Code	Competence heading	Description
А	REFLECTION AND SELF-AWARENESS	
A1	Understanding the nature of knowledge and competence	Understand the qualities of different kinds of knowing, understanding, know-how, values, skills and competences and how they inter-relate and reinforce each other
A2	Reflection on own action	Reflect upon and evaluate own actions and knowledge; learn from own professional practice, from successes and mistakes
В	ETHICS, PRINCIPLES AND VALUES	
B1	Follow an accepted code of ethics	
B1.1	Consideration of ethical issues and values	Incorporate into judgements consideration of ethical issues, values and the role of the profession in society
B1.2	Commitment to own profession	Act to uphold the honour, integrity and dignity of the profession, demonstrating commitment to positive development of the profession, for the benefit of the wider community
B1.3	Recognition of limits of own competence	Generally perform work independently only in areas of proven competence; when operating in areas of developing competence, or where research is required, be open about the facts, and seek appropriate support
B1.4	Fair competition	Build professional reputation on merit, not compete unfairly
B1.5	Objectiveness and truthfulness	Give evidence, express opinions or make statements in an objective and truthful manner and on the basis of adequate knowledge, particularly when it might be assumed that such statements are made within the professional role
B1.6	Equality	Ensure equitable practice (e.g. non-discrimination)
B1.7	Personal integrity and honesty	Show at all times personal integrity, honesty and respect for others, and consistency between behaviour and expressed attitudes
B1.8	Independence and self-reliance	Show independence and self-reliance
B1.9	Avoiding conflicts of interest	Avoid personal matters affecting professional conduct or judgement
B1.10	Personal sense of purpose and vision	Engage a personal sense of purpose and vision
B1.11	Maintaining personal standards	Maintain self-imposed high standards, excellence and attention to detail, while being able to adjust to real constraints for the achievement of practicable outcomes
B2	Exercise duty of care to clients and the commu	nity
B2.1	Responsibility for public welfare, health, safety	Place responsibility for the welfare, health and safety of the community at all times before responsibility to the profession, to sectional interests (including the client), or to other professionals
B2.2	Professional loyalty and reliability	Apply professional skill in the interests of employer, client, and the wider community acting in professional matters as a faithful agent or trustee
B2.3	Client care and communication	Check that the client's brief, wishes and views are fully understood, taken into account, and responded to, and that the client is kept informed and consulted
B2.4	Confidentiality and personal integrity	Respect confidentiality, and avoid making improper use of privileged information and professional relationships, consistent with retaining the highest standards of personal integrity
B2.5	Trust and confidence	Develop trust and confidence, influencing decisions in the absence of formal authority
B3	Develop and promote environmental principles	·
B3.1	Consider environmental impact	Incorporate into judgements consideration of environmental impact
B3.2	Recognition of diversity of ecosystems	Recognise that ecosystem interdependence and diversity form the basis for continued human existence
B3.3	Recognition of finite capacity of the environment	Recognise the finite capacity of the environment to assimilate human-made changes
B3.4	Promote environmental actions in engineering	Promote the actions required in engineering practice to improve, sustain and restore the environment
B3.5	Waste minimisation, recycling, and alternatives	Promote the wise use of non-renewable resources through waste minimisation, recycling and the development of alternatives wherever possible
B3.6	Minimise use of raw materials and energy	Strive to achieve the beneficial objectives of engineering work with the lowest possible consumption of raw materials and energy, the use of low embodied-energy products, and by adopting sustainable management practices
B3.7	Take account of total lifecycle implications	Take account of total life-cycle implications of products and projects in relation to the environment

COMPETENCE FRAMEWORK

B3.8	Take account of effects on culture and heritage	Take account of possible effects of engineering work on likely cultural or heritage factors
B4	Assume professional responsibility for own a	ctions
B4.1	Quality and consequences of own and others' work	Accept responsibility for the quality and consequences of own work and for the work of others for whom accountable
B4.2	Professional risks and liabilities	Take account of potential professional risks and liabilities, and accept responsibility for them
B4.3	Operate safely at all times	Operate safely at all times, including in uncertain and risk-prone circumstances, taking care of others
B4.4	Occupational health and safety requirements	Implement appropriate occupational health and safety requirements
