2004 MANPOWER SURVEY REPORT

ELECTRONICS INDUSTRY

電 子 業

二 〇 〇 四 年 人 力 調 查 報 告

ELECTRONICS AND TELECOMMUNICATIONS TRAINING BOARD

VOCATIONAL TRAINING COUNCIL

職 業 訓 練 局

電 子 業 及 電 訊 業 訓 練 委 員 會

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Abstract of the Report on the 2004 Manpower Survey of the Electronics Industry

Objective

The survey was conducted in May/June 2004 by the Electronics and Telecommunications Training Board of the VTC to collect up-to-date manpower information by principal job in the electronics industry.

Coverage

2. The fieldwork of the manpower survey covered 636 establishments which were selected by means of a stratified random sampling method from a total of some 4 210 establishments. The survey covered the workforce in the following sectors of the electronics industry:

Sector 1: Manufacturing (579 Establishments)

Manufacturers of

(a) Computing machinery and equipment (HSIC 3822),

(b) Transistorized radios (HSIC 3831),

(c) Television receivers and communications equipment (HSIC 3832),

(d) Sound reproducing and recording equipment and apparatus (HSIC 3833),

(e) Gramophone, records and magnetic tapes (HSIC 3834),

(f) Electronic parts and components (HSIC 3840),

(g) Electronic toys (HSIC 3852),

(h) Electronic industrial apparatus (HSIC 3868), and

(i) Electronic products, not elsewhere classified (HSIC 3873).

Sector 2: Trading and Services (2 183 Establishments)

Establishments of

(a) Burglar alarm/intercommunication system installation (HSIC 5516),

(b) Imports and exports of

(i) scientific and professional instruments and apparatus (HSIC 631805),+

(ii) telephone system (HSIC 631821),+

(iii) telecommunications services (HSIC 631822),+

(iv) electrical goods (HSIC 631823),+

(v) computer, computer peripherals and software packages (HSIC 631824),+ and

(vi) office machines, appliances and equipment (HSIC 631825), +

(c) Data processing and tabulating services (HSIC 8333), + and

(d) Other electronics engineering services not included in (a) to (c).

Sector 3: Telecommunication Services (145 Establishments)

Establishments of

(a) Wireline based fixed telecommunications network services (HSIC 732101),

(b) Fixed telecommunications network services, nowhere else classified (HSIC 732199),

(c) Radio paging services (HSIC 7322),

(d) Mobile communications services (HSIC 732901),

(e) Internet access services (HSIC 732902),

(f) Satellite communications services (HSIC 732903), and

(g) Radio and television stations and studios (HSIC 9411)

Sector 4: Wholesale (1 269 Establishments)

Establishments of wholesales of

(a) Telephone system (HSIC 611821),

(b) Telecommunications equipment (excluding telephone system) (HSIC 611822),

(c) Electrical goods (excluding machinery, office and telecommunications equipment and appliances) (HSIC 611823),

(d) Computer, computer peripherals and software packages (HSIC 611824), and

(e) Office machines, appliances and equipment (excluding computer, furniture and fixtures) (HSIC 611825).

Sector 5: Design Houses, Relevant Educational Institutions And Government Departments (34 Establishments)

(a) Electronics design houses,

(b) Relevant departments of local educational institutions, and

(c) Relevant government departments.

Notes: (1) HSIC - Hong Kong Standard Industrial Classification.

(2) + The number excludes those establishments with an employment size below 10 as they are unlikely to have a significant number of technical staff.

Survey Findings

3. The survey revealed that in June 2004, a total of 111 143 persons were employed in the Hong Kong electronics industry. Of the 111 143 employees, 46 594 were employed in principal jobs of electronics engineering and related disciplines in the electronics industry.

4. The distribution of workers employed in principal jobs of electronics engineering and related disciplines by sector according to skill level is as follow:

Skill Level	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Total	
	Manufacturing	Trading and Services	Telecom Services	Wholesale	Design Houses & Gov Dept etc	Number	Percentage
Technologist	1 086	10 551	2 101	506	524	14 768	31.7%
Technician	2 268	12 329	3 958	929	1 072	20 556	44.1%
Craftsman	496	3 211	720	84	276	4 787	10.3%
Operative	5 835	438	131	68	11	6 483	13.9%
Total	9 685	26 529	6 910	1 587	1 883	46 594	100%
	(20.8%)	(56.9%)	(14.8%)	(3.4%)	(4.1%)	(100%)	

5. At the time of the survey, employers reported a total of 415 trainees and 1 040 vacancies in electronics engineering and related disciplines, representing 0.89% and 2.2% respectively of the workforce. Besides, employers also forecasted that the industry would require 48 238 workers by June 2005, an increase of 3.5% of the workforce in June 2004.

Future Manpower Requirement (2005 – 2007)

6. With the continuous benefits from the mainland's growing economy and the revival in the global economy, Hong Kong's economy has no longer influenced by the SARS effect but is recovering steadily and expected to grow mildly in the coming years. Based on the business outlook, parts and components trends and product trends, the Training Board has a cautious optimistic view that the electronics industry will be benefited from the local economy recovery and will grow mildly and steadily in the coming years. Also the industry will need more manpower, especially at high skill levels, to adopt the rapidly changed new technologies to the industry.

7. Taking the above into consideration as well as employers' forecast on manpower requirement in 2005 collected from the survey, the Training Board considers that the technical manpower of Sector 4 will be stable, a mild decrease in Sector 1, while a moderate growth in Sectors 2, 3 and 5 from 2005 to 2007.

8. Based on members' experience and knowledge of the manpower characteristics of the industry which will be espected to have low mobility of skilled workers in the coming years, the Training Board estimates the loss of technical manpower of the industry in terms of a wastage rate for 2005-2007, as below:

Skill Level	Annual Wastage Rate
Technologist	3.0%
Technician	3.0%
Craftsman	3.0%

9. The Training Board has also estimated the average annual training demands at technologist, technician and craftsman levels from 2005 to 2007 by the electronics industry to cover both growth and wastage as below:

Skill Level	Average Annual Training Demand
Technologist	419 – 513
Technician	1 093 – 1 335
Craftsman	230 – 282

10. In view of the slow pick up of the global economy and taking into account the effect of China's accession to World Trade Organisation on business opportunities to Hong Kong, the Training Board has cautious optimism in the mild and steady growth of the electronics industry in the coming few years. However, the expanding mainland and other Asian electronics manufacturing industry will continue to pose an increasing threat to the local electronics industry. Hong Kong manufacturers must therefore upgrade their products by adding more features and enriching their product assortment. In order to complete in the world markets, manufacturers also have to produce more innovative and higher value-added products. As a result, there will be a continued demand for properly trained manpower at higher skill levels. The Training Board recommends that employers should take measures to strengthen and upgrade their technical workforce.

