Competences required for applicants to attain registration as Clinical Scientists

Modality: Medical Physics and Clinical Engineering

Experience: The candidate should be able to demonstrate that he/she has worked in an environment that has enabled the individual to receive training and gain experience relevant to the competences set out below.

1 - SCIENTIFIC

	Area of competence	Specific competencies
Sci1	understanding the science that underpins the specialty (modality) and the broader aspects of medicine and clinical practice	perform and advise on more complex procedures, measurements and calibrations critically appraise current procedures, applications and strategies within a particular discipline demonstrate an awareness and understanding of new developments and techniques specify, evaluate and commission an item of equipment, system or facility and produce protocols for its safe and effective introduction into service design and supervise construction of equipment not commercially available undertake research and development programmes using a range of skills to enable critical review of literature, formulation of hypothesis design and conduct of appropriate experiments and critical appraisal and dissemination of results
Sci2	demonstrating a strong base of knowledge appropriate to the specialty and to the investigations and therapeutic options available	
Sci3	experience of searching for knowledge, critical appraisal of information and integration into the knowledge base	
Sci4	ability to apply knowledge to problems associated with the routine provision, and development, of the service	
Sci5	ability to identify the clinical decision which the test/intervention will inform	
Sci6	ability to make judgements on the effectiveness of procedures	
Sci7	application of the knowledge base to the specialty (modality) and to the range of procedures/investigations available	

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Competences required for applicants to attain registration as Clinical Scientists

Modality: Medical Physics and Clinical Engineering

1 - SCIENTIFIC	
Achievement of:	an understanding of the physics, engineering and life sciences employed in the practice of Medical Physics and Clinical Engineering develop research skills and expertise to be able to identify problems, formulate hypotheses and develop experimental plans to resolve problems the ability to search the literature effectively and critically
Achieved through:	a structured taught element (e.g. an IPEM accredited MSc, lecture courses) and participation in appropriate (or equivalent) IPEM training programmes participation in local research meetings and national scientific meetings, and evidence of supervised and collaborative research initiatives, having the potential to contribute to PhD material the presentation of research and development of a standard suitable for publication
Assessed by:	the locally IPEM-nominated PATR co-ordinator and IPEM PATR assessor, or ACS-nominated supervisor and assessors (assuming that the IPEM postgraduate diploma is already obtained)

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2 - CLINICAL

	Area of competence	Specific competencies
Clin1	to understand the requirements of accuracy and precision of a procedure in the context of diagnosis, prognosis, monitoring and treatment and to use that information appropriately	understand the significance of diagnostic results and other data and be able to advise on the application of diagnostic or therapeutic techniques maintain an up-to-date knowledge of clinical practice within a particular discipline design, introduce and evaluate new or improved methods used in diagnosis, treatment and rehabilitation
Clin2	ability to provide interpretation of data and a diagnostic (therapeutic) opinion, including any further action to be taken by the individual directly responsible for the care of the patient	
Clin3	understanding of the wider clinical situation relevant to the patients presenting to his/her specialty	
Clin4	ability to develop/devise an investigation strategy taking into account the complete clinical picture	
Clin5	understanding of the clinical applications of his/her specialty and the consequences of decisions made upon his/her actions/advice	
Clin6	awareness of the evidence base that underpins the use of the procedures employed by the service	

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2 - CLINICAL	
Achievement of:	an understanding of normal physiology and anatomy and the pathology and mechanisms of disease an understanding of disease processes in areas relevant to the particular discipline standards of appearance, personal hygiene and behaviour that engender the trust and respect of patients and clinical colleagues an understanding of medical ethics as it applies to Medical Physics and Clinical Engineering
Achieved through:	a structured taught element (e.g. an IPEM accredited MSc, lecture courses) and participation in appropriate (or equivalent) IPEM training programmes participation in local research meetings and national scientific meetings, and evidence of supervised and collaborative research initiatives, having the potential to contribute to PhD material attendance at clinical meetings, grand rounds and clinical audit meetings self-endeavour (literature awareness) under tutelage of an appropriate supervisor
Assessed by:	the locally IPEM-nominated PATR co-ordinator and IPEM PATR assessor, or ACS-nominated supervisor and assessors (assuming that the IPEM postgraduate diploma is already obtained)