B4.5	Community safety requirements	Investigate community safety requirements and act to solve any incipient safety problems
B4.6	Appropriate precautions in hazardous operations	Take appropriate precautions when dealing with hazardous operations
B4.7	Disaster prevention, mitigation, recovery methods	Take account of disaster prevention, mitigation and recovery methods

C GENERIC PROFESSIONAL COMPETENCES, common to all professions

C1	Maintain and develop own expertise	
C1.1	Manage own continuing professional development	Manage and pursue own continuing professional development in relation to professional goals and/or corporate strategic objectives
C1.2	Acquire and maintain broad general education	Acquire and maintain the broad education necessary to understand the impact of engineering solutions in the widest context, and a knowledge of historical and contemporary issues
C1.3	Understand appropriate engineering competences	Have a comprehensive understanding of and acquire the appropriate engineering competences (see Sections D, E and F) and the relevant knowledge, including critical evaluation and relevant know-how covering when and how to apply it
C1.4	Know own limitations and seek external help	Know the limitations of own competence and recognise when, where and how to search for additional information, help or expertise
C1.5	Learn from other people, sources, media	Learn from other people and from a variety of sources and media
C1.6	Maintain career development plan	Work out and maintain a career development plan, mapping out a plan for acquiring learning in the professional as well as the private domains
C1.7	Maintain record of professional development	Maintain record of professional development activities (Record of Achievement), identifying the learning achieved
C2	Develop new professional knowledge	
C2.1	Assess existing knowledge, know-how and competence	Audit and assess existing knowledge, know-how and competence
C2.2	Pursue independent research	Pursue independent research, where knowledge and expertise required is not available: for the resolution of immediate problems, in pursuit of excellence, for own professional development, and for the development of the profession
C3	Develop and mentor others	
C3.1	Know competence of others	Know the areas of competence of others and when to involve them
C3.2	Give constructive feedback	Give a lead and constructive feedback to others
C3.3	Encourage subordinates to advance their expertise	Actively aid and encourage subordinates to advance their knowledge and experience
C3.4	Develop competences of colleagues, subordinates	Consciously develop competences of colleagues, particularly concentrating on subordinates
C3.5	Help colleagues develop their own thinking	Help all colleagues and peers to clarify and develop their own thinking, enabling them to build on each other's ideas
C3.6	Determine training needs and plans for others	Identify and determine training needs and plans for others
C3.7	Review effectiveness of training and development	Review effectiveness of work-place training and development programmes and activities
C4	Self management	
C4.1	Develop teamwork, awareness of self and others	Focus on the development of teamwork skills, self awareness, and awareness of others
C4.2	Suspend action to reflect, maintain self-control	Suspend judgement and action for the sake of reflection and understanding, maintaining self-control
C4.3	Monitor own professional performance and impact	Self-monitor professional performance and impact, employing critical appraisal
C4.4	Produce accurate accounts of own practice	Produce accurate accounts of own professional practice

C4.5	Tolerate ambivalent feelings, motives, uncertainty	Tolerate ambivalent feelings and motives, and uncertainty about the outcomes of a situation
C4.6	Express thoughts and feelings with integrity	Express thoughts and feelings with integrity in a situation, in an authentic and honest manner, while sustaining professional role
C4.7	Awareness of effect of feelings on work situations	Be aware of the effect of own and others' feelings on work situations
C4.8	Time management	Practise effective time management
C5	Team work: work as a member of and lead a t	eam
C5.1	Collaborate to achieve shared purposes, interests	Engage the collaboration of others in the pursuit of shared purposes or reciprocal interests
C5.2	Listen and contribute in diverse environments	Listen and contribute fully in multi-disciplinary, inter-disciplinary and multi- cultural environments
C5.3	Read social situations and adapt action	Read social situations and adapt action to them
C5.4	Accept feedback	Accept feedback from others, taking account of other points of view
C5.5	Respect others' ideas and divergent views	Allow colleagues freedom to express their own ideas, protecting the expression of divergent views
C6	Communication and representation in the pro	fessional role
C6.1	Effective and relevant communication	Communicate effectively, with relevance, sensitivity to context and audience, with conciseness and focus, using appropriate concepts, conventions and symbols in the spoken, written and drawn media in the language adopted for official and professional usage
C6.2	Effective listening	Listen effectively, providing feedback.
