EVIDENCE MATRIX

Section 1: Programmes submitted

Scope of Application	
Accreditation subject area	*Transferable Skills Training*
Proposing HEI	*University of Warwick*
Department/Faculty/school etc.	*Postgraduate Certificate in Transferable Skills in Science, Faculty of Science.*
Programme title and titles of awards covered	*Postgraduate Certificate in Transferable Skills in Science* *Postgraduate Award in Transferable Skills in Science*
Programme duration	*3 years*
Date of HEI formal Approval	*October 2011*
Planned review date	*Annually*

Programme overview

The University of Warwick has established a Postgraduate Certificate in Transferable Skills in Science (PGCTSS) for Doctoral Researchers. The requirements of the certificate are designed to develop the key skills necessary for researchers to proceed to the next stage of a scientific career in academia, industry or other sectors. Programme is available to all Doctoral Students in the Faculty of Science, Engineering and Medicine at the University of Warwick.

Programme aims

The main aims of the PGCTSS are:

- To increase research effectiveness by developing research related skills
- To prepare researchers for future roles as senior scientists and team leaders
- To develop the skills to allow the researcher to exercise responsibility for, and leadership of, their research and exploring these skills in a variety of settings.

Postgraduate Certificate in Transferable Skills in Science (60 CATS) for Doctoral Researchers

The Postgraduate Certificate in Transferable Skills in Science for researchers is a 60 CATS certificate composed of a number of modules that help the scientist to identify and gain core skills for a career in science. The structure of the Certificate follows the scheme below:

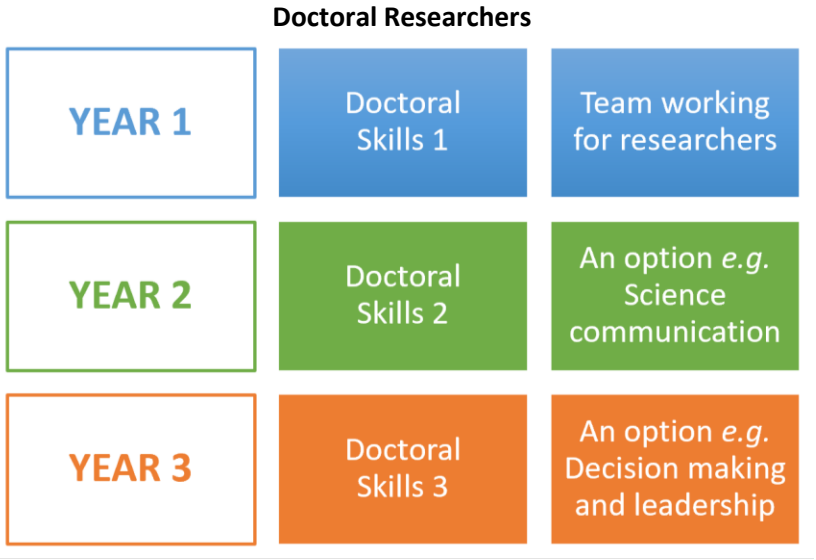

Figure 1. Illustrative structure of the PGCTSS programme for doctoral researchers.

Postgraduate Award in Transferable Skills in Science (30 CATS)

Students also have an option to take a Postgraduate Award in Transferable Skills in Science (30 CATS), usually composed of two Doctoral Skills modules and one optional module.

Doctoral Skills modules

Doctoral Skills modules are portfolio modules focusing on the skills and progression of graduates through their research project. Portfolio tasks get more advanced as the student progresses through years 1, 2 and 3.

Table 1. Summary of the tasks, combined into categories, as required for completion of Doctoral Skills modules in years 1, 2 and 3 of PhD.

