

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

Location where Training will be done	Training Outcomes	Previous 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 <ul style="list-style-type: none"> a) Discuss the size, history and internal culture of the trainee’s own organisation. b) Discuss an overview of the relationship between the trainee’s own organisation, government departments and other organisations. c) Discuss the structure and functions of different units within the trainee’s own organisation. d) Demonstrate the awareness to follow operational procedures and practices as required by the trainee’s own organisation. e) Communicate effectively with oral and/or written presentation of history, activities, structure, Management System, Quality Assurance System and personnel and welfare policies of the Company. 	CCO 1.10 CCO 1.10 CCO 1.10 CCO 1.10 CO 1.1	11 11 11 10	
	1.1.2 Training Programme, Prospects and Career Development <ul style="list-style-type: none"> a) Discuss an overview of the internal communication systems, training system and career development pathway within the trainee’s own organisation. 	CCO 1.10	11	

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	<p>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.</p> <p>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.</p> <p>d) Demonstrate a commitment to participate in the local organisations or community services for general personal development.</p>	<p><i>CCO 1.2</i></p> <p><i>CCO 1.3</i></p> <p><i>CCO 1.3</i></p>	<p>11</p> <p>11</p> <p>11</p>	
	1.2 Information about the HKIE			
Location 2	Description 2			
	<p>a) Discuss an overview of the HKIE organisation as well as its history and role in society.</p> <p>b) Demonstrate a commitment to participate in relevant activities organised by the HKIE.</p>	<p><i>CCO 1.1</i></p> <p><i>CCO 1.1</i></p>	<p>11</p> <p>11</p>	
	2. Engineer as a Profession			Continuous
	2.1 Professionalism			
Location 3	Description 3			
	<p>a) Discuss the social and ethical responsibilities of engineers in society.</p>	<p><i>CCO 1.2</i></p>	<p>8</p>	

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	<p>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.</p> <p>c) Explain the ethical standards and responsibilities of professional engineers as required by the HKIE.</p> <p>d) Demonstrate the awareness to follow the codes of practice of professional engineers.</p> <p>e) Demonstrate the awareness to uphold the dignity, standing and reputation of the engineering profession.</p> <p>f) Demonstrate the awareness to protect the interests of the community including the environment, welfare, health and safety in conducting engineering activities.</p> <p>g) Produce a well-structured, clear and concise report on the roles and responsibilities of a Graduate Building Engineer in a typical project.</p>	<p><i>CCO 1.2</i></p> <p><i>CCO 1.2</i></p> <p><i>CCO 1.2</i></p> <p><i>CCO 1.2</i></p> <p><i>CCO 1.2</i></p> <p><i>CO 1.1</i></p>	<p>8</p> <p>8</p> <p>8</p> <p>8</p> <p>8</p> <p>10</p>	
	2.2 Occupational Safety and Health			
Location 4	Description 4			
	<p>a) Demonstrate an understanding of the statutory health and safety requirements.</p> <p>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.</p> <p>c) Apply the safety management system in accordance with the industry standards and regulatory requirements.</p> <p>d) Evaluate the possible health and safety impacts caused by engineering works.</p>	<p><i>CCO 1.5</i></p> <p><i>CCO 1.5</i></p> <p><i>CCO 1.5</i></p> <p><i>CO 2.10</i> <i>CO 1.3</i></p>	<p>9</p> <p>9</p> <p>7</p> <p>9</p>	