3 - TECHNICAL

	Area of competence	Specific competencies
Tech1	understanding of the principles associated with a range of techniques employed in the modality including the appropriate use of Information Technology	interpret and apply current legislation, codes of practice, guidance notes and related documents appropriate to a particular discipline interpret and apply appropriate standards, in particular British and European standards organise and conduct appropriate audits and surveys and demonstrate the consequence of such procedures review and analyse the results of quality control procedures and demonstrate an ability to discuss with others the findings, implications and actions required. take appropriate action in the case of incidents and accidents analyse and advise on health and safety issues within a particular discipline
Tech2	knowledge of the standards of practice expected from these techniques including positioning of patients for safe interventions	
Tech3	experience of performing these techniques	
Tech4	the ability to solve problems that might arise during the routine application of these techniques (troubleshooting)	
Tech5	understanding of the principles of quality control and quality assurance	
Tech6	experience of the use of quality control and quality assurance techniques including restorative action when performance deteriorates	

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3 - TECHNICAL

Achievement of:	an understanding of, and ability to apply, the principles and practice of Health and Safety at work to his/her own activities an understanding of, and ability to apply, the principles of quality assurance to his/her own work an ability to explain to others the outcome of QC processes and to implement the findings
Achieved through:	a structured taught element (e.g. an IPEM accredited MSc, lecture courses) and participation in appropriate (or equivalent) IPEM training programmes participation in local research meetings and national scientific meetings, and evidence of supervised and collaborative research initiatives, having the potential to contribute to PhD material self-endeavour (literature awareness) under tutelage of an appropriate supervisor practical instruction at bench level and participation in locally organised health and safety courses
Assessed by:	the locally IPEM-nominated PATR co-ordinator and IPEM PATR assessor, or ACS-nominated supervisor and assessors (assuming that the IPEM postgraduate diploma is already obtained)

4 - RESEARCH AND DEVELOPMENT

	Area of competence	Specific competencies
R&D1	ability to read and critically appraise the literature	critical assessment of recent literature in candidate's specialties carry out research projects as part of both the MSc and PATR which are presented both in the style of a postgraduate project report and a scientific paper oral presentation of project results to a group of peers either locally or at a national meeting
R&D2	ability to develop the aims and objectives associated with a project	
R&D3	ability to develop an experimental protocol to meet the aims and objectives in a way that provides reliable and robust data (i.e. free of bias)	
R&D4	ability to perform the required experimental work ability to produce and present the results (including statistical analysis)	
R&D5	recognise the value of research and has the ability to critically appraise results in the light of existing knowledge and the hypothesis developed and to formulate further research questions	
R&D6	ability to present data and provide a critical appraisal to an audience of peers – both spoken and written	

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4 – RESEARCH & DEVELOPMENT	
Achievement of:	present material effectively through reports, presentation and seminars communicate scientific material effectively to professional colleagues
Achieved through:	participation in local research meetings and national scientific meetings, and evidence of supervised and collaborative research initiatives, having the potential to contribute to PhD material self-endeavour (literature awareness) under tutelage of an appropriate supervisor
Assessed by:	the locally IPEM-nominated PATR co-ordinator and IPEM PATR assessor, or ACS-nominated supervisor and assessors (assuming that the IPEM postgraduate diploma is already obtained)

5 - COMMUNICATION

	Area of competence	Specific competencies
Com1	ability to assess a situation and act accordingly when representing the specialty	present material effectively in scientific publications and lectures contribute at a professional level to clinical teams demonstrate an ability to communicate and explain complex or sensitive issues to patients, relatives and staff demonstrate an involvement in the training, supervision and education of other staff
Com2	ability to respond to enquiries regarding the service provided when dealing with clinical colleagues	
Com3	ability to communicate with patients, carers and relatives, the public and other healthcare professionals as appropriate	
Com4	ability to communicate the outcome of problem solving and research and development activities	
Com5	evidence of presentation of scientific material at meetings and in the literature	