C6.3	Presentation of professional information	Prepare, interpret and present professional information
C6.4	Internal and external networking	Liaise with colleagues and experts within and beyond the organisation
C6.5	Interpretation of engineering instructions	Correctly interpret engineering instructions received
C6.6	Instructing subordinates	Issue clear and accurate instructions to subordinates
C6.7	Select appropriate communication methods	Select appropriate methods of communication
C6.8	Communication in foreign languages	Communicate effectively in professional settings in other relevant foreign languages
C6.9	Negotiating, advising and influencing	Communicate and negotiate with, advise and influence individuals and groups both
		inside and outside own organisation
C7	Management and business: Manage people, r	inside and outside own organisation esources, projects and business affairs
C7 C7.1	Management and business: Manage people, r Management of tasks, people or resources	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources
C7 C7.1 C7.1.1	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources
C7 C7.1 C7.1.1 C7.1.2	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources
C7 C7.1 C7.1.1 C7.1.2 C7.1.3	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates
C7 C7.1 C7.1.1 C7.1.2 C7.1.3 C7.1.4	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates
C7 C7.1 C7.1.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates
C7 C7.1 C7.1.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required
C7 C7.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7	Management and business: Manage people, rManagement of tasks, people or resourcesSet and implement work objectives and prioritiesDetermine methods of approachAnalyse work for resource estimatesMake time, resource and cost estimatesOrganise small work teamsLead technical or other personnelMonitor tasks to ensure planned performance	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required
C7 C7.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.7	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management
C7 C7.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7 C7.2	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management Economic evaluation of work undertaken	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management Perform economic evaluation tasks in relation to work undertaken
C7 C7.1 C7.1.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7 C7.2 C7.2.1	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management Economic evaluation of work undertaken Legal implications of work undertaken	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management Perform economic evaluation tasks in relation to work undertaken Recognise legal implications of work undertaken
C7 C7.1 C7.1.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7 C7.2 C7.2.1 C7.2.3	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management Economic evaluation of work undertaken Legal implications of work undertaken Apply appropriate regulations	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management Perform economic evaluation tasks in relation to work undertaken Recognise legal implications of work undertaken Recognise, interpret and apply appropriate regulations
C7 C7.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7 C7.2 C7.2.1 C7.2.3 C7.2.4	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management Economic evaluation of work undertaken Legal implications of work undertaken Apply appropriate regulations Marketing	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management Perform economic evaluation tasks in relation to work undertaken Recognise legal implications of work undertaken Recognise, interpret and apply appropriate regulations Assess marketing needs, define and implement marketing strategies
C7 C7.1 C7.1.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7 C7.2 C7.2.1 C7.2.3 C7.2.4 C7.2.5	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management Economic evaluation of work undertaken Legal implications of work undertaken Apply appropriate regulations Marketing Risk assessment	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management Perform economic evaluation tasks in relation to work undertaken Recognise legal implications of work undertaken Recognise, interpret and apply appropriate regulations Assess marketing needs, define and implement marketing strategies Carry out risk assessment tasks
C7 C7.1 C7.1.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7 C7.2 C7.2.1 C7.2.3 C7.2.4 C7.2.5 C7.2.6	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management Economic evaluation of work undertaken Legal implications of work undertaken Apply appropriate regulations Marketing Risk assessment Business management	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management Perform economic evaluation tasks in relation to work undertaken Recognise legal implications of work undertaken Recognise, interpret and apply appropriate regulations Assess marketing needs, define and implement marketing strategies Carry out risk assessment tasks Recognise business needs of enterprise and act on them in terms of costs, time, and other factors
C7 C7.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7 C7.2 C7.2.1 C7.2.3 C7.2.4 C7.2.5 C7.2.6 C7.2.7	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management Economic evaluation of work undertaken Legal implications of work undertaken Apply appropriate regulations Marketing Risk assessment Business planning	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management Perform economic evaluation tasks in relation to work undertaken Recognise legal implications of work undertaken Recognise, interpret and apply appropriate regulations Assess marketing needs, define and implement marketing strategies Carry out risk assessment tasks Recognise business needs of enterprise and act on them in terms of costs, time, and other factors Assess and prepare business plans