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	<ul style="list-style-type: none"> e) Comply the engineering works with the legal and regulatory safety requirements in Hong Kong. f) Carry out the engineering works with reference to the company safety manual. g) Develop procedures and protocols to manage safety requirements of a project. h) Produce clear and concise record of involvement in safety matters in your Quarterly Reports and discuss with the ES at quarterly interviews. 	<p><i>CO 3.9</i> <i>CO 1.3</i> <i>CO 2.10</i></p> <p><i>CO 2.10</i></p> <p><i>CO 3.9</i> <i>CO 2.10</i> <i>CO 1.3</i></p> <p><i>CO 1.3</i></p>	<p>2</p> <p>2</p> <p>7</p> <p>10</p>	
	2.3 Environment			
Location 5	Description 5			
	<ul style="list-style-type: none"> a) Demonstrate an understanding of the relevant statutory environmental requirements related to the trainee’s discipline. b) Evaluate the inter-relationship of technology with the environment in the work place. c) Demonstrate the awareness of the impact of technology on the environment in society. d) Analyse environmental assessment report. e) Use environmental assessment report to support identification of solution of a problem. f) Demonstrate an understanding of environmental considerations in planning a project. 	<p><i>CCO 1.6</i></p> <p><i>CCO 1.6</i></p> <p><i>CCO 1.6</i></p> <p><i>CO 3.6</i></p> <p><i>CO 3.6</i></p> <p><i>CO 3.13</i></p>	<p>9</p> <p>9</p> <p>9</p> <p>9</p> <p>9</p> <p>9</p>	
	3. Engineering Practice and Application			
	3.1 Planning Work			12
Location 6	Description 6			
	<ul style="list-style-type: none"> a) Compile basic data to identify work problem. b) Carry out thinking / analytical process to define work problem. 	<p><i>CO 3.1</i></p> <p><i>CO 3.1</i></p>	<p>3</p> <p>3</p>	

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	<ul style="list-style-type: none"> c) Analyse the possible sources and availability of materials, plant and equipment, manpower and sub-contractors used in running a project. d) Appraise the national and International Standards, Codes of Practice, Technical Memorandum, etc. taking into account their limitations. e) Analyse the use, performance and cost of equipment and/or plant used in implementing a solution of the works. f) Examine the technical specifications for a particular item of work. g) Apply life cycle costing and value engineering concepts according to the current practice in Hong Kong. h) Produce programming in different stages by employing programming methods including computer-aided programming. i) Examine the different stages of method statement production and programming. 	<p><i>CO 2.9</i></p> <p><i>CO 3.3</i></p> <p><i>CO 2.6</i></p> <p><i>CO 3.7</i></p> <p><i>CO 3.8</i></p> <p><i>CO 3.10</i></p> <p><i>CO 3.11</i></p>	<p>3</p> <p>2</p> <p>1</p> <p>4</p> <p>2</p> <p>4</p> <p>3</p>	
	3.2 Producing Work			51
Location 7	Description 7			
	<ul style="list-style-type: none"> a) Compile relevant data and results of analytical work to produce solution to a problem. b) Produce well-structured, clear and concise documentation on the solution containing diagrams, sketches, charts, etc. c) Produce project day-to-day reports and other project document with appropriate computer software. d) Produce quality works related to dimensional control and accuracy of works. e) Apply the design process and management. f) Apply the quality control principles to meet a designated specification. 	<p><i>CO 3.4</i></p> <p><i>CO 3.5</i></p> <p><i>CO 1.2</i></p> <p><i>CO 2.5</i></p> <p><i>CO 2.1</i></p> <p><i>CO 2.11</i></p>	<p>4</p> <p>10</p> <p>3</p> <p>4</p> <p>1</p> <p>6</p>	

