

**THE HONG KONG INSTITUTION OF ENGINEERS
ENGINEERING GRADUATE TRAINING SCHEME “A”**

MODEL TRAINING GUIDE

CONTROL AUTOMATION & INSTRUMENTATION ENGINEERING

Model Training Guide (MTG)

The Model Training Guide is a guide to Companies on the practical experiences considered relevant in the formal training of potential Professional Engineers.

Training Programme (TP)

The Training Programme is the plan prepared by a Company which is designed to meet the experiences listed in the MTG and to meet the objectives set out in the Record of Objectives. This ‘plan’ is presented for approval on Form TD1 Part 2 as a part of the Assessment/Reassessment procedures.

Training Period - Nominally 2 years

The length of the training is based on meeting the objectives and not determined by time. The times shown below are indicators only of the time that a trainee would normally take to meet the relevant objectives.

Training Aim

It is important to note that the Scheme “A” Graduate Training is designed to be a fast track by which a graduate can obtain full professional status. The training therefore covers both Technical and Professional matters.

Continuing Professional Development (CPD)

An implicit part of the Scheme “A” training is related to CPD which should be an integral and relevant part of the development of the graduate trainee.

Training Programme Content

(C=Core, D=Desirable)

1. Introduction (minimum 1 week C)
 - 1.1 Information about the company
 - (a) Sources of guidance
 - (b) Size, history, subsidiaries if any
 - (c) Products, markets and competitors
 - (d) Management structure and functions
 - (e) Communication systems
 - (f) Locations and layout of the facilities
 - (g) Safety, health and welfare
 - (h) Joint consultation arrangements if any

- 1.2 Information about training programmes, prospects & career development
 - (a) The HKIE & the Scheme “A” Graduate Training
 - (b) Specialist skills
 - (c) Work of related disciplines
 - (d) Management techniques
 - (e) Sources of guidance

2. CAI Engineering Practice and Applications (52 weeks in total)

2.1 Engineering Practice (minimum 8 weeks C)

The training should include basic engineering practice appropriate to the employer activities. Typical examples may cover the use of tools and their safety requirements; the property and choice of materials; application and calibration of measurement instruments; choice of signal transmission and interface techniques; selection and use of transducers and sensors; engineering control and sampling techniques; proficiency in functional schematic handling, use of engineering software packages and so on. ‘Hands-on’ experience in these areas should be provided.

2.2 Engineering Applications (minimum 30 weeks C)

The training should include critical study and evaluation, OR procurement, installation and commissioning, OR design and development of typical control, automation OR instrumentation components, subsystems, products, equipment and engineering projects in accordance with requirements and specifications.

- (a) For design oriented activities, coverage should extend to design analysis, computer aided modeling or prototyping, critical analysis and objective evaluations of system reliability, stability and integrity; maintainability, ergonomics, safety, health and environmental considerations, standards and regulations.
- (b) For process or production oriented activities, the training should include applications of CAI in large scale production process. Typical aspects may include data capture, acquisition and monitoring; real time process control; selection of control actuators; selection, evaluation or design of testing and automation equipment or system; application of CAD/CAM/CIM/mechatronics/artificial intelligence to production automation, testing, diagnosis, fault analysis/and quality control.
- (c) For project handling activities, the project should include system design, installation, commission, operation and maintenance of plant and associated equipment. Typical coverage may include general familiarisation of industrial design practices and standard codes of instrumentation; critical analysis and understanding of system specification and performance under responsibility; in-depth knowledge of technique, procedure and rationale in inspection, testing and evaluation of the overall system and subsystem operation, robustness and integrity. Trainees should also gain exposures in the preparation and compilation of plant

operating procedures; design of maintenance schedules; involvement in emergency and major repairs, industrial safety and environmental consideration.

* A balanced combination of (a), (b) or (c) (without unnecessary overlap) is acceptable.

3. Engineering Administration and Management Techniques (26 weeks in total)

- 3.1 Interpretation, preparation and communication of requirement, specifications and drawings; report and manual compilation. (minimum 6 weeks C)
- 3.2 Cost estimate and comparison, analysis and evaluation. (minimum 4 weeks C)
- 3.3 Procurement procedures, tender document preparation and evaluation, pre-qualification of supplier, commercial terms, delivery schedules and monitoring, quality control, stock keeping. (minimum 3 weeks C)
- 3.4 Project Management (minimum 8 weeks C)

The training should provide team work environment at a multi-disciplinary level. Coverage should include, but not limited to considerations in safety, quality management, legal issues, environmental protection and energy conservation issues. The training would put emphasis on the logical approach to engineering specification, work co-ordination, material handling, manpower and budget planning and keeping, work programme preparation, critical path analysis, contingency, supervision of subordinates, progress monitoring.

4. Objective Training (26 weeks in total)

This is training in any one or more of the activities outlined in Section 2 or 3, which leads to an initial appointment as a CAI engineer. It should also aim to develop skills and knowledge needed. Special courses dealing with the particular technologies having a bearing on future work may be necessary during training.

N.B.

1. The minimum training period must not be less than 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 Membership Admission Requirements booklet.
4. During their training, each trainee is required to maintain a Graduate Training Log Book, CPD Logbook and Record of Objectives.