11. The Training Board will conduct another manpower survey of the electronics industry in 2006 to review and update the manpower requirements of the industry.

SECTION I

INTRODUCTION

The Training Board

1.1 The Electronics and Telecommunications Training Board of the Vocational Training Council appointed by the Hong Kong Special Administrative Region Government is required by its terms of reference to determine the manpower and training needs of the electronics industry and to make recommendations to the Council for the development of training facilities to meet such needs. The Training Board comprises members nominated by major trade associations, professional bodies, training and educational institutions, and government departments. The Training Board's membership is at Annex 1.

The Survey

1.2 In pursuance of its terms of reference, the Training Board conducted its 2004 manpower survey of the electronics industry from 28th May to 30th June 2004 to collect up-to-date manpower information with the following objectives:

(i) To assess the manpower and training needs by principal job of the electronics industry.

(ii) To recommend measures to meet the manpower and training needs of the electronics industry.

1.3 The survey was carried out with the assistance of the Census and Statistics Department. The following information was collected from each employer selected for the survey:

(a) number of workers employed at the time of the survey,

(b) number of workers under training,

(c) number of existing vacancies,

(d) employer's forecast on total number of workers by June 2005,

(e) average monthly income of workers, and

(f) employer's views on preferred education, training mode and training period of workers.

1.4 Employers were also requested to provide information on their technologists, technicians and craftsmen who had been deployed to work outside Hong Kong for more than 6 months during the 12 months prior to the survey.

Scope of the Survey

1.5 The survey covered establishments, relevant educational institutions and government departments in the following five sectors of the electronics industry:

Sector 1: Manufacturing

Manufacturers of

(a) Computing machinery and equipment (HSIC 3822),

(b) Transistorized radios (HSIC 3831),

(c) Television receivers and communications equipment (HSIC 3832),

(d) Sound reproducing and recording equipment and apparatus (HSIC 3833),

(e) Gramophone, records and magnetic tapes (HSIC 3834),

(f) Electronic parts and components (HSIC 3840),

(g) Electronic toys (HSIC 3852),

(h) Electronic industrial apparatus (HSIC 3868), and

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Sector 2: Trading and Services

Establishments of

(a) Burglar alarm/intercommunication system installation (HSIC 5516),

(b) Imports and exports of

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(d) Other electronics engineering services not included in (a) to (c).

Sector 3: Telecommunication Services

Establishments of

(a) Wireline based fixed telecommunications network services (HSIC 732101),

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Sector 4: Wholesale

Establishments of wholesales of

(a) Telephone system (HSIC 611821),

(b) Telecommunications equipment (excluding telephone system) (HSIC 611822),

(c) Electrical goods (excluding machinery, office and telecommunications equipment and appliances) (HSIC 611823),

(d) Computer, computer peripherals and software packages (HSIC 611824), and

(e) Office machines, appliances and equipment (excluding computer, furniture and fixtures) (HSIC 611825).

Sector 5: Design Houses, Relevant Educational Institutions and Government Departments

(a) Electronics design houses,

(b) Relevant departments of local educational institutions, and

(c) Relevant government departments.

Notes:

(1) HSIC - Hong Kong Standard Industrial Classification.

(2) + The number excludes those establishments with an employment size below 10 as they are unlikely to have a significant number of technical staff.

Method of Survey

1.6 There were altogether 4 210 establishments in the above five sectors of the electronics industry, excluding those with employment size below 10 in Sector 2 which were unlikely to have a significant number of relevant technical staff. In view of limited resources available, the stratified random sampling method was adopted to select establishments in Sectors 1, 2, 3 and 4. However, all the establishments in Sector 5 were included. A total of 636 establishments were selected to be visited in the survey and they employed about 63.3% of the workforce in the industry.

1.7 Two weeks before the fieldwork, a survey questionnaire together with explanatory notes and job descriptions of a list of principal jobs in electronics engineering and related disciplines of the industry (Annexes 3 to 5) were sent to each selected establishment.

1.8 During the fieldwork period, officers of the Census and Statistics Department visited all 636 establishments to collect the completed questionnaires and, where necessary, to help employers to complete the questionnaires.

1.9 All returned questionnaires were scrutinized and, where necessary, clarified with the respondents. The data collected were then processed by the Census and Statistics Department. The survey data of Sectors 1, 2, 3 and 4 were scaled up statistically to reflect the overall manpower situation of these sectors at the time of the survey.

Publicity

1.10 Prior publicity of the survey was given through the local press. Relevant employers' associations were also requested to publicize the survey among their members.

Survey Response

1.11 Of the 636 selected establishments for the survey, 448 supplied the required information and 18 refused to do so. The remaining 170 establishments had either closed, moved, merged with other establishments or changed nature of their business. The effective response rate of the survey was about 96.1%.

1.12 During the survey, some establishments just provided its rough manpower information and did not give details of their employees' monthly income, number of trainees or number of vacancies at the date of survey. The reasons were they were too busy and not willing to provide confidential information of their organizations.

The Report

1.13 This report presents the findings of the survey, the Training Board's forecast of the manpower needs of the electronics industry and recommendations on measures to meet these needs. In the report, both the terms "workforce" and "workers' refer to technical manpower in the listed principal jobs but exclude trainees. The term "trainees" includes all those receiving any form of training including registered apprentices under a contract of apprenticeship.

SECTION II

SUMMARY OF SURVEY FINDINGS

Number of Persons Employed

2.1 The survey revealed that in June 2004, a total of 111 143 persons were employed in the Hong Kong electronics industry. Of the 111 143 employees, 46 594 were employed in principal jobs of electronics engineering and related disciplines of the electronics industry which were summarised in the following paragraphs.

