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ROYAL AERONAUTICAL SOCIETY

Guidance for Academic Applicants for CEng Registration

Competence A should not be significantly different to the majority of applicants, with a similar profile to those following a corporate route – evidence of underpinning degree (most likely supplemented with a MSc/PhD level qualification in area of specialism), higher level teaching qualification (for instance, Postgraduate Certificate in Higher Education Teaching), professional development course attendance (internal and external).

Competence B should reflect the practical application of theoretical knowledge within the context of engineering research. Evidence could include holding UK Research Council (EPSRC/ESRC), European (FP7, ERC), TSB or industrially funded grants and presenting both the research implementation complemented with the identified 'pathway to impact' for the work (societal/industrial context of academic research). 'Pathway to Impact' statements (or similar) are becoming commonplace in the application procedures for many of the main research funding bodies, and require a clear demonstration of mapping of fundamental research through to end application area.

For example (fictitious examples):

B	1. Identify potential projects and opportunities	EP/xxxxxxxxx/1 As a follow on from earlier non-destructive testing work, I identified that ultrasonic waves produced from pulsed laser sources could be used for continuous monitoring of potential defects in aerospace composites. This was successfully presented to EPSRC as a research programme and has been funded for a period of three years.
		FP7/ xxxxxxxx Acoustic Modelling of Turbofan Ducts. This research programme was developed through a consortium to consider the development of new acoustic modelling approaches for turbofan ducts. I identified that there was a lack of understanding in predicting sound transmission in the new generation of composite acoustic liners, and I proposed this should be incorporated into the description of work to our industrial partners. I now lead a Work Package which is devoted to this topic.
		Workshop on NextGen ATM. As part of my work in ATM modelling, I identified that there was a lack of understanding of NextGen in my research team. I secured funding from my Head of School and invited speakers from academic/ ATM stakeholders in the US for a workshop to discuss the issues and identify areas of common interest.
	2. Conduct appropriate research, and undertake	EP/xxxxxxxxx/1 As the PI for this programme, I was responsible for the development of a robust system which could be used for the continuous monitoring of crack propagation using ultrasonic waves.

	design and development of engineering solutions	This was extensively tested and reported on through academic publications and conference presentations.
		PhD LES/DES modelling of cavity flows. During my PhD, I benchmarked the use of DES modelling approaches against other commonly used CFD modelling tools, and developed a 'best practice' for the use of DES for this type of problem. Approaches were validated through a series of supporting experimental tests and published in peer reviewed Aeronautical Journal.
	3. Implement design solutions, and evaluate their effectiveness	As WP lead for the development of a new modelling approach for sound transmission in acoustic liners, I was responsible for ensuring integration of the models with those developed in other WPs, and interfacing on a regular basis with other WP leaders to ensure consistency in methods and to identify conflicts in processes as early as possible.
		Test facility upgrade. As part of a major refurbishment of facilities within the university, I was responsible for identifying the technical need for a new test facility, liaising with contractors on specification and overseeing the installation of the new test cell. I developed the accompanying test procedure manual and evaluated the new test cell against the original specification.
		PhD Research. My PhD was industrially funded by xxxxx, and I was responsible for the implementation and testing of the improved baseline cost-time analysis model into the existing legacy systems, and to provide detailed guidance and training/documentation on the use of the new system.

Competence C should again have similarities to that which would be presented by a corporate applicant, although it is likely to be based on a number of smaller budget/team projects. Typical examples would be research council funding applications (project planning, manpower forecasting, justification of resources and financial projections), research grant management (financial management, funding body reporting, day-to-day project management including postgraduate/postdoctoral staff, staff mentoring/appraisals and training) and PhD student management (financial management, training facilitation and CPD for student, progress monitoring and evaluation).

