

THE HONG KONG INSTITUTION OF ENGINEERS
SCHEME “A” GRADUATE TRAINING
CONSOLIDATED MODEL TRAINING GUIDE
NUCLEAR ENGINEERING

Location where Training will be done	Training Outcomes	Reference	HKIE Competence Ref.	Length of Time (weeks)
	1. Introduction			1
	1.1 Information about the Company			
<i>Location 1</i>	<i>Description 1</i>			
	1.1.1 Own Organisation			
	a) Discuss the size, history and internal culture of the trainee’s own organisation.	<i>CCO</i>	11	
	b) Discuss an overview of the relationship between the trainee’s own organisation, government departments and other organisations.	<i>CCO</i>	11	
	c) Discuss the structure and functions of different units within the trainee’s own organisation.	<i>CCO</i>	11	
	d) Demonstrate the awareness to follow operational procedures and practices as required by the trainee’s own organisation.	<i>CCO</i>	11	
	e) Discuss the objectives, requirements and processes that support the quality assurance system within the trainee’s own organisation.	<i>CCO</i>	11	
	f) Apply the quality assurance system according to the policy of the trainee’s own organisation.	<i>CCO</i>	11	
	1.1.2 Training Programme, Prospects and Career Development			
	a) Discuss an overview of the internal communication systems, training system and career development pathway within the trainee’s own organisation.	<i>CCO</i>	11	

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	b) Demonstrate a commitment to extend and develop up-to-date technical knowledge through reading relevant engineering publications, participating in seminars or conferences, and information searching.	<i>CCO</i>	11	
	c) Demonstrate a commitment to extend and develop up-to-date knowledge of local, regional and international current affairs through reading relevant engineering publications, participating in seminars or conferences, and information searching.	<i>CCO</i>	11	
	d) Demonstrate a commitment to participate in the local organisations or community services for general personal development.	<i>CCO</i>	11	
	1.2 Information about the HKIE			
Location 2	Description 2			
	a) Discuss an overview of the HKIE organisation as well as its history and role in society.	<i>CCO</i>	11	
	b) Demonstrate a commitment to participate in relevant activities organised by the HKIE.	<i>CCO</i>	11	
	2. Engineer as a Profession			Continuous
	2.1 Professionalism			
Location 3	Description 3			
	a) Discuss the social and ethical responsibilities of engineers in society.	<i>CCO</i>	8	

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	b) Explain the rules and standard requirements of conducting engineering activities to the HKIE, employers, clients, general public and colleagues in accordance with the HKIE Rules of Conduct.	<i>CCO</i>	8	
	c) Explain the ethical standards and responsibilities of professional engineers as required by the HKIE.	<i>CCO</i>	8	
	d) Demonstrate the awareness to follow the codes of practice of professional engineers.	<i>CCO</i>	8	
	e) Demonstrate the awareness to uphold the dignity, standing and reputation of the engineering profession.	<i>CCO</i>	8	
	f) Demonstrate the awareness to protect the interests of the community including the environment, welfare, health and safety in conducting engineering activities.	<i>CCO</i>	8	
	2.2 Occupational Safety and Health			
Location 4	Description 4			
	a) Demonstrate an understanding of the statutory health and safety requirements.	<i>CCO</i>	9	
	b) Demonstrate an understanding of the responsibilities of professional engineers for the health and safety of the employers, employees and general public when engaging in engineering activities.	<i>CCO</i>	9	
	c) Apply the safety management system in accordance with the industry standards and regulatory requirements.	<i>CCO</i>	7	
	2.3 Environment			
Location 5	Description 5			
	a) Demonstrate an understanding of the relevant statutory environmental requirements related to the trainee’s discipline.	<i>CCO</i>	9	

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	b) Evaluate the inter-relationship of technology with the environment in the work place.	<i>CCO</i>	9	
	c) Demonstrate the awareness of the impact of technology on the environment in society.	<i>CCO</i>	9	
	3. Engineering Fundamentals and Practices			45
	3.1 Engineering Fundamentals			10
Location 6	Description 6			
	3.1.1 Material for nuclear engineering and radiation technology			
	a) Describe the characteristics of the material employed in apparatus, components, equipment, or systems in an environment exposed to radiation.		1	
	b) Describe the fundamentals and good practices in the use, handling or decommissioning of the material exposed to radiation.		1	
	c) Explain the degradation process of the material exposed to radiation.		1	
	3.1.2 Knowledge of nuclear engineering and radiation technology			
	a) Explain the principles governing the operations of engineering systems in an environment exposed to radiation.		1	
	b) Provide an overview of the engineering operations of apparatus, equipment, or systems involved in nuclear installations or radiation facilities.		1	
	c) Explain the ranges of validity and limitations in the operations of engineering systems in an environment exposed to radiation.		1	

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	<ul style="list-style-type: none"> i) Describe the implementation of the processes for the systems in an environment exposed to radiation. j) Maintain knowledge in the technical specifications and user instructions of the processes in nuclear installations or radiation facilities, while taking into account the prevailing industrial good practices. k) Contribute to an information system for knowledge management of the processes in nuclear installations or radiation facilities in accordance with good engineering management practices. l) Assess the cost-effectiveness of potential alternatives of processes in nuclear installations or radiation facilities, aiming for continuous improvement while considering industrial good practices. 		6 11 6 5	
	4. Engineering Administration and Management Practices			32
	4.1 Interpretation or preparation of project / plant / equipment specifications and drawings.			8
Location 8	Description 8			
	<ul style="list-style-type: none"> a) Analyse project/ plant/ equipment requirements. b) Compile specifications to meet the requirements. c) Develop engineering drawings. 		6 6 6	
	4.2 Familiarisation of tendering procedures and undertaking tender evaluation and contract administration.			8
Location 9	Description 9			
	<ul style="list-style-type: none"> a) Support the procurement process such as tendering, tender evaluation, contract award and administration. 		6	