Doctoral Skill tasks (see module handbooks and module proposals for more detail)	**Year 1**	**Year 2**	**Year 3**
Critical literature review Starting Literature Review – 5 Research papers Critical review of Recent Advances Critical Review of Manuscript	DS1A	DS2C	DS3D
Research planning and management Research Plan (including budget) in year 1, 2 and 3 Time Management Managing a Research Budget	DS1B	DS2A	DS3A, DS3B, DS3K
Research reports Year 1 Interim Research Report End of year 1 Research Report 18 Month Research report End of Year 2 Research Report Thesis Plan (at about 30 months) Scientific Writing Draft Thesis Chapter Scientific Writing: Report or paper	DS1C, DS1D	DS2B, DS2D	DS3C, DS3E, DS3F
Oral communication Year 1 Research Poster or Summary of Seminar to a General Audience or Teaching/Outreach Poster Marking/Postgraduate Presentation Assessment Poster or Oral Presentation Verbal Presentations	DS1E*, DS1G	DS2E	DS3H
Seminars/Keeping up with developments Summary of Seminar to a General Audience* Seminar Summaries Seminar Review Seminar Review for a General Reader	DS1E*, DS1F	DS2F, DS2G	
Teaching/Supervision/Mentoring Teaching/Outreach in years 1 and 2 Research Supervision/Undergraduate Teaching	DS1E*	DS2H	DS3L
Scientific networking Meeting Planning Networking Year 2 and Year 3	DS1H	DS2I, DS2J	DS3G

Event Organisation/ Meeting Planning			
Building professional profile Professional webpage years 1, 2 and 3 Career Development (CV)	DS1I	DS2K	DS3M, DS3N
Research applications/Intellectual Property			DS3I
Research ethics			DS3J

Optional modules

To complete the certificate, the researcher must also complete 3 × 10 CATS of optional modules. Optional modules consist of taught element, usually equivalent to 3 days of contact time and follow-up tasks collated in a module portfolio. Each module focuses on one aspect of transferrable skills development.

Table 2. List of optional modules available within the PGCTSS programme with an indication of availability at different stages of the programme.

Optional modules (see module handbooks and module proposals for more detail)	**Doctoral researchers**		
	Year 1	**Year 2**	**Year 3**
CH953: Team Working in a Research Environment	x		
CH954: Science Communication		x	
CH955: Decision Making and Leadership			x
CH957: Business, Innovation and Commercialisation for Researchers		x	x
CH934: Academic Scientific Writing: Writing focused scientific articles and reports	x	x	x
CH933: Academic Scientific Writing: Writing extended scientific articles and reports	x	x	x
CH973: Research Ethics and Practice	x	x	x
HR903: Bioscience, Politics and Social Acceptability	x	x	x
MA925: Practical Applications of Computational Techniques	x	x	x
CH961: Introduction to Teaching for Postgraduate in Sciences	x	x	
CH958: Project Management	x	x	x
LLxxx: Language Courses		x	x

Staff Structure

The PGCTSS programme is managed by a Programme Director, Dr Nikola Chmel, and has a dedicated part-time administrator, Ms Louise Hockenhull. The programme facilitators, leading on the individual modules are recruited both internally and externally. The programme is formally overseen by an exam board and an external examiner.

PGCTSS examination board membership:

Professor Michael Shipman – Chair
Dr Nikola Chmel – Secretary and Programme Director
Professor David Leadley - Physics
Professor Keith Leppard – Life Sciences
Dr Peter Gammon - Engineering
Dr Gareth Alexander – Complexity Science
Ms Louise Hockenhull – PGCTSS Administrator
Mr Charlie Cunningham – Senior Careers Consultant

PGCTSS external examiner 2015-2018: Professor Richard Layfield FRSC
PGCTSS external examiner 2019-2022: Dr Janet P. De Wilde CChem

Assessment procedures and Quality Assurance

Each module is assessed pass or fail, all the module components must be passed. Each module component is assessed by the researcher supervisor and/or mentor who gives feedback and signs off when completed. The whole module is then assessed by the Director of Graduate Studies and signed of as Pass when all the components are completed satisfactorily. The Certificate has an examination board with the external examiner who reviews a substantial portion of the submitted portfolios (usually about 1/3) and reviews the assessment quality and consistency across the programme.