Manpower by Skill Level and by Sector

2.2 The distribution of workers by skill level and by sector is given in the following Table 2.A, and Figures 1 and 2.

Table 2.A: Distribution of Workers by Skill Level and by Sector

Skill Level	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Total	
	Manufacturing	Trading and Services	Telecom Services	Wholesale	Design Houses & Gov Dept etc	Number	Percentage
Technologist	1 086	10 551	2 101	506	524	14 768	31.7%
Technician	2 268	12 329	3 958	929	1 072	20 556	44.1%
Craftsman	496	3 211	720	84	276	4 787	10.3%
Operative	5 835	438	131	68	11	6 483	13.9%
Total	9 685	26 529	6 910	1 587	1 883	46 594	100%
	(20.8%)	(56.9%)	(14.8%)	(3.4%)	(4.1%)	(100%)	

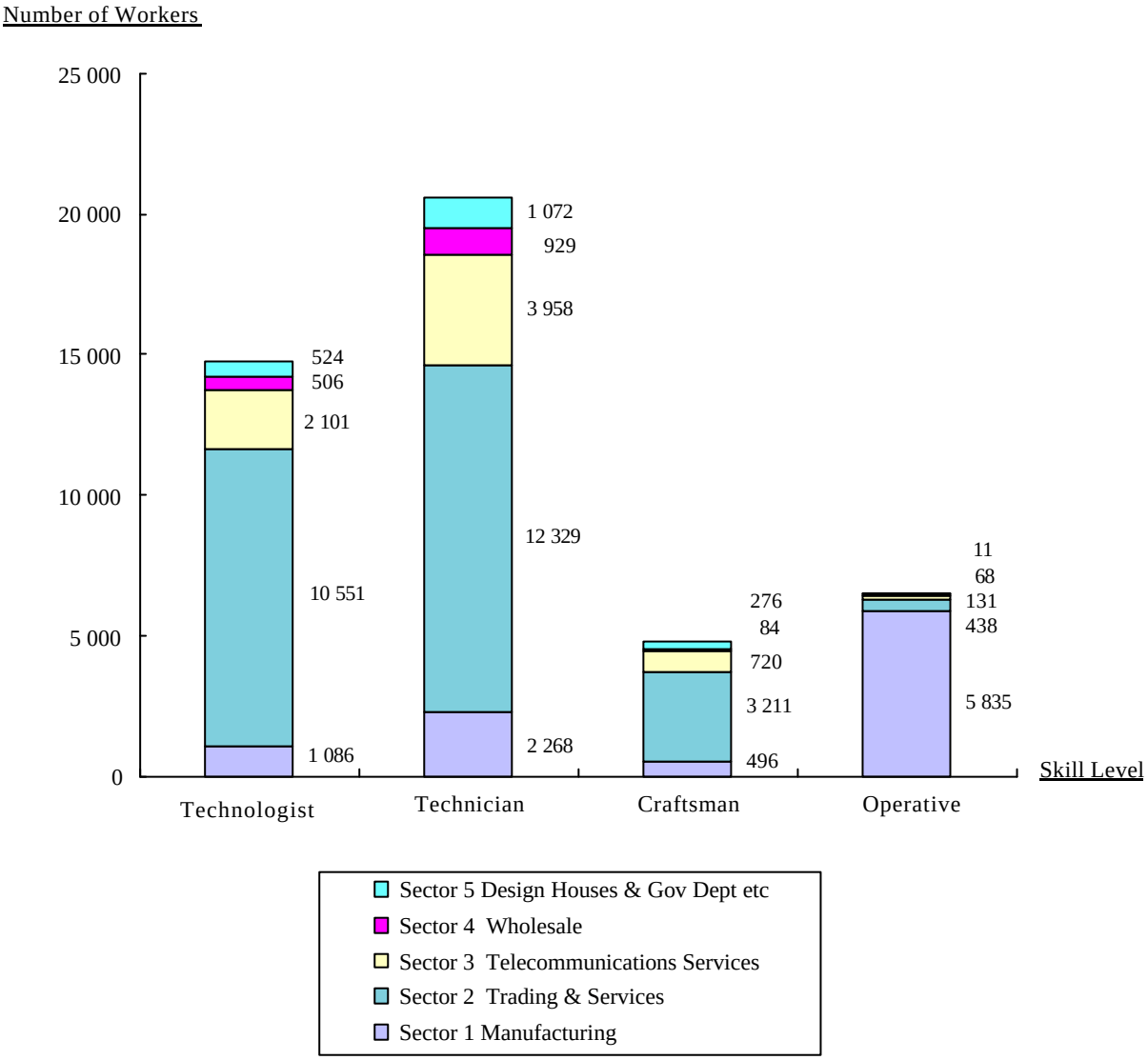


Figure 1: Distribution of Workers by Skill Level

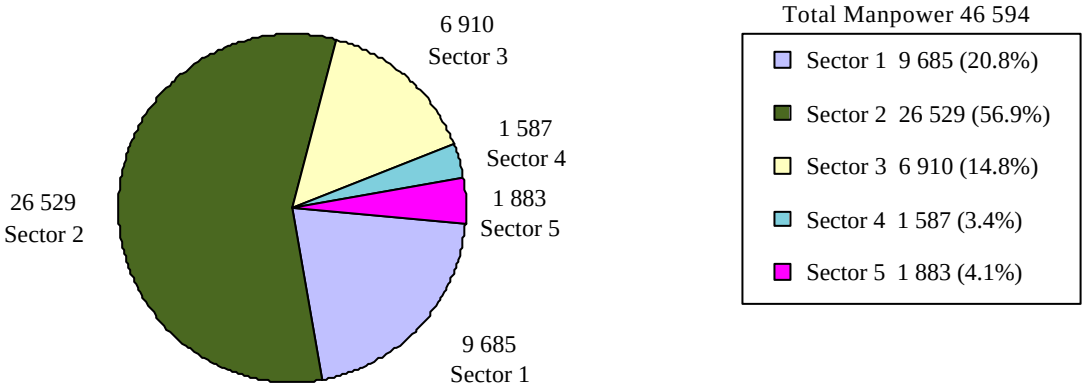


Figure 2: Distribution of Workers by Sector

The Most Populous Job

2.3 The most populous principal job by skill level is given in Table 2.B below:

Table 2.B: The Most Populous Job by Skill Level

Skill Level	Job Title	Number of Workers
Technologist	Electronics Engineer	6 919
Technician	Electronics Technician	12 587
Craftsman	Electronics Craftsman	3 956
Operative	Operator	6 483

Number of Trainees

2.4 There were 415 trainees at the time of the survey and their distribution by skill level is given in Table 2.C below. Details of the reported trainees by sector are shown in Appendices 1-5.