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	g) Produce a justified solution by identifying the major factors on which the solution depends for accuracy or completeness.	<i>CO 3.4</i>	12	
	h) Carry out simple design for falsework, formwork and temporary work.	<i>CO 2.17</i>	4	
	i) Apply the appropriate procedures for foundation construction and geotechnical engineering works.	<i>CO 2.18</i>	3	
	j) Evaluate alternative solutions to an engineering problem from a technical perspective.	<i>CO 3.2</i>	4	
	k) Evaluate alternative solutions to an engineering problem from a financial perspective.	<i>CO 3.2</i>	6	
	l) Produce accurate general arrangement and detailed drawings using scales and drawing sizes appropriate to the information to be conveyed.	<i>CO 3.5</i>	10	
	m) Produce the technical specifications for a particular item of work.	<i>CO 3.7</i>	4	
	n) Carry out taking off quantities and building up cost estimates according to the current practice in Hong Kong.	<i>CO 3.8</i>	2	
	o) Carry out cost benefit analysis according to the current practice in Hong Kong.	<i>CO 3.8</i>	2	
	4. Engineering Administration and Management Techniques			
	4.1 Pre-Contract Work			8
Location 8	Description 8			
	a) Combine various documents to form a particular contract.	<i>CO 2.1</i>	1	
	b) Carry out contract procurement process.	<i>CO 2.1</i>	1	
	c) Apply the procurement procedures including tender preparation, evaluation and contract award.	<i>CO 4.1</i>	3	
	d) Carry out procurement procedures including pre-qualification enquiries, pricing enquiries and tender interview.	<i>CO 4.2</i>	3	

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	e) Produce well-structured, clear and concise tender document on enquiries and interview stages.	<i>CO 4.2</i>	10	
	f) Examine the written and verbal format of tender during enquiries and interview stages.	<i>CO 4.3</i>	3	
	g) Assess the budget of a project.	<i>CO 4.4</i>	6	
	4.2 Technical and Commercial Leadership			28
Location 9	Description 9			
	4.2.1 Quality Assurance			
	a) Discuss the objectives, requirements and processes that support the quality assurance system within the trainee’s own organisation.	<i>CCO 1.10</i>	11	
	b) Apply the quality assurance system according to the policy of the trainee’s own organisation.	<i>CCO 1.10</i>	11	
	c) Carry out the implementation of relevant ISO systems such as ISO 9000 and ISO 14000.	<i>CO 2.11</i>	6	
	d) Carry out the implementation of Site Quality Assurance Systems.	<i>CO 2.12</i>	6	
	e) Comply with Site Quality Assurance Systems.	<i>CO 2.12</i>	6	
	4.2.2 Site Supervision and Management			
	a) Carry out resources planning.	<i>CO 3.12</i>	4	
	b) Examine the correct practice of construction work.	<i>CO 2.17</i>	4	
	c) Apply the procedure for the issue and/or receipt, registration and filing of work instructions and/or drawings and amendments.	<i>CO 2.2</i>	1	
	d) Appraise the Document Management System.	<i>CO 2.16</i>	6	
	e) Compile appropriate incoming and outgoing documents for proper circulation and action.	<i>CO 2.16</i>	6	

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	f) Develop plan to keep accurate daily records of events and instructions.	<i>CO 2.3</i>	4	
	g) Appraise drawings for implementation of work instructions accurately.	<i>CO 2.4</i>	4	
	h) Carry out project works by employing good practices of Total Quality Management.	<i>CO 2.11</i>	6	
	i) Examine the duties and responsibilities of all parties in a contract exercise.	<i>CO 2.1</i>	1	
	j) Appraise the roles of various parties of the project including RPE.	<i>CO 2.13</i>	5	
	k) Carry out supervision according to the Site Supervision Plan.	<i>CO 2.13</i>	5	
	l) Develop appropriate mechanism to supervise project personnel and sub-contractors to achieve smooth project works.	<i>CO 2.13</i>	5	
	m) Develop appropriate mechanism to co-ordinate with the client / consultant / sub-contractor to achieve smooth project works.	<i>CO 2.14</i>	5	
	n) Communicate effectively with relevant professionals to co-ordinate the interface of building services installations and builder’s work.	<i>CO 2.15</i>	4	
	4.2.3 Progress Monitoring and Payment			
	a) Derive the requirements and criteria of project progress monitoring and reporting works.	<i>CO 2.7</i>	4	
	b) Plan the implementation of project progress monitoring and reporting works.	<i>CO 2.7</i>	6	