The quality assurance of PGCTSS programme occurs via the normal University of Warwick mechanisms for assuring quality of its degrees and qualifications. This includes periodic reviews and audits by the relevant Boards of Studies and an annual examination board meeting following a detailed audit of each cohort of students by the external examiner who is appointed by the University Senate following a recommendation from the accrediting body (RSC, 2015-19).

Mentoring and support networks

Each programme student formally belongs to a Warwick Department or a CDT/DTP and as such belongs to the mentoring/support schemes available in their home department. As a minimum, each doctoral student has a supervisor and a two-member advisory panel. The Director of Graduate Studies in each department has an overview of training/activities of doctoral students in their Department.

Additional support and mentoring are available from: Doctoral College, SkillsForge, Student Opportunities (formerly Student Careers and Skills), Wellbeing Support, Human Resources and various informal support network including Doctoral and Postdoctoral societies, Student Staff Liaison Committee (SSLC) and the Students Union.

Supervisor Training
As required by home departments.

Recruitment and Selection
All doctoral students in the Faculty of Science, Engineering and Medicine at the University of Warwick are eligible to register on the programme.

Attributes mapping
The following matrices identify which attributes required for Chartered Status by RSB, RSC and IOP and for RSci Status are demonstrated throughout the developmental opportunities and through the evidence collected in students' portfolios.

Table 3. Chartered Physicist attribute mapping onto Doctoral Skills modules (see Tables 1 and 2 for task codes and the webiste for more details about each task).

		Critical literature review	Research planning and management	Research reports	Oral communication	Seminars/Keeping up with developments	Teaching/Supervision	Scientific networking	Building professional profile	Research applications/IP	Research ethics
You should demonstrate your ability to:											
A. Application of general and specialist knowledge	a) evaluate data critically, drawing logical conclusions;	X		X						X	
	b) apply a logical approach to problem solving;		X	X			X				
	c) apply a creative problem-solving approach to physics-related projects.		X	X			X				
In addition, you are asked to demonstrate your ability in two of the following areas:	d) exploit and/or develop emerging technologies to enhance current practices;	X	X	X		X					
	e) ensure continuing fitness for purpose of products and services;					X				X	

	f) publish in peer-reviewed scientific journals to further the understanding of the physics community;			X							
	g) promote innovation and technology transfer;					X				X	
	h) supervise undergraduate or post-16 physics project work;						X				
	i) design and deliver undergraduate programmes;						X				
	j) contribute to the profession outside your immediate working environment;					X		X			
	k) contribute to the public understanding of physics.						X				
B. Applying physics to the analysis and solution of problems	a) identify potential projects and opportunities using your physics knowledge;	X	X			X		X			
	b) conduct and document appropriate research and design possible solutions;		X	X							
	c) plan and implement solutions;		X								
	d) evaluate solutions and make improvements.	X	X			X					
C. Technical and managerial skills	a) plan for effective project implementation;		X								

	b) make effective use of all resources (such as people, time, finance, physics knowledge) and demonstrate leadership in carrying out tasks;		X				X				
	c) develop the capabilities of people for whom you are responsible, e.g. students, team members, to meet the demands of changing technical and managerial requirements;						X				
	d) bring about continuous improvement through quality management.		X				X				
D. Communication and interpersonal skills	a) communicate clearly and effectively with others at all levels, by both oral and written methods;			X	X			X			
	b) present and discuss concepts, ideas and plans convincingly and objectively with your superiors and others;				X			X			
	c) participate effectively within a team;		X				X				
	d) exert appropriate influence and effective leadership qualities.						X				

E. Professional conduct	a) carry out the continuing professional development necessary to ensure competence in your future career.					X		X			
	Note that anyone awarded CPhys after 31/12/11 will be required to submit evidence of their continuing professional development (CPD) every three years to retain the designation										
Doctoral Skills 1		DS1A	DS1B	DS1C, DS1D	DS1E*, DS1G	DS1E*, DS1F	DS1E*	DS1H	DS1I		
Doctoral Skills 2		DS2C	DS2A	DS2B, DS2D	DS2E	DS2F, DS2G	DS2H	DS2I, DS2J	DS2K		
Doctoral Skills 3		DS3D	DS3A, DS3B, DS3K	DS3C, DS3E, DS3F	DS3H		DS3L	DS3G	DS3M, DS3N	DS3I	DS3J

Table 4. Chartered Physicist attribute mapping onto PGCTSS optional modules (see Table 2 and the website for more details about each module).