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	4.3 Performing budgeting and estimation of the relevant costs for the business including labour, manufacturing, installation, transportation and life cycle costs.			8
Location 10	Description 10			
	a) Derive the cost estimate of the engineering business including labour, materials, manufacturing, installation, transportation.		6	
	b) Derive the cost estimates of the life cycle of the engineering business as appropriate.		6	
	4.4 Conducting work/project scheduling and resources management.			8
Location 11	Description 11			
	a) Develop the work/project plan and identify its critical path(s).		12	
	b) Prepare the work/project budget.		12	
	c) Formulate work/project scheduling and management plan with the support of the relevant management information systems.		6	
	5. Direct Objective Training			26
Location 12	Description 12			
	<p><i>This section covers any activities related to Nuclear Engineering. It should aim to develop skills and knowledge relating to personal qualities, communication, human resources management and business operational sense in addition to the technical, commercial and engineering knowledge acquired by the trainees during earlier parts of their training. The latest developments in the discipline should be included. All Training Outcomes, if not yet achieved in earlier parts of training, should be completed here.</i></p> <p><i>Specific project(s) should be assigned to the trainee according to the work nature of the trainee in this period. The emphasis of the project(s) should be on the applications of the essential knowledge and skills acquired in the previous phases of the training programme. The trainee is expected to report the progress at scheduled intervals.</i></p>			

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Location where Training will be done	Training Outcomes	Reference	HKIE Competence Ref.	Length of Time (weeks)
	<i>Regular reviews between the supervisor(s) and the trainee should be arranged so as to ensure the progress is in line with the project objective(s).</i>			
	6. Other Common Core Outcomes for Continuous Development			Continuous
	6.1 Preparation of reports, procedures and manuals of construction, installation, testing, commissioning, operation and maintenance.			
Location 13	Description 13			
	a) Produce grammatically correct, clear and concise documents (including memos, letters, instructions, reports, resumes and technical papers) which meet the business objectives.	<i>CCO</i>	10	
	b) Evaluate the needs of the intended readers to design appropriate technical contents for communication.	<i>CCO</i>	10	
	6.2 Conducting technical presentation, sales and contract negotiation.			
Location 14	Description 14			
	a) Demonstrate negotiating skills required for various engineering activities.	<i>CCO</i>	10	
	6.3 Knowledge of general administration including financial management, human resources, social awareness, marketing techniques, etc.			
Location 15	Description 15			
	6.3.1 Human Resources Management			
	a) Demonstrate the awareness of the duties and employment criteria for different job positions in an engineering project.	<i>CCO</i>	6	
	b) Demonstrate an understanding of the relevant legal requirements and regulatory issues of labour employment and management.	<i>CCO</i>	6	
	c) Discuss the appropriate staff training and development programmes in the organisation.	<i>CCO</i>	6	

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	6.3.2 Business Operations			
	a) Recognise the importance of intellectual property to business operations.	<i>CCO</i>	11	
	b) Describe the legal requirements in Hong Kong relevant to intellectual property rights.	<i>CCO</i>	11	
	c) Identify appropriate tools and method to measure and improve the productivity of business operations.	<i>CCO</i>	11	
	d) Identify appropriate information technology applications to manage business information and to facilitate business operations.	<i>CCO</i>	11	
	e) Recognise the importance of research and development towards business operations.	<i>CCO</i>	11	
	f) Demonstrate the awareness of financial considerations in operating business.	<i>CCO</i>	11	
	g) Recognise the importance of business development in business operations.	<i>CCO</i>	11	
	6.4 Development of communication skills in verbal and written Chinese and English.			
Location 16	Description 16			
	a) Communicate ideas orally in an accurate and clear manner under various situations (including presentations and meetings).	<i>CCO</i>	10	
	b) Formulate an oral presentation of complicated data and information in an effective and persuasive manner.	<i>CCO</i>	10	

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	6.5 Leadership Qualities			
Location 17	Description 17			
	a) Discuss the various leadership qualities required of a leader including accountability, conflict management and resources management etc.	<i>CCO</i>	6	
	b) Explain the importance of accountability and responsibility required by a leader for making decisions on engineering activities.	<i>CCO</i>	6	
	c) Apply various management skills in engineering projects.	<i>CCO</i>	6	
	d) Distinguish the relationship between good leadership and good management skills.	<i>CCO</i>	6	
	e) Demonstrate an understanding of the importance of teamwork and partnering skills in engineering projects.	<i>CCO</i>	6	
	6.6 Development of Personal Qualities			
Location 18	Description 18			
	a) Identify appropriate innovative approach and/or tools for professional development.	<i>CCO</i>	11	
	b) Demonstrate interpersonal skills for professional development.	<i>CCO</i>	10	
	c) Demonstrate sound time management skill for professional development.	<i>CCO</i>	11	
	d) Demonstrate a commitment to continuous development and enhancement.	<i>CCO</i>	11	

N.B.

1. The training period must not be less than 104 weeks (24 months).
2. The programme set out is for guidance only but substantial departure should not be made. Employers should endeavour to provide training to their trainees in as many areas as possible as is appropriate to the sector of employment.
3. This guide should be read in conjunction with Section 3 of the M3 Routes to Membership.
4. During the training, each trainee is required to maintain a Graduate Training Log Book, Record of Continuing Professional Development and Record of Training Outcomes.