Table 2.C: Distribution of Trainees by Skill Level

Skill Level	Number of Workers	Number of Trainees	Percentage of Workers at the Same Level
Technologist	14 768	31	0.21%
Technician	20 556	153	0.74%
Craftsman	4 787	231	4.83%
Operative	6 483	0	0%
Total	46 594	415	0.89%

2.5 The principal job with the largest number of trainees at each skill level are given in Table 2.D below:

Table 2.D: Principal Job at Each Skill Level with the Largest Number of Trainees

Skill Level	Job Title	Number of Trainees
Technologist	Electronics Engineer	31
Technician	Electronics Technician	152
Craftsman	Electronics Craftsman	231

Number of Existing Vacancies and Employers' Forecast of Total Number of Workers by June 2005

(Appendices 1-6)

2.6 Employers reported a total of 1 040 vacancies, representing 2.2% of the total workforce. The reported vacancies by skill level are shown in Table 2.E and Figure 3 below. Details of the reported vacancies by sector are shown in Appendices 1-5.

2.7 Employers also forecasted that the industry would require 48 238 workers in electronics engineering and related disciplines by June 2005. Their distribution by skill level is shown in Table 2.E and Figure 3 below. Details of the forecasts by sector are also shown in Appendices 1-5.

Table 2.E: Reported Vacancies in June 2004 and Forecasted Number of Workers by June 2005

Skill Level	No. of Workers Employed in June 2004	No. of Reported Vacancies in June 2004	Employers' Forecast of Total No. of Workers by June 2005
Technologist	14 768	347	15 315
Technician	20 556	465	21 304
Craftsman	4 787	90	4 977
Operative	6 483	138	6 642
Total	46 594	1 040	48 238

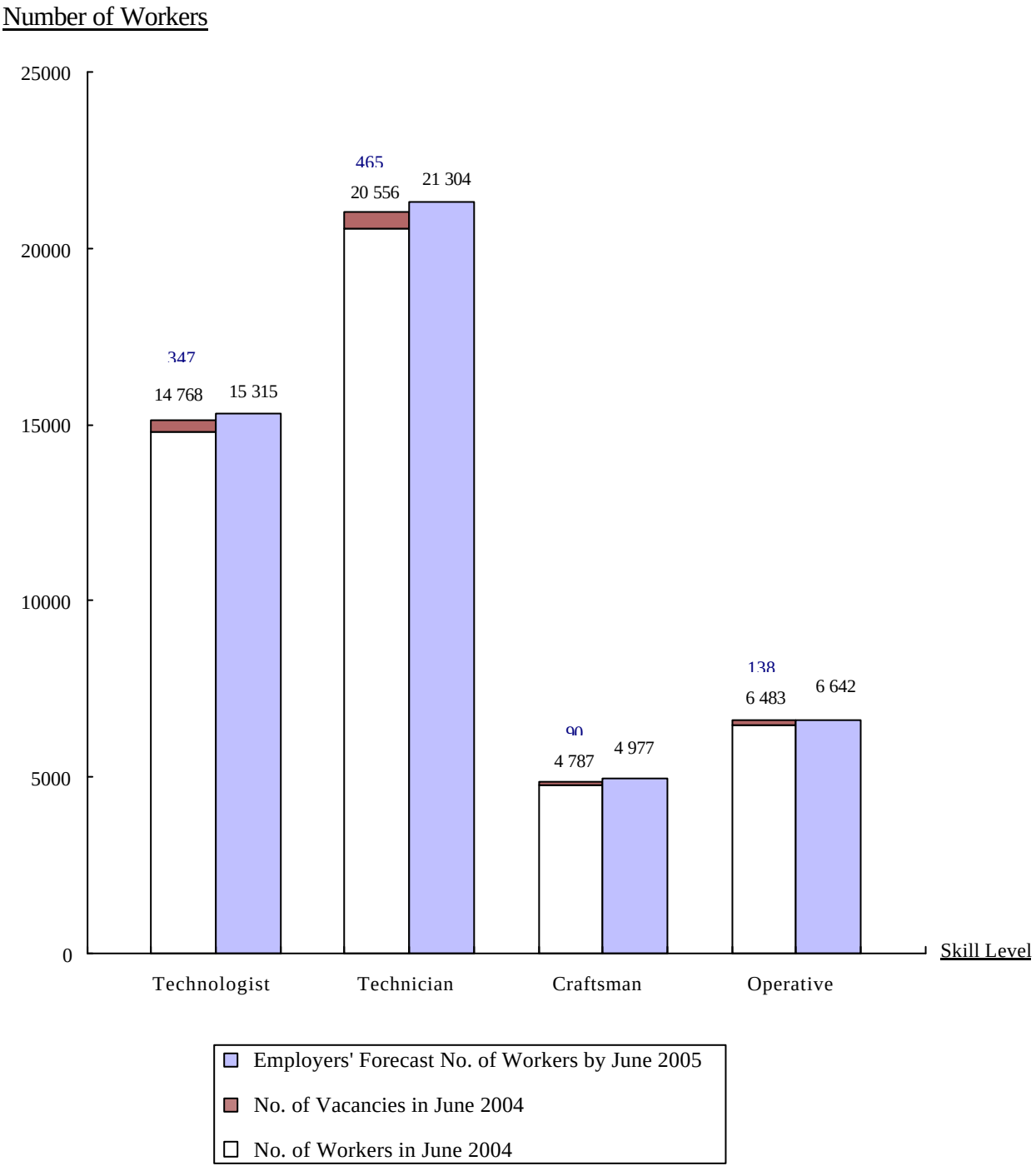


Figure 3: Comparison of Sum of Number of Workers and Vacancies by Skill Level in June 2004 with Employers' Forecast No. of Workers by Skill Level by June 2005

Preferred Education Standard

2.8 Views of employers on the preferred education standard of technologists, technicians and craftsmen are given in Table 2.F and Figure 4 below:

Table 2.F: Employers' Views on Preferred Education Standard

Skill Level	Number of Workers	Degree, Associate-ship or Equivalent	Higher Diploma	Diploma	Higher Certificate	Certificate	Secondary 5	Craft Certificate	Secondary 3 or below	Unspecified
Technologist	14 768	11 804	1 650	271	61	-	-	-	-	982
Technician	20 546	5 168	2 485	3 326	1 835	4 859	585	-	-	2 288
Craftsman	4 787	-	-	-	-	1 482	929	3 070	195	7
Total	40 101	16 972	4 135	3 597	1 964	6 341	1 514	3 070	195	3 277