5 – COMMUNICATION

Achievement of:	Communicate effectively with clinical and professional colleagues understanding and practising the principles of confidentiality . present material effectively through reports, presentation and seminars . discuss appropriately with patients, procedures being undertaken . demonstrate an ability to work within a team
Achieved through:	a structured taught element (e.g. an IPEM accredited MSc, lecture courses) and participation in appropriate (or equivalent) IPEM training programmes participation in local research meetings and national scientific meetings, and evidence of supervised and collaborative research initiatives, having the potential to contribute to PhD material . peer reviewed publications
Assessed by:	the locally IPEM-nominated PATR co-ordinator and IPEM PATR assessor, or ACS-nominated supervisor and assessors (assuming that the IPEM postgraduate diploma is already obtained

6 - PROBLEM SOLVING

	Area of competence	Specific competencies
PS1	to assess a situation	utilise knowledge base of training to formulate a solution to a subject specific problem demonstrate the ability to assess the problem and prioritise actions to resolve it demonstrate an ability to communicate intended actions to people involved in or affected by the problem
PS2	determine the nature and severity of the problem	
PS3	call upon the required knowledge and experience to deal with the problem	
PS4	initiate resolution of the problem	
PS5	demonstrate personal initiative	

6 – PROBLEM SOLVING

Achievement of:	ability to tackle problems in a structured and pragmatic way taking account of associated safety issues discuss appropriately with co-workers and patients, steps being undertaken to resolve problems
Achieved through:	on-the-job assessment of response to day-to-day problems evidence of effective resolution of problems encountered during both knowledge and competency based elements of training
Assessed by:	the locally IPEM-nominated PATR co-ordinator and IPEM PATR assessor, or ACS-nominated supervisor and assessors (assuming that the IPEM postgraduate diploma is already obtained)

7 - PROFESSIONAL ACCOUNTABILITY

	Area of competence	Specific competencies
Prof1	Has read, understands and follows the Standards of Proficiency for Clinical Scientists and published by the Health Professions Council	must be able to recognise legal and ethical boundaries of the modality and practice and conduct research within these boundaries must be able to recognise the limits of his/her knowledge and skills must understand the principles of clinical governance and be able to audit, reflect on and review practice must understand the need for and basic requirements of accreditation schemes appropriate to the modality must understand the importance of effective communication with colleagues and be able to function as an effective member of a multidisciplinary team must understand the principles of appraisal and be able to supervise staff in his/her area of responsibility must participate in an appropriate CPD scheme (after completion of training) must have acquired a basic knowledge of health and safety requirements appropriate to the discipline must have acquired a basic understanding of the structure and organisation of the department, and relevant financial aspects.
Prof2	To be personally responsible for and must be able to justify their decisions	
Prof3	Understanding of the legal and ethical requirements of the modality, and the ethical aspects of scientific research.	
Prof4	Understands the need to practice safely and effectively within their abilities and can recognise the limits of personal practice and identify when to seek advice.	
Prof5	Ability to manage personal workload and prioritize tasks appropriately.	
Prof6	Can demonstrate competence in the principles of clinical governance including clinical audit, accreditation requirements relevant to the modality. This will include the importance of equality and diversity, confidentiality, informed consent and data security	
Prof7	Ability to contribute effectively to work undertaken as part of a multi-disciplinary team	
Prof8	Ability to supervise others as appropriate to area of practice. Understanding of the role of appraisal in staff management and development.	
Prof9	Understanding of the need and obligation for career-long self-directed learning and the importance of continuing professional development.	
Prof10	Understanding of the need for, and ability to establish and maintain, a safe practice environment. Understanding of the requirements and obligations of Health and Safety including infection control	
Prof11	Understanding of the structure and organization of the department and how it fits into the local clinical setting, General understanding of the way the modality is structured and practised in other locations within the UK. Basic understanding of the importance of financial accountability, budgetary control and resource management.	

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7 – PROFESSIONAL ACCOUNTABILITY	
Achievement of:	an understanding of the management principles and tools used in the service . the ability to act as a professional and work effectively as part of a team . understanding of the importance and principles of accreditation, audit, confidentiality, data security and safe working practice
Achieved through:	a structured taught element (eg approved MSc course or approved lecture programme), participation in appropriate training programmes and local courses on general, personnel and financial management, health and safety, audit, etc . participation in local seminars and meetings, attendance at clinical audit meetings and clinical governance committees. . attendance at departmental management meetings . involvement, under supervision, in management within the laboratory . mentoring by an experienced practitioner
Assessed by:	the nominated local supervisor and appropriate professional body external advisor/tutors