

Competence Criteria for Incorporated Engineer Registration

The work of an Incorporated Engineer (IEng) is characterised by their ability to act as exponents of today's technology through creativity and innovation. To this end, they maintain and manage applications of current and developing technology, and may undertake engineering design, development, manufacture, construction and operation. Incorporated Engineers are engaged in technical and commercial management and possess effective interpersonal skills. They demonstrate a personal and professional commitment to society, to their profession, and to the environment.

The competence criteria set out the required skills and knowledge. They are based upon the Competence Statements issued by the Engineering Council (EC^{UK}) as part of UK-SPEC.

You will be expected to refer to all 16 competence criteria in your Engineering Practice Report, demonstrating that you are fully competent in at least 60% - 70% and that you have a knowledge and understanding of the remainder. Please note that the 60-70% applies to each subsection A-E.

A. Use a combination of general and specialist engineering knowledge and understanding to apply existing and emerging technology.

| No | Objective | Range | Evidence Examples |
|----|---|---|---|
| A1 | Maintain and extend a sound theoretical approach to the application of technology in engineering practice. This could include an ability to: | Identify the limits of one's personal knowledge and skills. Strive to extend one's technological capability. Broaden and deepen one's knowledge base through new applications and techniques. | Identify, through project involvement areas for personal development. Read technical journals via paper/electronic media. Attend courses and seminars. Participate in group peer reviews. Engage in post project analysis. Identify elements of sustainability and work towards reducing carbon emissions. |

| No | Objective | Range | Evidence Examples |
|----|---|--|---|
| A2 | Use a sound evidence-based approach to problem solving and contribute to continuous improvement. This could include an ability to: | Establish users' requirements for improvement. Use market intelligence and knowledge of technological developments to promote improve the effectiveness of engineering products, systems and services. Contribute to the evaluation and development of continuous improvement systems. | Establish effective ways of working with clients and users. Develop practical engineering solutions within project constraints. Evaluate solutions to practical and physical problems. Participate in team reviews and value engineering exercises. Disseminate information to others in a range of forms e.g. graphs, diagrams, written, spoken. Devise/Implement mid-course corrections. |

B. Apply appropriate theoretical and practical methods to design, develop, manufacture, construct, commission, operate and maintain engineering products, processes, systems and services.

| No | Objective | Range | Evidence Examples |
|----|---|---|--|
| B1 | Identify, review and select techniques, procedures and methods to undertake engineering tasks. This could include an ability to: | Select a review methodology Review the potential for enhancing engineering products, process, systems and services, using evidence from best practice. Establish an action plan to implement the results of the review. | Establish a clear client or project brief. Define problem or task to be undertaken. Use software or tabulated data in developing solutions. Discuss solutions with peer group or quality circle. Use spreadsheets to consolidate information. |
| B2 | Contribute to the design and development of engineering solutions. This could include an ability to: | Contribute to the identification and specification of design and development requirements for engineering products, processes, systems and services. Identify problems and evaluate possible engineering solutions to meet client needs. Contribute to the design of engineering solutions. | Identify possible routes to develop project to successful conclusion. Evaluate progress at key milestones for design/delivery. Present progress and solutions to others for discussion and development. Demonstrate presentation skills and critical thinking. Validate own solutions / ideas against similar schemes or problems. Use/evaluate innovative solutions/ new technology in specific projects with particular reference to sustainability and reduced carbon emissions. |

| No | Objective | Range | Evidence Examples |
|-----------|--|--|--|
| B3 | Implement design solutions and contribute to their evaluation. This could include an ability to: | Secure the resources required for implementation. Implement design solutions, taking account of cost, quality, safety, reliability, appearance, fitness for purpose and environmental impact. Identify problems during implementation and take corrective action. Contribute to the evaluation of design solutions. Contribute to recommendations for improvement. | Undertake project analysis to establish resource level required. Participate in active projects. Make progress reports to employer/client. Identify/report deficiencies. Receive/evaluate/deliver training in implementation techniques. Work directly or by secondment/placement on site-based activities or at manufacturers' works. Read manufacturers' literature. Attend manufacturers'/ suppliers' seminars or presentations. Participate in the analysis of a post-occupancy review |

C. Provide technical and commercial management

| No | Objective | Range | Evidence Examples |
|-----------|---|---|--|
| C1 | Plan for effective project implementation. This could include an ability to: | Identify the factors affecting the project implementation. Prepare and agree implementation plans and method statements. Secure the necessary resources and confirm roles in project team. Apply the necessary contractual arrangements with other stakeholders (client, subcontractors, suppliers, etc.) | Establish critical completion or review dates/programmes. Have experience of supervising others to co-ordinate activities with objectives. Assist in preparation of job/person specifications and job adverts. Participate in selecting team members, coach, and train and develop team spirit. Contribute to preparation/handling of handover/closing documentation. Assist client's budget projections by forecasting long-term life costs. Take account of effects of total life costing in bid analysis |
| C2 | Manage the planning, budgeting and organisation of tasks, people and resources. This could include an ability to: | Operate appropriate management systems. Work to the agreed quality standards, programme and budget. Manage work teams, coordinating project activities. Identify variations from quality standards, programme and budgets, and take corrective action. Evaluate performance and recommend improvements. | Analyse and predict resource level required having assembled programme, delivery dates and budget requirements. Schedule work against agreed targets and monitor progress. Engage in ongoing evaluation of building services engineering projects from conception to completion. Have experience of:- Factory acceptance tests, witness testing on site, role of regulatory authorities. Documentation/commissioning activity/setting to work of projects within the RAC sector. |