C7 C7.1 C7.1.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7 C7.2 C7.2.1 C7.2.3 C7.2.4 C7.2.5 C7.2.6 C7.2.7 C7.2.7	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management Economic evaluation of work undertaken Legal implications of work undertaken Apply appropriate regulations Marketing Risk assessment Business planning Manage human resources	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management Perform economic evaluation tasks in relation to work undertaken Recognise legal implications of work undertaken Recognise, interpret and apply appropriate regulations Assess marketing needs, define and implement marketing strategies Carry out risk assessment tasks Recognise business needs of enterprise and act on them in terms of costs, time, and other factors Assess and prepare business plans Manage human resources
C7 C7.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7 C7.2 C7.2.1 C7.2.3 C7.2.4 C7.2.5 C7.2.6 C7.2.7 C7.3 C7.3.1	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management Economic evaluation of work undertaken Legal implications of work undertaken Apply appropriate regulations Marketing Risk assessment Business planning Manage human resources Occupational health and safety	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management Perform economic evaluation tasks in relation to work undertaken Recognise legal implications of work undertaken Recognise, interpret and apply appropriate regulations Assess marketing needs, define and implement marketing strategies Carry out risk assessment tasks Recognise business needs of enterprise and act on them in terms of costs, time, and other factors Assess and prepare business plans Manage human resources Comply with occupational health and safety requirements
C7 C7.1 C7.1.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7 C7.2 C7.2.1 C7.2.2 C7.2.3 C7.2.4 C7.2.5 C7.2.6 C7.3.1 C7.3.2	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management Economic evaluation of work undertaken Legal implications of work undertaken Apply appropriate regulations Marketing Risk assessment Business planning Manage human resources Occupational health and safety Performance appraisal	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management Perform economic evaluation tasks in relation to work undertaken Recognise legal implications of work undertaken Recognise, interpret and apply appropriate regulations Assess marketing needs, define and implement marketing strategies Carry out risk assessment tasks Recognise business needs of enterprise and act on them in terms of costs, time, and other factors Assess and prepare business plans Manage human resources Comply with occupational health and safety requirements Perform performance appraisal of subordinates
C7 C7.1 C7.1.1 C7.1.2 C7.1.3 C7.1.4 C7.1.5 C7.1.6 C7.1.7 C7.2 C7.2.1 C7.2.2 C7.2.3 C7.2.4 C7.2.5 C7.2.6 C7.3.1 C7.3.2 C7.3.3	Management and business: Manage people, r Management of tasks, people or resources Set and implement work objectives and priorities Determine methods of approach Analyse work for resource estimates Make time, resource and cost estimates Organise small work teams Lead technical or other personnel Monitor tasks to ensure planned performance Finance, law, marketing, business management Economic evaluation of work undertaken Legal implications of work undertaken Apply appropriate regulations Marketing Risk assessment Business planning Manage human resources Occupational health and safety Performance appraisal Equal opportunities	inside and outside own organisation esources, projects and business affairs Plan, organise, direct and control tasks, people or resources Analyse work to be performed to provide the basis for resource estimates Analyse work to be performed to provide the basis for resource estimates Exercise leadership of engineers, technical or other personnel where required Monitor tasks to ensure activities performed as planned, and take corrective action as required Perform economic, financial, legal, marketing and business management Perform economic evaluation tasks in relation to work undertaken Recognise legal implications of work undertaken Recognise, interpret and apply appropriate regulations Assess marketing needs, define and implement marketing strategies Carry out risk assessment tasks Recognise business needs of enterprise and act on them in terms of costs, time, and other factors Assess and prepare business plans Manage human resources Comply with occupational health and safety requirements Perform performance appraisal of subordinates Comply with equal opportunity requirements

C7.4	Apply project management principles	Apply project management principles
C7.4.1	Project monitoring and planning	Undertake project monitoring and planning tasks
C7.4.2	Work breakdown	Develop work breakdown structure
C7.4.3	Critical path analysis, work scheduling	Prepare critical path or work schedules
C7.4.4	Progress monitoring	Monitor progress, investigate departures from schedule and initiate corrective action

D	GENERIC ENGINEERING COMPETENCE	S, common to all professional engineers
D1	Professional engineering practice	
D1.1	Solve engineering problems	Solve engineering problems
D1.1.1	Exercise original thought	Exercise original thought in synthesising satisfactory outcomes to engineering challenges
D1.1.2	Exercise professional judgement	Exercise professional judgement in making engineering decisions
D1.1.3	Work of a creative and innovative nature	Undertake work of a creative and innovative nature
D1.1.4	Recognise and solve problems	Recognise and solve engineering problems
D1.1.5	Interdisciplinarity and multidisciplinarity	Extend knowledge of related disciplines or fields and foster cooperation across discipline boundaries when working in a multidisciplinary environment
D1.1.6	Investigating needs and opportunities	Investigate needs and exploit opportunities within a particular industry or area of expertise
D1.1.7	Identifying and framing problems	Identify, frame and reframe problems so that they are amenable to solution
