

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

**MODEL TRAINING GUIDE**

**INFORMATION 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**

1. Introduction (1 month core)
  - 1.1 Information about the company (size, history, subsidiaries, products, services, markets, competitors, management structure, management functions, people communications, locations of facilities & their layout, safety, health, welfare of employees, joint management – staff consultation, etc.)
  - 1.2 Information about training programme, prospects & career development (specialist skills, taxonomy, work of related discipline, management techniques, sources of guidance, etc.), sources of information, Web Page address.
  - 1.3 Appreciation of information ethics like copyright, data privacy, role of the

Data Privacy Commissioner, data protection & security, e-commerce transaction applications, Hong Kong legislation on these as well as intellectual property, codes of practice.

- 1.4 Users of Information Infrastructure. Working in a department/unit which is a heavy user of the information resources, their role in formulating information strategies, computer application development methodologies, user requirements, acceptance criteria, testing & evaluation, handling changes, user training, identifications of cost and benefits, etc.. Observing Office Automation. Computer Supported Co-operating Working and “Mission-critical” systems.

## 2. Supporting the Information Environment (3 to 6 months core)

Familiarisation with:

- 2.1 Existing standards in technology, documentation, networking, programming, program development environment, databases, degree of formality and methodologies used in design specifications, etc.
- 2.2 Change Requests, Configuration Management and Trouble Reporting Procedures – initiation, analysis, authorisation, allocation of resources, review, acceptance, etc.
- 2.3 Study of, existing information systems’ designs; understanding the linkage between sub-systems; how components are assembled to form sub-systems; information security policy; how they evolve; how they are re-engineered; history of changes, test data, test results; documentation.
- 2.4 Study of telecommunications system; understanding the basic operation principles; current available wired and wireless services; network security control and management, future evolution; relevant marketing and regulatory issues.
- 2.5 Information Systems Administration – processor hardware, telecommunications hardware, operating systems, networking protocols and products, database packages, hyper text protocols, web services, data encryption and PKI, Dynamic re-configuration etc.
- 2.6 Diagnosis of problems, trouble shooting, testing for functionality, diagnostic tools, debugging approaches. “Help-Desk” functions.
- 2.7 Data Collection for future use – network traffic, system utilization and usage patterns, frequency of page visits, their analysis, design improvement as a result, etc.

## 3. Operational Environment (2 to 4 months core)

This is a combination of Computer Systems acting as Servers. User Workstations acting as Clients, Network Administration, Operating System Maintenance & Upgrades, Cabling, Liaison with Service Providers, Computer Machine Room/ Internet Data Centre operations, optical/magnetic tape/disk library and its maintenance, automatic logging, error recovery, cold restart, warm restart, uninterruptible power supply, system administration, adding new users, hardware and software vendors and liaising with them, security aspects, spare parts

maintenance, visiting user locations, feedback from users on their satisfaction with the information infrastructure, documentation regarding operational aspects, reporting breakdowns, security breach, theft, loss due to damage etc.. The network aspects will include modems, modem pool, cabling systems, trunking, optical-fibre, routers, bridges, network controllers, multi-plexors, Internet and Intranet, dial-up line versus leased-line versus VPN (Virtual Private Network), traffic management, congestion control, anti-virus and anti-spam control software for problem determination, human resources development, organisational structure, staff development, security, trusting colleagues, performance appraisal, promotion, merit increase, professional updating, etc.

4. Advanced Topics (up to 3 months)

This provides opportunity to update the trainee on new developments in the technology area (operating systems, networking, middleware, broadband network, switching and transmission systems, wireless mobile communications, lightwave communications, distributed processing, high-performance and grid computing distributed databases, replication, transaction processing, programming, graphics, Internet, World Wide Web, wireless access etc. etc.). The new developments could also be in the applications area (e.g. Smart Card for the Transportation Sector, Digital Library, Electronic Commerce, Electronic Publishing, Edu-tainment (i.e. Education plus Entertainment), Artificial Intelligence, Robotics, Virtual Reality, Computer Animation, Computer Supported Cooperative Work Place, Portal Applications, Utility Computing etc. Organisations must demonstrate their pro-active approach as opposed to a reactive approach.

5. Quality Audit (1 to 3 months core)

These days quality cannot be taken for granted. It has to be planned, researched and managed. The trainee cannot take an active role. The trainee cannot initiate new steps or supervise current work. The trainee can only play a passive role. It is thus expected that awareness build-up is the essence of this aspect of training. He or she should identify people involved, the organisational structure, mechanisms and procedures, documentation, authority limits, management support, international standards (e.g. ISO 9000). There must be a demonstration of the awareness of the trainee in order to satisfactorily complete this module of the training programme.

6. Objective Design Training (7 to 12 months core)

It involves the trainee in various aspects of the Information Infrastructure. This module is quite different from Section 2 and 3 which do not involve any design activity. In as much as design is the hallmark of an engineer, he or she must be involved in technology-oriented design aspects as well as management oriented aspects of planning, implementing and commissioning of new systems and/or major enhancements to existing systems.

6.1 Technically orientated design aspects

- (a) Requirement Analysis
- (b) Architectural Design

- (c) Detailed Design and Usability
- (d) (User) Acceptance Test Plan
- (e) Coding
- (f) Unit Testing
- (g) Integration Testing
- (h) System Commissioning

## 6.2 Management orientated planning aspects

- (a) Software Planning Tool
- (b) Estimation of Development/Project
- (c) Documentation
- (d) Requirements Specification
- (e) Software Specification
- (f) Software sizing
- (g) Project Planning & Control
- (h) Project Management
- (i) Management Process Models

A standard methodology such as SSADM is recommended.

Design should include considerations for maintainability as well as reusability. All aspects of this work should draw on experience of Section 2 as well as Section 5. In particular, familiarity with international and installation standards should find practice here. The Objective Training may involve learning of new methodologies, programming tools, programming languages, language extensions and Computer Aided Software Engineering (CASE) Tools. It is expected that the trainees will be provided with a good working environment such as advanced workstations, CASE Tools (Integrated Tools preferred), good library, Computer Aided Learning facilities etc. Close supervision of trainees should meet with the dual objectives of effective technology.

## 7. Engineering Administration (up to 1 month)

This optional element will cover personnel administration, budgeting, office work, office automation, communication, paper work etc. germane to any engineering discipline, as also marketing, customer interface, after sales support, contracting, etc.

### **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.