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	c) Develop method to measure and record the work done for payment purposes.	<i>CO 2.8</i>	4	
	d) Develop method to prepare or check interim valuations.	<i>CO 2.8</i>	4	
	4.3 Post-Contract Work			4
Location 10	Description 10			
	a) Apply relevant system and concept used in the post-contract stage.	<i>CO 5.1</i>	3	
	b) Support the preparation or checking of valuation and/or final accounts.	<i>CO 5.2</i>	6	
	c) Assess work done for claims / charges / payment.	<i>CO 5.2</i>	6	
	d) Carry out review of project budget at interim and final stages.	<i>CO 5.3</i>	6	
	5. Other Common Core Outcomes for Continuous Development			Continuous
	5.1 Leadership and Management			
Location 11	Description 11			
	a) Discuss the various leadership qualities required of a leader including accountability, conflict management and resources management etc.	<i>CCO 1.9</i>	6	
	b) Explain the importance of accountability and responsibility required by a leader for making decisions on engineering activities.	<i>CCO 1.9</i>	6	
	c) Apply various management skills in engineering projects.	<i>CCO 1.9</i>	6	
	d) Distinguish the relationship between good leadership and good management skills.	<i>CCO 1.9</i>	6	
	e) Demonstrate an understanding of the importance of teamwork and partnering skills in engineering projects.	<i>CCO 1.9</i>	6	
	5.2 Development of Personal Qualities			
Location 12	Description 12			
	a) Identify appropriate innovative approach and/or tools for professional development.	<i>CCO 1.4</i>	11	

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	<ul style="list-style-type: none"> b) Demonstrate interpersonal skills for professional development. c) Demonstrate negotiating skills required for various engineering activities. d) Demonstrate sound time management skills for professional development. e) Demonstrate a commitment to continuous development and enhancement. 	<p><i>CCO 1.4</i></p> <p><i>CCO 1.4</i></p> <p><i>CCO 1.4</i></p> <p><i>CCO 1.4</i></p>	<p>10</p> <p>10</p> <p>11</p> <p>11</p>	
	5.3 Communication			
Location 13	Description 13			
	<ul style="list-style-type: none"> a) Communicate ideas orally in an accurate and clear manner under various situations (including presentations and meetings). b) Formulate an oral presentation of complicated data and information in an effective and persuasive manner. c) Produce grammatically correct, clear and concise documents (including memos, letters, instructions, reports, resumes and technical papers) which meet the business objectives. d) Evaluate the needs of the intended readers to design appropriate technical contents for communication. 	<p><i>CCO 1.7</i></p> <p><i>CCO 1.7</i></p> <p><i>CCO 1.7</i></p> <p><i>CCO 1.7</i></p>	<p>10</p> <p>10</p> <p>10</p> <p>10</p>	
	5.4 Human Resources Management			
Location 14	Description 14			
	<ul style="list-style-type: none"> a) Demonstrate the awareness of the duties and employment criteria for different job positions in an engineering project. b) Demonstrate an understanding of the relevant legal requirements and regulatory issues of labour employment and management. c) Discuss the appropriate staff training and development programmes in the organisation. 	<p><i>CCO 1.8</i></p> <p><i>CCO 1.8</i></p> <p><i>CCO 1.8</i></p>	<p>6</p> <p>6</p> <p>6</p>	

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	5.5 Business Operations			
Location 15	Description 15			
	a) Recognise the importance of intellectual property to business operations.	<i>CCO 1.11</i>	11	
	b) Describe the legal requirements in Hong Kong relevant to intellectual property rights.	<i>CCO 1.11</i>	11	
	c) Identify appropriate tools and method to measure and improve the productivity of business operations.	<i>CCO 1.11</i>	11	
	d) Identify appropriate information technology applications to manage business information and to facilitate business operations.	<i>CCO 1.11</i>	11	
	e) Recognise the importance of research and development towards business operations.	<i>CCO 1.11</i>	11	
	f) Demonstrate the awareness of financial considerations in operating business.	<i>CCO 1.11</i>	11	
	g) Recognise the importance of business development in business operations.	<i>CCO 1.11</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.