D1.1.8	Generating innovative solutions	Generate a range of innovative solutions, evaluate them and choose between them
D1.1.9	Sound, practical judgement	Reach sound, practical judgements even in response to complex, changing, ambiguous and unpredictable situations
D1.1.10	Applying learning to new contexts and situations	Apply learning to new contexts and new situations; relate experience to general principles; establish links between different kinds of knowledge; formulate theories to explain new observations and use them in a purposeful way
D1.1.11	Effective use of technology	Use technology effectively, responding appropriately to constraints and limitations
D1.1.12	Initiative, responsiveness, decisiveness	Take initiative, and show responsiveness, decisiveness and tenacity, focusing on a given objective; recognising at the same time that all professional judgements are open to question, and consequently be adaptable, innovative and flexible, with a capacity to facilitate compromise and evaluate potential outcomes
D1.2	Apply engineering methods	
D1.2.1	Identifying engineering applications	Identify engineering applications
D1.2.2	Resolution of identified applications	Propose concepts for resolution of identified engineering applications
D1.2.3	Specification of engineering applications	Specify selected engineering applications
D1.2.4	Documentation and recording of outcomes	Control the currency of documentation recording outcomes
D1.2.5	Assessing acceptance and future requirements	Assess user acceptance and future requirements
D1.3	Apply quality management principles	
D1.3.1	Implementation of quality system	Implement or contribute to quality system
D1.3.2	Foster the acceptance of quality management	Foster the acceptance by subordinates and colleagues of quality management principles
D1.3.3	Work to appropriate quality standards	Perform work to appropriate quality standards
D1.3.4	Quality control and assurance techniques	Apply quality control and assurance techniques
D1.3.5	Best-practice quality systems	Create and follow best-practice quality systems, in terms both of quality assurance and quality control, ensuring that work is fit for purpose
D1.4	Use appropriate engineering and technological aids	
D1.4.1	Mathematical analysis, simulations, modelling	Select and use mathematical analysis, engineering science, computer simulations or other modelling techniques
D1.4.2	Computer systems applications	Select and utilise computer systems applications
D1.4.3	Software programming and use	Direct and undertake software programming and utilisation tasks
D1.4.4	Use of technological tools	Select and use technological aids and monitor their performance

D1.5	Conduct testing, measurement and evaluation	
D1.5.1	Definition of test objectives	Define test objectives
D1.5.2	Test procedures and schedules	Devise test procedures and schedules
D1.5.3	Measurement procedures and equipment	Develop measurement procedures and equipment
D1.5.4	Critical engineering tests and measurements	Undertake critical engineering tests and measurements
D1.5.5	Non-critical tests and measurements	Supervise non-critical tests and measurements
D1.5.6	Evaluation of test results	Evaluate results of tests and measurements
D2	Engineering planning, design and documenta	tion
D2.1	Definition of engineering design requirements	Clarify and define engineering design requirements
D2.1.1	Negotiation of initial specification or brief	Negotiate initial specification or brief in terms of client perceptions and engineering realities
D2.1.2	Functional design requirements analysis	Perform functional design requirements analysis
D2.1.3	Design for performance, reliability, maintenance	Address design concepts such as performance, reliability, maintainability and ergonomics
D2.1.4	Impact of design factors	Determine impact on design of factors such as production, construction, installation, commissioning, life cycle implications, logistic support and training of users.
D2.1.5	Design constraints: liability, environment,	Determine possible constraints, such as product liability legislation, the effect of the external physical environment on the item to be designed, or the effect of that item on the environment, and take appropriate measures as a consequence
D2.1.6	Design standards and specifications	Use engineering design standards and specifications, and write functional specifications
D2.2	Preparation of concept proposals	Prepare concept proposal to meet requirements
D2.2.1	Creativity and initiative in design	Exercise creativity and initiative in investigating, analysing and conceptualising possible concepts to meet design objectives
D2.2.2	Analysis of concepts for design, assessing impact	Analyse promising concepts for final design to assess impacts of factors such as performance, reliability and maintainability
D2.2.3	Identification of problem areas	Identify possible problem areas and negotiate modifications or adaptations to the design brief if necessary
D2.2.4	Cost-benefit and risk analysis, feasibility,	Undertake cost-benefit and risk analyses, feasibility studies and life-cycle costing to produce a workable design
D2.2.5	Proposal preparation and documentation	Prepare and recommend for implementation a documented proposal to meet client or manufacturing requirements
D2.3	Design work or commissioning	Perform or arrange for design of selected proposal
D2.3.1	Significant design tasks	Undertake or arrange for significant design tasks
D2.3.2	Analysis for components and materials	Perform or arrange for analysis to select components and materials
D2.3.3	Engineering specifications of design outcome	Prepare and check engineering specifications of design outcome
D2.4	Design evaluation	Perform design evaluation
D2.4.1	Physical or computer modelling	Demonstrate the design by physical or computer models
D2.4.2	Design test scheduling	Prepare design test schedules for performance and physical environmental testing
D2.4.3	Test result analysis	Oversee testing, analyse test results and recommend or arrange corrective action to overcome any shortcomings revealed.