| No | Objective | Range | Evidence Examples |
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| C3 | Manage teams and develop staff to meet changing technical and managerial needs. This could include an ability to: | Agree objectives and work plans with teams and individuals. Identify team and individual needs, and plan for their development. Manage and support team and individual development. Assess team and individual performance, and provide feedback. | Prepare short, medium, long-term programmes to meet objectives. Have experience of working with colleagues, contemporaries and other professionals. Contribute to developing team spirit to achieve common objectives. Participate in appraisal process / HR development scheme such as Investors in People. Prepare project/progress reports. Supervise others. |
| C4 | Manage continuous quality improvement This could include an ability to: | Ensure the application of quality management principles by team members and colleagues. Manage operations to maintain quality standards. Evaluate projects and make recommendations for improvement. | Take part in quality circles or similar. Point to examples of QA success/shortfall. Be aware of /participate in achieving international quality benchmarks e.g. ISO. Participate in damage limitation /reparation when QA becomes compromised. Participate in post project reviews. |

D. Demonstrate effective interpersonal skills.

| No | Objective | Range | Evidence Examples |
|-----------|---|--|---|
| D1 | Communicate with others at all levels. This could include an ability to: | Contribute to, chair and record meetings and discussions. Prepare letters, documents and reports. Exchange information and provide advice to technical and non-technical colleagues. | Prepare agendas, participate in and minute meetings. Be confident in presenting ideas and information in written, electronic and verbal form. Develop communication channels with other team members and be familiar with document control and information transfer. Involve third parties e.g. manufacturers, professionals, construction teams in continuous dialogue. |
| D2 | Present and discuss proposals. This could include an ability to: | Prepare and deliver appropriate presentations. Lead and sustain debates with audiences. Feed the results back to improve the proposals. | Participate in receiving and developing a brief having due regard to cultural and commercial backgrounds of clients and colleagues. Develop and practice skills in presentation e.g. appropriate software, flip charts, overheads, having prepared the material. Attend seminars, courses, feed back knowledge gained, ask questions and debate answers. |

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| D3 | Demonstrate personal and social skills. This could include an ability to: | Know and manage one's own emotions, strengths and weaknesses. Be aware of the needs and concerns of others. Be confident and flexible in dealing with new and changing interpersonal situations. Identify, agree and work towards collective goals. Resolve conflicts and create, maintain and enhance productive working relationships. | Select and use a variety of communications styles e.g. formal, informal. Write for different uses e.g. memos, formal letters, reports, e-mails, minutes. Exhibit listening skills and contribute to solution of problems. Develop inter-personal skills e.g. assertiveness, negotiation, compromise and dealing with conflict. Have the ability to communicate in a foreign language. |
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E. Demonstrate a personal commitment to professional standards, recognising one's obligations to society, the profession and the environment.

| No | Objective | Range | Evidence Examples |
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| E1 | Comply with relevant codes of conduct. This could include an ability to: | Comply with the rules of professional conduct of one's own professional body. Work constructively within all relevant legislation, including social and employment legislation. | Examine, digest and abide by the relevant Codes of Conduct. Exercise all reasonable professional skill and care. Give due regard to ECUK guidelines where appropriate Be professionally competent. Obtain and maintain a working knowledge of all relevant current and impending legislation and codes of practice that will impact on your work. Research, read and participate in the activities of the Institute. |
| E2 | Manage and apply safe systems of work This could include an ability to: | Identify and take responsibility for one's own obligations for health, safety and welfare issues Ensure that systems satisfy HS&W requirements Develop and implement appropriate hazard identification and risk management systems Manage, evaluate and improve these systems | Be aware of your employer's Health and Safety Policy as it relates to you personally and to your responsibilities for the safety of others, Participate in providing information for the Health and Safety plan for projects and to comply with the Construction (Design & Management) Regulations (CDM). Be familiar with safe systems of work and method statements for the execution of work and permits to work system |

| No | Objective | Range | Evidence Examples |
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| E3 | Undertake engineering activities in a way that contributes to sustainable development This could include an ability to: | Operate and act responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously Use imagination, creativity and innovation to provide products and services which maintain and enhance the quality of the environment and community, and meet financial objectives Understand and encourage stakeholder involvement | Actively promote solutions and designs that support sustainability in materials and energy sources. Actively engage in the process of reducing carbon emissions by reducing energy requirements Use prudent design techniques and innovation. Where possible, use sustainable technologies such as photovoltaics, wind power, biomass etc. |
| E4 | Carry out continuing professional development necessary to maintain and enhance competence in one's area of practice. This could include an ability to: | Undertake reviews of one's development needs Prepare action plans to meet personal and organisational objectives Carry out planned (and unplanned) CPD activities Maintain evidence of competence development Evaluate CPD outcomes against the action plans Assist others with their own CPD. | Be involved with IOR activities. Read professional journals, attend employer and other development seminars. Plan own immediate, medium and long term CPD. Establish links with local training/education providers. Advise others on building services engineering careers. Monitor and foster the career development of others Access information sources for learning opportunities. Transfer skills between professional and personal life. |