		Team Working in a Research Environment	Science Communication	Decision Making and Leadership	Business, Innovation and Commercialisation for Researchers	Academic Scientific Writing: Writing focused scientific articles and reports	Academic Scientific Writing: Writing extended scientific articles and reports	Research Ethics and Practice	Bioscience, Politics and Social Acceptability	Practical Applications of Computational Techniques	Introduction to Teaching for Postgraduate in Sciences	Project Management	Language Courses
You should demonstrate your ability to:													
A. Application of general and specialist knowledge	a) evaluate data critically, drawing logical conclusions;				X								
	b) apply a logical approach to problem solving;	X			X					X			
	c) apply a creative problem-solving approach to physics-related projects.				X					X			
In addition, you are asked to demonstrate your ability in	d) exploit and/or develop emerging technologies to enhance current practices;												

two of the following areas:	e) ensure continuing fitness for purpose of products and services;				X								
	f) publish in peer-reviewed scientific journals to further the understanding of the physics community;		X			X	X						
	g) promote innovation and technology transfer;				X								
	h) supervise undergraduate or post-16 physics project work;										X		
	i) design and deliver undergraduate programmes;										X		
	j) contribute to the profession outside your immediate working environment;				X						X		
	k) contribute to the public understanding of physics.		X		X						X		
B. Applying physics to the analysis and solution of problems	a) identify potential projects and opportunities using your physics knowledge;	X			X								

	b) conduct and document appropriate research and design possible solutions;				X								
	c) plan and implement solutions;											X	
	d) evaluate solutions and make improvements.				X					X			
C. Technical and managerial skills	a) plan for effective project implementation;				X							X	
	b) make effective use of all resources (such as people, time, finance, physics knowledge) and demonstrate leadership in carrying out tasks;			X	X						X	X	
	c) develop the capabilities of people for whom you are responsible, e.g. students, team members, to meet the demands of changing technical and managerial requirements;										X		

	d) bring about continuous improvement through quality management.			X	X						X	X	
D. Communication and interpersonal skills	a) communicate clearly and effectively with others at all levels, by both oral and written methods;	X	X		X	X	X				X		X
	b) present and discuss concepts, ideas and plans convincingly and objectively with your superiors and others;	X	X		X						X		
	c) participate effectively within a team;	X	X		X						X		
	d) exert appropriate influence and effective leadership qualities.			X	X						X		
E. Professional conduct	a) carry out the continuing professional development necessary to ensure competence in your future career.	X	X	X	X	X	X	X	X	X	X	X	X

Table 5. Registered Scientist attribute mapping onto Doctoral Skills modules (see Tables 1 and 2 for task codes and the website for more details about each task).

		Critical literature review	Research planning and management	Research reports	Oral communication	Seminars/Keeping up with developments	Teaching/Supervision	Scientific networking	Building professional profile	Research application/IP	Research ethics
A. Application of knowledge: Identify and use relevant scientific understanding, methods and skills to address broadly-defined, complex problems	A1: Develop, maintain and extend a sound theoretical approach to application of science and technology in practice	X	X			X					
	A2: Apply underlying scientific concepts, principles and techniques in the context of new and different areas of work		X	X			X			X	
	A3: Analyse, interpret and evaluate relevant scientific information, concepts and ideas and to propose solutions to problem	X		X			X				
B. Personal responsibility: Exercise personal responsibility in planning and implementing tasks	B1: Work autonomously while recognising limits of scope of practice		X	X			X				
	B2: Take responsibility for safe working practices and contribute to their evaluation and improvement		X				X				
	B3: Promote and ensure the application of quality standards		X				X				
	B4: Take responsibility for planning and developing courses of action as well as exercising autonomy and judgement within broad parameters		X				X				