D2.4.4	Effect evaluation	Evaluate effects on external environment
D2.4.5	Consultation on design evaluation	Participate in consultation with affected parties on design evaluation
D2.5	Supporting documentation	Prepare supporting documentation
D2.5.1	Preparation of documentation	Prepare supporting documentation for production or construction, installation, operation, maintenance and training
D2.5.2	Editing and checking of documentation	Edit and check supporting documentation
D2.6	Maintenance of design documentation	Maintain integrity of design documentation
D2.6.1	Identification of designed item by documentation	Identify designed item by appropriate engineering design documentation and records
D2.6.2	Changes in documentation	Recommend proposed changes for approval for incorporation in a controlled manner

D2.6.3	Design record maintenance	Ensure all engineering design records are maintained as a true description of the designed item
D2.7	Present, report on and advocate engineering ideas	Present, report on and advocate engineering ideas
D2.7.1	Professional lectures	Prepare and present lectures at a professional level
D2.7.2	Publications and papers	Prepare papers for publication in Professional Engineering journals
D2.7.3	Communication of engineering information	Communicate engineering information effectively within the engineering work- force, and to others
D2.7.4	Information within the enterprise	Convey engineering information effectively to any engineering and non- engineering level in the enterprise
D2.7.5	Negotiation, conflict resolution, counselling	Undertake negotiation, conflict resolution, counselling, exchanging ideas and conveying convictions and attitudes
D2.8	Prepare and communicate engineering documents	Prepare and communicate engineering documents
D2.8.1	Professional engineering reports	Prepare professional engineering reports
D2.8.2	Specifications, standards, graphics,	Prepare documents such as specifications, standards and graphical representations
D2.8.3	Complex documents	Prepare or contribute to complex documents such as environmental impact statements
D2.8.4	Interpretation of engineering drawings	Correctly interpret applicable engineering drawings and other graphics, specifications, standards, regulations, codes of practice and environmental impact statements

Е	SPECIFIC ENGINEERING COMPETENCES	
E1	Research, development and commercialisation	
E1.1	Research	Perform research
E1.1.1	Research requirements	Identify requirements for research
E1.1.2	Literature surveys	Undertake literature surveys
E1.1.3	Fundamental or applied research	Undertake fundamental or applied research
E1.1.4	Seeking new knowledge	Seek new knowledge
E1.1.5	Communication of research results	Identify and communicate results of research
E1.2	Formulation of development concepts	Formulate concepts for development
E1.2.1	Requirement identification	Identify new requirements for development
E1.2.2	Concept examination	Examine promising concepts
E1.2.3	Concepts for further development	Nominate concepts for further development
E1.3	Resource development of research outcomes	Seek resources for development of research outcomes
E1.3.1	End-user needs definition	Define ultimate user needs
E1.3.2	Resource proposals	Prepare proposals seeking resources for development
E1.3.3	Cost estimates	Prepare cost estimates for development, design, production or construction, and operation
E1.4	Perform market research on research outcomes	
E1.4.1	Product specification	Determine desirable product properties
E1.4.2	Product pricing	Gather information and make recommendations for determining product pricing
E1.4.3	Product distribution	Make recommendations regarding distribution of the product
E1.4.4	Product promotion	Make recommendations for promotion of the product
E1.5	Commercialise research outcomes	
E1.5.1	Economic evaluation of research outcomes	Carry out economic evaluation of research outcomes
E1.5.2	Marketing of research outcomes	Select likely mechanisms for marketing research outcomes
E1.5.3	Demonstration models for proving viability	Prepare demonstration models for proving technical and commercial viability
E1.5.4	Pilot schemes for proving viability	Develop pilot schemes for proving technical and commercial viability

E2	Materials and components	
E2.1	Define requirements for materials or components	Define requirements and applications for specific materials or components
E2.1.1	Materials/component property identification	Identify fundamental properties of a range of specialised materials or components, together with suitable alternatives
E2.1.2	Materials/components suitability assessment	Assess suitable applications for specialised materials or components
E2.1.3	Understanding of cross-disciplinary relations	Establish cross-disciplinary relationships to obtain specialist advice
E2.1.4	Recycling	Take account of opportunities for recycling
E2.1.5	Environmental and or other hazards	Take account of environmental or other hazards in using or disposing of materials or components
E2.2	Sourcing of raw materials	Source raw materials for making engineering materials or components
E2.2.1	Raw material sources	Locate suitable sources of raw materials
E2.2.2	Cost-effectiveness of materials, components	Select cost-effective materials or components
E2.3	Supervision of manufacturing	Supervise the preparation or manufacture of engineering materials and components