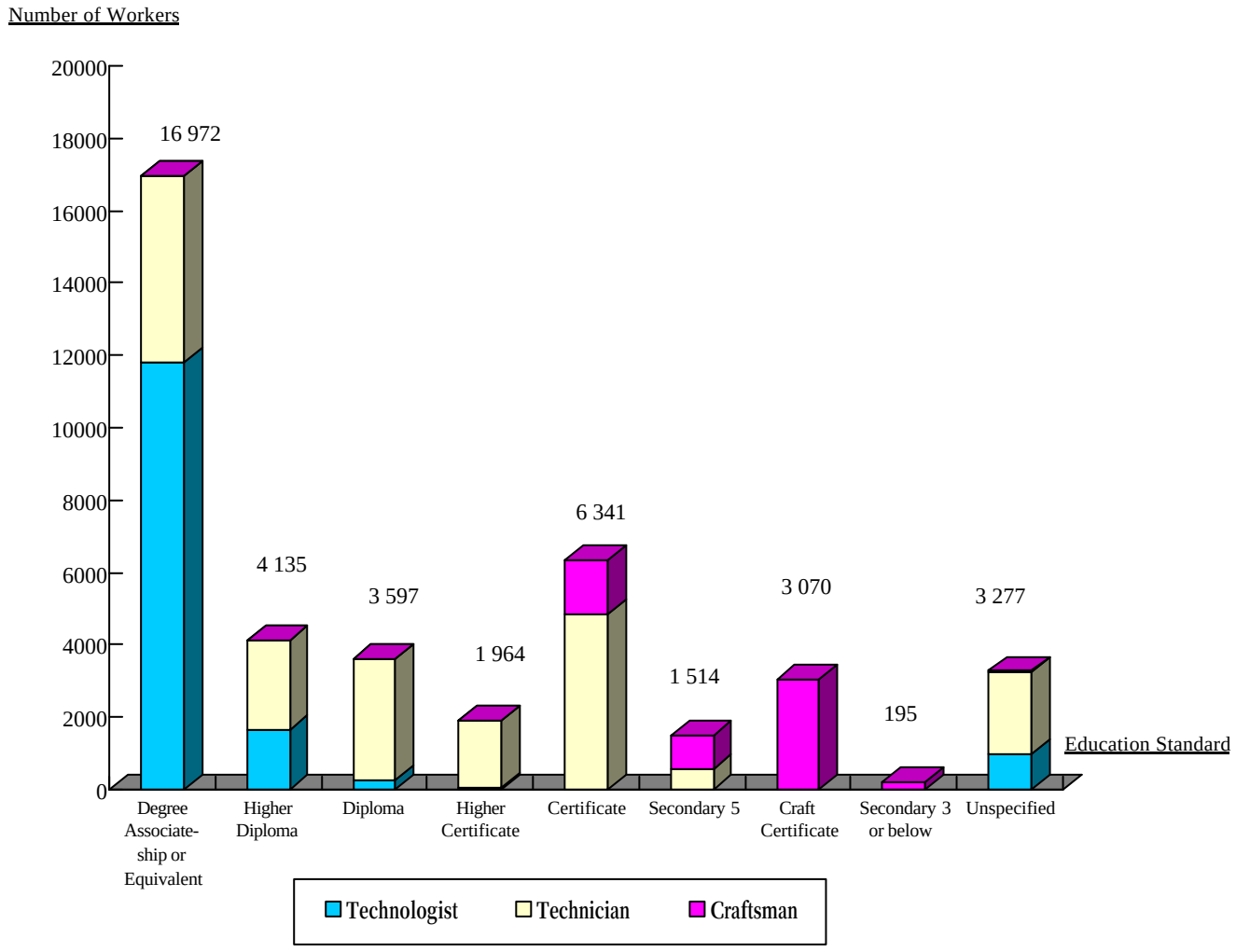


Figure 4: Employers' Preferred Education Standard

2.9 Views of employers on the preferred mode of training of technologists, technicians and craftsmen are given in Table 2.G and Figure 5 below:

Table 2.G: Employers' Views on Preferred Mode of Training

Skill Level	Number of Workers	Training Mode				
		Graduate Traineeship	On-the-job Training	Apprentice-ship	Off-the-job Training	Unspecified
Technologist	14 768	712	12 934	-	-	1 122
Technician	20 546	-	16 677	1 545	22	2 302
Craftsman	4 787	-	3 370	1 106	304	7
Total :	40 101	712	32 981	2 651	326	3 431

