, understands and follows the appropriate standard operating procedures, risk and COSHH assessments, and any other relevant health and safety documentation					
3. Understands and applies the appropriate internal and external quality control associated with the procedure					
4. Understands the risks associated with items of equipment and uses them appropriately					
5. Completes associated documentation accurately					
6. Output meets accepted laboratory/professional standards					
7. Carries out the procedure within the appropriate time frame					

Please grade the following areas using the scale below	Below expectations	Borderline	Meets expectations	Above expectations	Unable to comment[1]
8. Is aware of the limitations of the test					
9. Demonstrates awareness of the limits of responsibility and when to seek advice					
10. Professionalism					

[1]Please mark this if you have not observed the behaviour.

FEEDBACK AND DOCUMENTATION OF LEARNING NEEDS	AGREED ACTION

Outcome	Satisfactory	Date of		Time taken for	

	Unsatisfactory		**assessment**		**assessment**	
Signature of assessor		**Signature of student**			**Time taken for feedback**	

A5.2: Case-based Discussion Template

Student identification data			
Brief description of output and focus of scenario discussed			
Module	**Insert title**	**Insert title**	**Insert title**
Complexity of the scenario	**Low**	**Average**	**High**

Assessor's name	
Assessor's position	

Please grade the following areas using the scale below	**Below expectations**	**Borderline**	**Meets expectations**	**Above expectations**	**Unable to comment**[1]
1. Understands clinical and/or scientific principles relevant to scenario					
2. Can discuss relevant health and safety issues					

Please grade the following areas using the scale below	Below expectations	Borderline	Meets expectations	Above expectations	Unable to comment[1]
3. Can discuss the procedures used to obtain the results					
4. Can discuss the quality control procedures to ensure the result is accurate					
5. Demonstrates a knowledge of relevant 'Best Practice' guidelines and other policies relevant to the scenario					
6. Can discuss the significance of routine patient results with reference to the reason for referral					
7. Is aware of, and can use as required, appropriate resources to aid in the interpretation of results					
8. Is aware of the importance of the audit trail and can complete the audit trail accurately					

Please grade the following areas using the scale below	Below expectations	Borderline	Meets expectations	Above expectations	Unable to comment[1]
9. Demonstrates awareness of the limits of responsibility and when to seek advice					
10. Professionalism					

[1]Please mark this if you have not observed the behaviour.

FEEDBACK AND DOCUMENTATION OF LEARNING NEEDS	AGREED ACTION

Outcome	Satisfactory Unsatisfactory		Date of assessment		Time taken for assessment	
Signature of assessor		Signature of student			Time taken for feedback	

A5.3: Observed Clinical Event Template

Student identification data			
Brief description of output and focus of scenario discussed			
Module	**Insert title**	**Insert title**	**Insert title**
Complexity of the scenario	**Low**	**Average**	**High**

Assessor's name	
Assessor's position	

Please grade the following areas using the scale below	**Below expectations**	**Borderline**	**Meets expectations**	**Above expectations**	**Unable to comment**[1]
1. History taking *Does the student obtain the information required prior to undertaking a procedure from the patient or a clinical colleague?*					
2. Communication skills *e.g. Does the student use language appropriate to the situation (verbal and/or body language) when explaining or discussing an aspect of clinical care (test results, diagnostic procedure, equipment repair at the bedside), do they check the understanding of the patient or their*					

Please grade the following areas using the scale below	**Below expectations**	**Borderline**	**Meets expectations**	**Above expectations**	**Unable to comment[1]**
colleague?					
3. Clinical examination skills *e.g. Does the student undertake a clinical skill, such as locating a vein for phlebotomy, performing a diagnostic test appropriately and accurately?*					
4. Clinical judgement *e.g. Is the procedure correct for the required outcome?*					
5. Scientific judgement *e.g. Was the choice of equipment appropriate for the required outcome, has it been correctly calibrated and any necessary settings correctly applied?*					
6. Professionalism *e.g. Did the student introduce themselves and their role or did they discuss the procedure/result with a colleague using appropriate language, considering any patient confidentiality or ethical issues?*					
7. Organisation and efficiency *e.g. Was the student well organised and efficient, ensuring all record keeping was appropriate and accurate; did they keep to time and ensure accurate recording of results; did they process the results in a timely fashion?*					

Please grade the following areas using the scale below	**Below expectations**	**Borderline**	**Meets expectations**	**Above expectations**	**Unable to comment[1]**
8. Overall clinical care *e.g. Did the student show respect, empathy and compassion for the patient and/or recognise the importance of the procedure/test within the care pathway for the patient or colleagues where the test contributes to a diagnosis, treatment or management?*					

For specific examples of opportunities where an OCE may be appropriate please visit the National School of Healthcare Science website (www.nshcs.org.uk/).

Appendix 6: Further Information

NHS Networks

An open network to share curricula produced for the Modernising Scientific Careers (MSC) programme.
www.networks.nhs.uk/nhs-networks/msc-framework-curricula/

Details of the Practitioner Training Programme including curricula from 2010/11 to 2015/16 can be found at:
www.networks.nhs.uk/nhs-networks/msc-framework-curricula/ptp

Details of the Practitioner Training Programme including curricula from 2016 onwards can be found at:
https://www.nshcs.hee.nhs.uk/

National School of Healthcare Science (NSHCS)

As part of the Modernising Scientific Careers (MSC) programme, the National School of Healthcare Science (the School) was established in October 2011 to support the implementation and delivery of the new healthcare science education and training programmes and to comply with the structures within 'Liberating the NHS: Developing Healthcare Workforce - Policy 16977 (January 2012)' acting on behalf of the Chief Scientific Officer (CSO) for England. It also provides some elements of support for the three other UK health departments.

On 1st April 2013, the School became part of Health Education England (HEE) and is hosted within the West Midlands.
The role of the NSHCS includes:

- Curricula management including assessment (new developments; review; fitness for purpose; version control etc);
- Coordination and monitoring of MSC Education and Training implementation;
- Quality management including accreditation of academic and work-based training environments;
- Monitoring and supporting the progress of trainees through the NSHCS themed boards (STP/HSST).

www.nshcs.org.uk

Chief Scientific Officer (CSO)

Source of information and news, including the CSO Bulletin, latest press releases, publications and consultations can be found at:
https://www.england.nhs.uk/tag/chief-scientific-officer/

Academy for Healthcare Science (AHCS)

The Academy for Healthcare Science (AHCS) brings together the UK's diverse and specialised scientific community who work across the health and care system including; NHS Trusts, NHS Blood and Transplant, Public Health England, independent healthcare organisations, and the academic sector across the UK.

The AHCS runs a Professional Standards Authority accredited Register for Healthcare Science Practitioners not covered by statutory regulation.
www.academyforhealthcarescience.co.uk/

Council of Healthcare Science in Higher Education (CHSHE)

The Council of Healthcare Science in Higher Education builds a unified identity of academic healthcare science by representing the interests of the sector. Working to improve and maintain quality in healthcare science education and training, the Council itself is made up of senior members of the academic healthcare science team. The work of the Council is also informed by two special interest groups made up of staff involved in the delivery and implementation of MSC programmes the PTP SIG and STP SIG.
www.councilofhealthcarescience.ac.uk/

Health and Care Professions Council (HCPC)

The Health and Care Professions Council is a regulator set up to protect the public. It keeps a register of health professionals who meet the HPC standards for their training, professional skills, behaviour and health.
www.hpc-uk.org/

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