E2.3.1	Materials preparation techniques	Specify materials preparation techniques
E2.3.2	Interactions between materials, components	Determine interactions between different materials or components
E2.3.3	Process control	Perform process control activities
E2.4	Assessment of material or component properties	Assess properties of materials or components
E2.4.1	Identification of operating environment	Identify operating environment
E2.4.2	Requirements for materials/component testing	Identify requirements for testing materials and components
E2.4.3	Site and laboratory tests	Perform or supervise, and evaluate site and laboratory tests
E2.4.4	Maintenance and calibration of test facilities	Direct maintenance and calibration relevant to test facilities
E2.4.5	Test reports	Prepare, approve and certify test reports
E2.4.6	Recommendation of materials or components	Recommend materials or components for specific uses
E2.5	Protection against deterioration	Select protection against deterioration
E2.5.1	Causes of deterioration	Recognise the causes of deterioration such as wear, corrosion, fatigue and ultra- violet radiation
E2.5.2	Minimising deterioration and preventing failure	Employs techniques for minimising deterioration and preventing premature failure
E2.5.3	Failure detection techniques	Utilise techniques for detecting indications of potential failure
E2.5.4	Material treatments	Specify material treatments such as heat treatment or surface treatment
E3	Manufacturing and production	
E3.1	Manufacturing or production process planning	Plan the manufacturing or production process
E3.1.1	Layout and work-flow analysis and optimisation	Analyse plant or system layout and work-flows and act to optimise flexibility and efficiency
E3.1.2	Management planning techniques	Employ management planning techniques
E3.1.3	Process operation monitoring	Monitor process operations and modify them to improve final products
E3.1.4	Critical path analysis, linear programming,	Utilise techniques such as critical path analysis, line of balance and linear programming
E3.1.5	Production planning liaison with design team	Undertake production planning liaison with the product design team
E3.1.6	Manufacturing line/process set-up	Set up a manufacturing line or process
E3.1.7	Manufacturing process cost analysis	Perform cost analysis tasks of manufacturing processes
E3.2	Quality assurance	Maintain and supervise a quality assurance programme
E3.2.1	Production processes performance monitoring	Monitor and regulate the performance of production or manufacturing processes
E3.2.2	Continuous manufacturing process improvement	Seek and implement changes for continuous improvement of manufacturing processes
E3.2.3	Statistical quality assurance	Apply statistical quality assurance techniques
E3.2.4	Reject rate & system-down time reduction	Initiate corrective action to reduce reject rate or system-down time
E3.2.5	Specific procedures collaboration	Collaborate in specific procedures
E3.2.6	Supplier quality assessment	Conduct quality assessment of suppliers

E3.3	Process operations, control and optimisation	Perform process operations, control and optimisation tasks
E3.3.1	Process operations and control improvements	Refine and optimise process operations and control
E3.3.2	Process operations and control	Perform process operations and control tasks
E3.3.3	Value analysis	Perform value analysis tasks
E3.3.4	Manufacturing or process problem solving	Perform tasks to diagnose and resolve manufacturing or process problems
E3.3.5	Flexible manufacturing processes	Collaborate in flexible manufacturing processes
E3.3.6	Plant economics, plant safety	Collaborate in plant economics and plant safety
E3.4	Raw materials management	Perform raw materials management tasks
E3.4.1	Materials handling, materials balance procedures	Develop materials handling and materials balance procedures
E3.4.2	Materials procurement and allocation	Specify, procure and allocate materials
E3.4.3	Materials reduction	Perform materials reduction programmes
E3.5	Production performance measurement	Measure production performance
E3.5.1	Manufacturing output measurement	Measure output of manufacturing process in terms of quantity, quality and cost to assess whether targets have been achieved
E3.5.2	Productivity analysis	Analyse productivity to determine where improvements can be achieved
E3.5.3	Materials usage analysis	Analyse usage of materials and expendables for efficiency improvements and supporting procedures
E3.5.4	Procedures analysis	Analyse procedures for improving efficiency
E4	Project implementation	
E4.1	Construction and installation	Perform construction or installation tasks
E4.1.1	Construction/ installation specifications	Prepare construction or installation specifications and schedules
E4.1.2	Construction/installation phasing	Contribute to phasing of construction or installation
E4.1.3	Service and facility specification	Specify services and facilities required
E4.1.4	Construction/installation supervision	Supervise construction or installation
E4.1.5	Construction/installation certification	Confirm satisfactory completion of construction or installation for certification
E4.2	Contract preparation and monitoring	Prepare and monitor contracts
E4.2.1	Tender schedule preparation	Prepare tender schedules