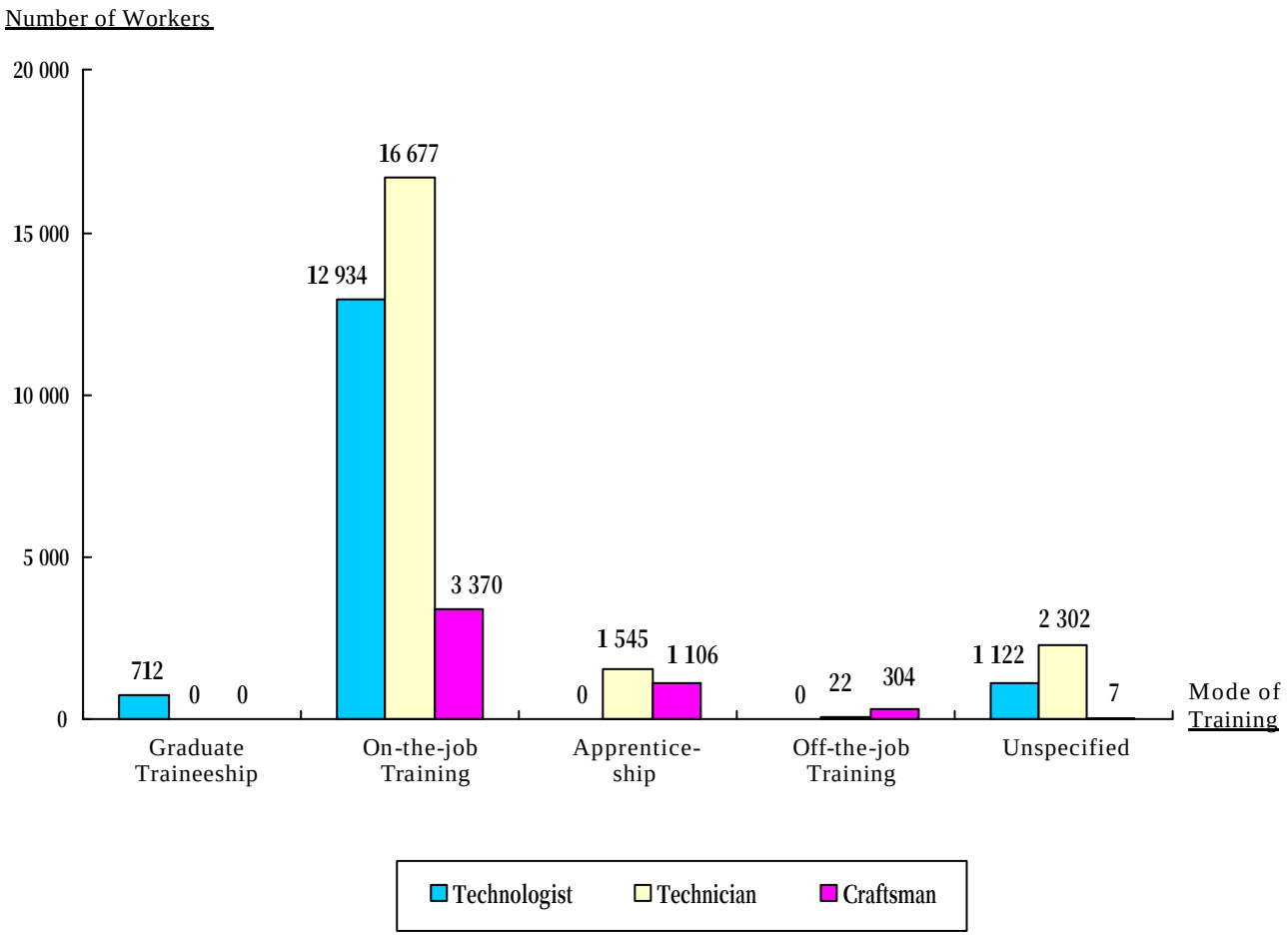


Figure 5: Employers' Preferred Mode of Training

2.10 Employers' views on the period of training required for each skill level are given in Table H and Figure 6 below:

Table 2.H: Employers' Views on Preferred Period of Training

Skill Level	Number of Workers	4 Years or Above	3 Years - < 4 Years	2 Years - < 3 Years	1 Year - < 2 Years	6 - < 12 Months	Below 6 Months	Unspecified
Technologist	14 768	5 229	3 534	3 977	280	150	81	1 217
Technician	20546	691	3 415	6 300	7 699	130	39	2 302
Craftsman	4 787	331	94	1 804	2 282	261	8	7
Total :	40 101	6 551	7 043	12 081	10 231	541	128	3 526

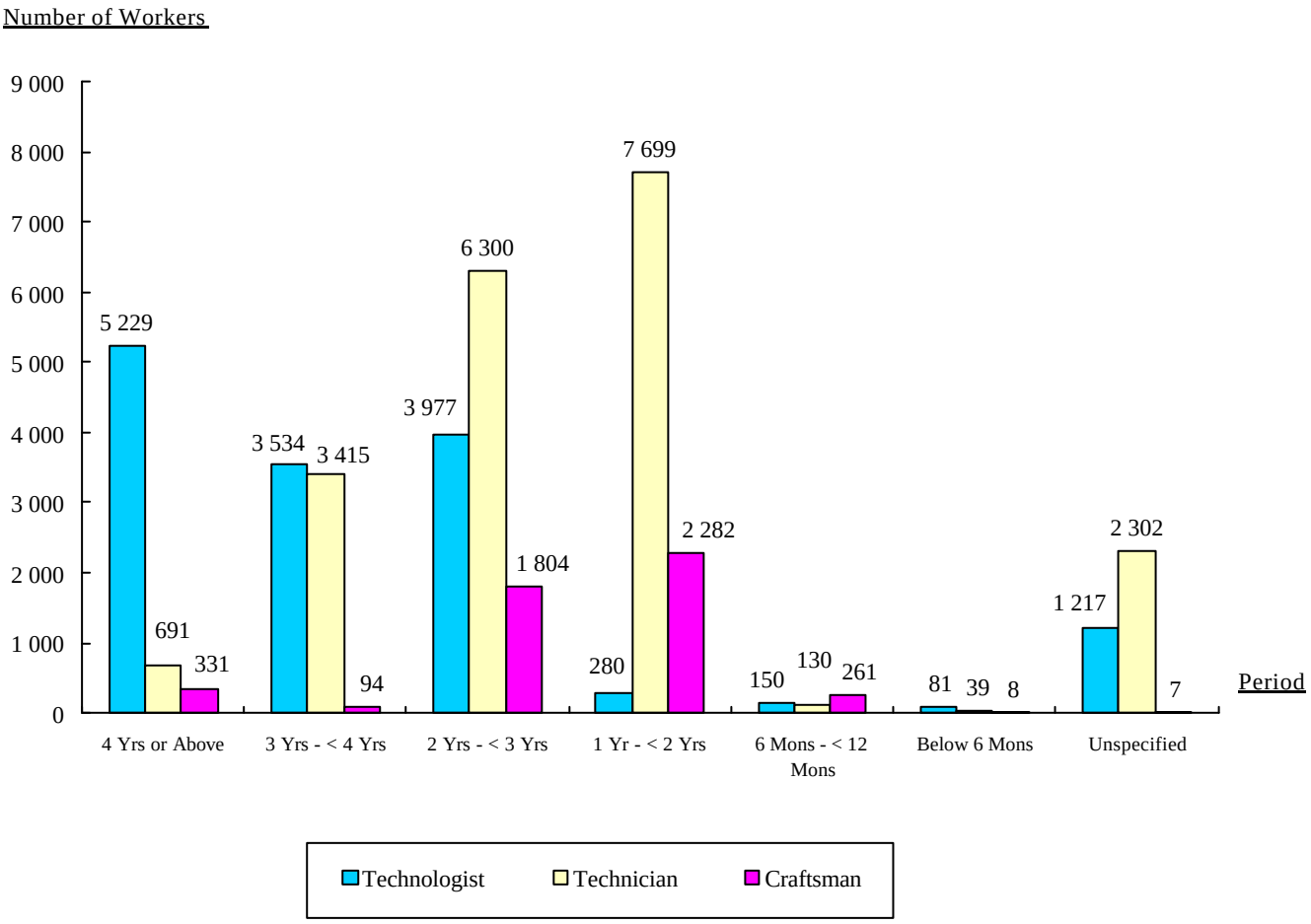


Figure 6: Employers' Preferred Period of Training

Note : Yrs = Years, Mons = Months

Monthly Income Range of Employees

(Appendix 7)

2.11 The distributions of monthly income ranges of workers in principal jobs of electronics engineering and related disciplines are at Appendix 7 and summarised in Table 2.I and Figure 7 below:

Table 2.I: Distribution of Workers by Monthly Income Range

Job Level	Below $6,001	$6,001-$8,000	$8,000-$10,000	$10,001-$15,000	$15,001-$20,000	$20,001-$25,000	$25,001-$30,000	Over $30,000	Unspecified
Technologist	-	-	36	1 217	2 420	2 638	1 833	3 418	3 206
Technician	30	303	2 649	5 892	4 214	1 532	1 564	314	4 058
Craftsman	11	826	1 702	2 064	119	-	-	-	65
Operative	1 746	3 513	1 074	25	-	-	-	-	125
Total	1 787	4 642	5 461	9 198	6 753	4 170	3 397	3 732	7 454

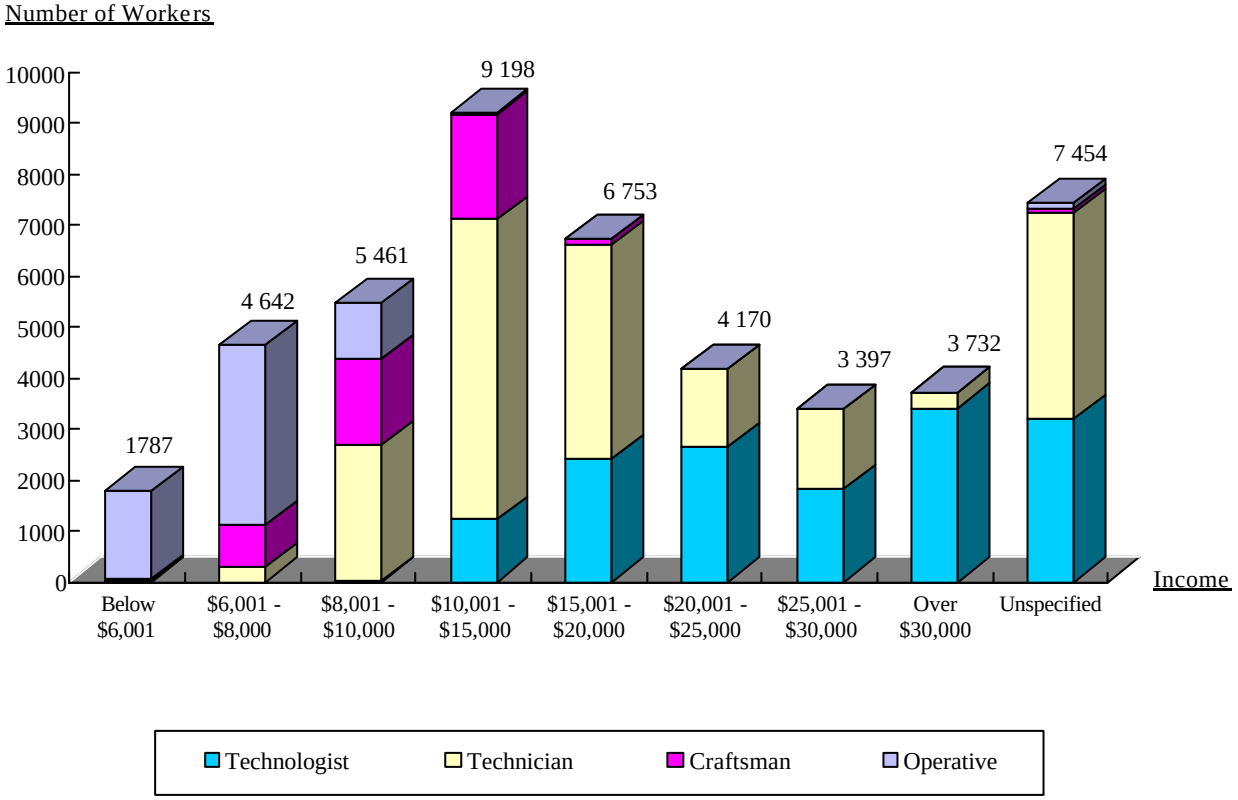


Figure 7: Distribution of Workers by Monthly Income Range

Internal Promotion

2.12 In the twelve months prior to the survey, 205 workers were promoted internally to higher skill level posts. The distribution of these workers is given in Table 2J.

Table 2.J: Internal Promotion in the Electronics Industry

Promotion From	Number of Workers Promoted	Percentage of Workers at the Promoted Level
Technician to Technologist	152	1.03%
Craftsman to Technician	41	0.20%
Operative to Craftsman	12	0.25%
Total	205	0.51%

Technical Staff Working Outside Hong Kong

2.13 In the past twelve months ending June 2004, 1 437 technologists, 533 technicians and 108 craftsmen had worked for more than 6 months outside Hong Kong. They represented 9.7%, 2.6% and 2.3% of the workforce in respective skill levels. However, the above figures may not represent wholly the actual situation as some large and medium establishments selected to be surveyed did not provide the information.

SECTION III

CONCLUSIONS

General

3.1 The Training Board has carefully examined the survey findings and considers that they generally reflect the actual employment situation of the electronics industry at the time of the survey.

Comparison of Manpower

3.2 The total manpower in principal jobs of electronics and related disciplines of the industry has decreased by 2.6% per annum from 49 094 workers in 2002 to 46 594 in 2004. An analysis of the manpower changes by sector and by skill level is detailed in the following paragraphs. In view of their close business and manpower nature, the Training Board decides to combine Sector 2 and Sector 4 for manpower comparison and analysis. The distribution and comparison of manpower in 2002 and 2004 by skill level and by branch are summarized in Table 3.A below:

Table 3.A : Comparison of Manpower in 2004 by Skill Level and by Sector with the Manpower in 2002 (shown in bracket)

Skill Level	Sector 1	Sectors 2 & 4	Sector 3	Sector 5	Total	
	Manufacturing	Trading, Services and Wholesale	Telecom Services	Design Houses & Govern' t Dept.		**Annual Change**
Technologist	1 086 (1 828)	11 057 (13 812)	2 101 (2 014)	524 (528)	14 768 (18 182)	**-9.9%**
Technician	2 268 (1 813)	13 258 (11 377)	3 958 (3 756)	1 072 (902)	20 556 (17 848)	**+7.3%**
Craftsman	496 (763)	3 295 (2 446)	720 (444)	276 (260)	4 787 (3 913)	**+10.6%**
Operative	5 835 (7 009)	506 (1 959)	131 (154)	11 (29)	6 483 (9 151)	**-15.8%**
Total	9 685 (11 413)	28 116 (29 594)	6 910 (6 368)	1 883 (1 719)	46 594 (49 094)	**-2.6%**
Annual Change	**-7.9%**	**-2.5%**	**+4.2%**	**+4.7%**	**-2.6%**	

Manpower Change by Sector

3.3 The SARS effect in 2003 and the subsequent economic downturn caused a bad impact to the electronics industry. Table 3.A shows that the total manpower of the electronics industry decreased by 2.6% annually over the past two years. It recorded a continued annual decrease of 7.9% in Sector 1 – Manufacturing, a mild annual decrease of 2.5% in Sectors 2 & 4 – Trading, Services and Wholesale. On the other hand, the survey showed that there were annual increases of 4.2% and 4.7% in Sector 3 – Telecommunication Services and Sector 5 – Design Houses and Government Departments respectively.