For example (fictitious examples):

C	1. Plan for effective project implementation	EP/xxxxxxxxx/1 As part of preparation of a funding submission to EPSRC for an ultrasonic wave monitoring system, I was responsible for developing the statement of work, including manpower, facility and equipment needs and associated budgetary breakdown.
		As a PhD supervisor for three PhD research students, I identify potential work proposals that can be achieved within a three year period, development of initial work plans with students which are reviewed through regularly scheduled progress meetings, identification and planning of necessary training, and identification/management of financial support packages.
	2. Plan, budget, organise, direct	As the Principal Investigator for a Technology Strategy Board (TSB) funded research programme, I was responsible for the project plan and ensuring that work packages were progressing on schedule,

	and control tasks, people and resources	preparation and submission of quarterly financial statements, meetings with the TSB monitor to report on progress and preparation of yearly technical reports/final project report. I maintained the project risk register and identified strategies for dealing with areas of concern.
		As programme director for Aeronautical Engineering, I am responsible for the delivery of the educational programmes and their compliance with quality assurance standards. I lead the academic staff in delivery of the courses, planning teaching activities, workload allocation and planning of budgets on a yearly basis for the delivery of teaching related activities.
	3. Lead teams and develop staff to meet changing technical and managerial needs	All projects: As line manager for a team of five postdoctoral research fellows, I am responsible for both ensuring that staff members are completing technical objectives both on time and to standard, and ensuring that all staff are regularly appraised in order to discuss issues and to plan/report against CPD activities.
		As primary supervisor for two PhD students, I am responsible for regular monitoring of work, reporting and feedback on progress, identifying training opportunities and needs.
	4. Bring about continuous improvement through quality management	All research projects: For both postdoctoral and PhD students, I ensure that I have regularly scheduled meetings to discuss progress and to provide feedback on regular intervals to support staff and to enhance quality of output. I also encourage staff/students to participate in international conferences/forums in order to get regular peer feedback on work.
		All teaching activities: as an engineering lecturer, I participate in yearly module and pathway review activities in order to ensure that all taught engineering modules compile with accreditation requirements, and to engage in debate with colleagues on module content to ensure content remains relevant.

Competence D should again not be significantly different from any other category of applicant, typical examples including engagement with industrial partners, local schools, university-wide committees, professional societies, technical conference presentations, conference/journal paper publication.

Competence E should again be reasonably similar to most applications, highlighting how development as an engineering researcher has been followed to date, and how they anticipate continuing. For most academic applicants, there should be clear evidence of engagement with those outside of the university through a range of potential activities as this is a major activity in most academic departments (Open Days, Open Evenings, voluntary organisations such as Sentinus, WISE, etc).

For example (fictitious examples):

E	1. Comply with relevant codes of conduct	As PI for the industrially funded xxxxxx, I am responsible for the agreement of and compliance with non-disclosure agreements for commercially sensitive data.
		For all wind tunnel testing that is undertaken as part of grant agreement FP7/ xxxxxxxx, I am responsible for ensuring that all risk assessments are conducted prior to testing and that all Health and Safety codes are

		reviewed on a regular basis to maintain current awareness of regulations and impact on testing.
	2. Manage and apply safe systems of work	I conduct Control of Substances Hazardous to Health (COSHH) for all research programmes with particular responsibility for those which require the use of carbon nanotubes.
		All projects: When conducting any new testing, I am responsible for ensuring the completion of full risk assessments, and to liaise with the Health and Safety Officer when appropriate to ensure that all regulations are fully complied with.
	3. Undertake engineering activities in a way that contributes to sustainable development	When designing new test specimens, all designs are checked for material wastage and to reduce scrap material where at all possible. All test specimens are carefully stored post testing if re-use of components may be possible.
		Outreach programme: I am currently a member of our School outreach programme, which involves running engineering awareness days for local Schools with a range of environmentally focused engineering demonstrations.
	4. Carry out continuing professional development necessary to maintain and enhance competence in own area of practice	I successfully completed an MSc in Aerospace Vehicle Design from xxxxxx, which allowed me to gain a deeper insight into wider issues associated with the design and development of a broad spectrum of Aerospace Vehicles moving forward into my PhD research programme.
		I regularly attend the Royal Aeronautical Society Annual conference to both present ongoing work, and also to keep up to date with the latest research in my field.