E4.2.2	Tender evaluation	Carry out tender evaluation
E4.2.3	Contract preparation	Prepare contracts
E4.2.4	Contractor performance monitoring	Monitor contractor performance and investigate departures from contract requirements
E4.2.5	Contractor performance investigation	Investigate contractor performance to recommend certification for payment approval
E4.3	Tender preparation	Prepare tenders and meet contract requirements
E4.3.1	Tender schedule evaluation	Evaluate tender schedules
E4.3.2	Tender preparation	Prepare tenders
E4.3.3	Progress monitoring	Monitor progress and investigate departures from contract requirements
E4.3.4	Progress reporting	Prepare progress reports for submission to client
E4.4	Site management	Perform site management tasks and activities
E4.4.1	Construction/installation site management	Undertake construction or installation site management tasks
E4.4.2	Materials ordering	Perform materials ordering tasks
E4.4.3	Development of site management procedures	Develop procedures
E4.4.4	Supervision of materials handling	Supervise on-site materials handling
E4.5	Commissioning	Perform commissioning
E4.5.1	Acceptance programme development	Perform acceptance programme development tasks
E4.5.2	Commissioning programme execution and supervision.	Undertake commissioning programme execution and supervision tasks
E4.5.3	Certification of completed commissioning	Confirm satisfactory completion of commissioning for certification

E5	Asset management	
E5.1	Asset procurement	Perform asset procurement tasks
E5.1.1	Asset needs specification	Investigate requirements for new assets
E5.1.2	Asset procurement specification	Prepare specification or brief for proposed new asset
E5.1.3	Purchasing	Carry out purchasing activities
E5.1.4	Acceptance testing	Perform or supervise acceptance testing on delivery
E5.2	Maintenance	Perform or supervise maintenance tasks
E5.2.1	Maintenance philosophy definition	Develop maintenance philosophy and asset performance parameters
E5.2.2	Preventive maintenance scheduling	Prepare preventive maintenance schedules
E5.2.3	Corrective maintenance instructions	Prepare corrective maintenance instructions
E5.2.4	Specification of maintenance test aids	Specify, and if required design, maintenance test aids
E5.2.5	Maintenance supervision	Supervise maintenance tasks
E5.2.6	Spares logistics requirement specification	Determine spares logistics requirements
E5.2.7	Fault diagnosis	Undertake fault diagnosis
E5.2.8	Failure mode and effect analysis	Perform failure mode and effect analysis
E5.3	Asset control and optimisation	Perform asset controlling and optimisation tasks
E5.3.1	Asset performance analysis	Define asset performance parameters
E5.3.2	Operating instructions and training of operators	Prepare operating instructions and trains operators
E5.3.3	Condition monitoring	Plan and perform condition monitoring tasks
E5.3.4	Supervision of asset systems	Perform tasks in supervising operation of asset systems
E5.3.5	Regulation of asset operation	Perform tasks in regulating asset operation to maintain service
E5.3.6	Asset life extension studies	Carry out asset life extension studies
E5.4	Disposal planning	Perform disposal planning
E5.4.1	Economic life analysis	Carry out studies to determine economic life
E5.4.2	Economic disposal	Carry out investigations into economic disposal
E5.4.3	Disposal action	Recommend disposal action
E5.4.4	Site rehabilitation	Carry out site rehabilitation
E6	Engineering education and training	
E6.1	Education and training – planning	Develop engineering education or training plans
E6.1.1	Education and training needs analysis	Define education and training needs
E6.1.2	Engineering education or training plans	Draw up engineering education plans for tertiary education or engineering training plans for training organisations
E6.1.3	Development of practical experience programmes	Develop practical experience programmes
E6.1.4	Curriculum or syllabus development	Develop curriculum, syllabus or exercises in engineering
E6.2	Education or training – implementation	Conduct engineering education or training programmes
E6.2.1	Development of teaching plans and materials	Develop lesson plans and teaching materials for engineering education or training programmes
E6.2.2	Experiential development plans	Develop experiential development plans
E6.2.3	Management of experiential development programmes	Manage programmes through which students or trainees gain theoretical and practical engineering experience
E6.2.4	Teaching and facilitation of learning	Conduct effective teaching, development and learning activities in whatever form is most appropriate to the circumstances
E6.2.5	Use of educational and training technology	Make effective use of educational and training technology to support teaching, development and learning processes in engineering education or training programmes
E6.2.6	Development of educational content	Develop the specific content of engineering education and training programmes through research, study, practice or other techniques
E6.2.7	Student or trainee assessment	Carry out formative and overall assessment of students or trainees engaged in engineering education or training programmes
E6.2.8	Assessment of education/training effectiveness	Assess the effectiveness of engineering education or training programmes
		Powing engineering advection or training programmes