C. Interpersonal skills: Demonstrate effective communication and interpersonal skills	C1: Demonstrate effective and appropriate communication skills			X	X		X	X	X		
	C2: Demonstrate interpersonal and behavioural skills						X	X			
	C3: Demonstrate productive working relationships and an ability to resolve problems		X				X	X			
D. Professional practice: Apply appropriate theoretical and practical methods	D1: Identify, review and select scientific techniques, procedures and methods to undertake tasks	X	X								
	D2: Contribute to the organisation of tasks and resources		X				X				
	D3: Participate in the design, development and implementation of solutions		X	X			X				
	D4: Contribute to continuous performance improvement	X	X					X			
E. Professional standards: Demonstrate a personal commitment to professional standards	E1: Comply with relevant codes of conduct and practice		X	X						X	X
	E2: Maintain and enhance competence in own area of practice through professional development activity					X		X			
Doctoral Skills 1		DS1A	DS1B	DS1C, DS1D	DS1E*, DS1G	DS1E*, DS1F	DS1E*	DS1H	DS1I		
Doctoral Skills 2		DS2C	DS2A	DS2B, DS2D	DS2E	DS2F, DS2G	DS2H	DS2I, DS2J	DS2K		
Doctoral Skills 3		DS3D	DS3A, DS3B, DS3K	DS3C, DS3E, DS3F	DS3H		DS3L	DS3G	DS3M, DS3N	DS3I	DS3J

Table 6. Registered Scientist attribute mapping onto PGCTSS optional modules (see Table 2 and the website for more details about each module).

		Team Working in a Research Environment	Science Communication	Decision Making and Leadership	Business, Innovation and Commercialisation for	Academic Scientific Writing: Writing focused	Academic Scientific Writing: Writing extended	Research Ethics and Practice	Bioscience, Politics and Social Acceptability	Practical Applications of Computational Techniques	Introduction to Teaching for Postgraduate in	Project Management	Language Courses
A. Application of knowledge: Identify and use relevant scientific understanding, methods and skills to address broadly-defined, complex problems	A1: Develop, maintain and extend a sound theoretical approach to application of science and technology in practice												
	A2: Apply underlying scientific concepts, principles and techniques in the context of new and different areas of work				X								
	A3: Analyse, interpret and evaluate relevant scientific information, concepts and ideas and to propose solutions to problem				X					X			
B. Personal responsibility: Exercise personal responsibility in planning and implementing tasks	B1: Work autonomously while recognising limits of scope of practice			X	X			X	X			X	
	B2: Take responsibility for safe working practices and contribute to their evaluation and improvement												
	B3: Promote and ensure the application of quality standards							X					

	B4: Take responsibility for planning and developing courses of action as well as exercising autonomy and judgement within broad parameters	X		X	X							X	
C. Interpersonal skills: Demonstrate effective communication and interpersonal skills	C1: Demonstrate effective and appropriate communication skills	X	X		X	X	X				X		
	C2: Demonstrate interpersonal and behavioural skills	X	X	X							X		
	C3: Demonstrate productive working relationships and an ability to resolve problems	X		X							X		
D. Professional practice: Apply appropriate theoretical and practical methods	D1: Identify, review and select scientific techniques, procedures and methods to undertake tasks												
	D2: Contribute to the organisation of tasks and resources				X							X	
	D3: Participate in the design, development and implementation of solutions				X							X	
	D4: Contribute to continuous performance improvement			X							X	X	
E. Professional standards: Demonstrate a personal commitment to professional standards	E1: Comply with relevant codes of conduct and practice							X	X				
	E2: Maintain and enhance competence in own area of practice through professional development activity	X	X	X	X	X	X	X	X	X	X	X	X