3.4 The followings attributed to the manpower changes by sector:

(i) The manpower decrease in Sector 1 was mainly due to continued transfer of key operations (engineering and product design) in manufacturing services from Hong Kong to the mainland and the SARS effect in 2003.

(ii) The slightly manpower decrease in Sectors 2 and 4 showed that it had not been fully recovered from the harm by the SARS effect in 2003 as the demand for capital electronics equipment and systems was recovering slowly.

(iii) The mild manpower increase in Sector 3 reflected that the sector which was one of the important infrastructures of Hong Kong continued to provide new telecommunication services to the public.

(iv) The mild manpower increase in Sector 5 was mainly due to the continuous expansion of IC design business in the sector.

Manpower Changes by Skill Level

3.5 The survey revealed a drastic decrease of technologists but high demand for technicians and surprising increase of craftsmen. The followings attributed to such manpower changes by skill level:

(i) The annual decrease of 9.9% of technologists might be due to restructure of the wage level of technologists and technicians to cope with the business environment of the electronics industry over the past two years. In the period, new technicians were usually recruited to replace those technologists who were laid off by companies/retired from work.

(ii) The significant annual increase of 7.3% of technician was attributed by the same reason mentioned in (i).

(iii) The noticeable annual increase of 10.6% of craftsmen was due to the new services launched in Sector 3 requiring more craftsmen to carry out installation work, and the upgrade of some 900 operatives to craftsmen in Sector 2.

Business Outlook

Whole Industry

3.6 The electronics industry had gone through a rather difficult period in the past two years. However, it is still the largest local merchandise export earner which accounted for 42% of Hong Kong's total exports in 2003. In 2002, Hong Kong was the largest world exporter of telephone sets in value terms. The exports of electronics products grew by 25% from January to September 2004. The mainland, USA, Europe, ASEAN and Japan were still its major markets.

Manufacturing Sector

3.7 Sector 1 – Manufacturing would unlikely to have growth in the coming year. In the meantime, companies in the sector would continue to downsize their operations in Hong Kong by transferring them outside Hong Kong. As a result, more and more local technical manpower would be employed for their operation there. The sufficient supply of experienced technical mainlanders with lower salaries than the Hong Kong counterparts would further tempt Hong Kong companies to replace their Hong Kong staff working in the mainland by mainlanders.

3.8 On the other hand, other than the mainland enterprises, other Asian manufacturers have continuously posed an increasing threat to the Hong Kong electronics manufacturing sector. In order to maintain the market shares, many local electronics manufacturers have differentiated their products by adding more features and enriching their assortments.

3.9 To face the strong competition, local electronics manufacturers have also gradually concentrated more in ODM business as a value-added service to their customers. In order to further enhance their competitiveness, they have adopted more advanced technologies in their product design and manufacturing.

Trading, Services and Wholesale Sectors

3.10 In view of the present economic development in Hong Kong and the benefits from the individual travel scheme of mainland visitors, Sector 2 – Trading and Services will have a mild business growth in the coming years and the manpower of the sector will slightly increase to cope with the improved business activities.

3.11 The wholesale business in Sector 4 - Wholesale will also be benefited from the present improved business environment. However, the technical manpower of the sector will be maintained at the present level as many companies in the sector have strict manpower control for better cost effectiveness.

Telecommunication Services Sector

3.12 Since the launch of third-generation (3G) mobile phone service by a major provider in January 2004, the other two 3G services providers will enter the market soon. This together with other new telecommunication services, such as digital television broadcast targetted to be launched in 2006/2007, and the Voice over Internet Protocol (VoIP) technology for phone service etc., will make Sector 3 - Telecommunication Services enjoy a mild growth in the coming years.

3.13 On the other hand, major telecommunication companies continue to expand the outsourcing portion of their technical works, limiting the growth of full-time employees in the sector. However, as the sector is still an important and large local servicing sector, it still requires an increase of manpower to cope with its growing business. As a result, it is believed that more technical workers will be in demand by the sector not only to provide for new services but for maintaining and upgrading the existing systems in the coming years.

Design Houses, University and Government Department Sector

3.14 There will be an additional demand for manpower by design houses in Sector 5 – Design Houses, University and Government Department as local IC design business will continue to expand in the coming years. It is expected that the sector will require more technical manpower especially at high skill levels to support its growth.

3.15 On the other hand, the Government Departments and Universities in the sector will continue consolidating their manpower in the coming year.

Challenges from China's WTO Accession, CEPA and 2008 Olympic Game

3.16 Following China's accession to the World Trade Organisation (WTO) in December 2001, it has gradually opened its market. This will continue to create lucrative opportunities for the Hong Kong's electronics industry. Its lower tariffs and removal of quotas will facilitate sales of products from Hong Kong. The liberalisation of China's trading and distribution sectors has further opened up a huge market for Hong's Kong's electronics companies, especially those in the parts and components branch. Also, the gradual removal of restrictions on domestic sales of goods manufactured by the mainland's foreign-invested enterprises gives Hong Kong firms with an extra opportunity to further expand their mainland market.

3.17 The Closer Economic Partnership Arrangement (CEPA) came into effect in January 2004. Hong Kong electronics companies producing electronics parts & components and products locally are benefited under CEPA from zero tariff access to the mainland market. Also, additional electronics items under the second phase of CEPA (CEPA II) will also enjoy duty-free access to the mainland market from 1st January 2005.

3.18 In 2008, China will hold the Olympic Game. It has started to build related facilities with an aim to establishing a high-tech centre for the event, including telecommunication infrastructures like 3G mobile phone service and digital television broadcast. This will provide ample business opportunities to Hong Kong electronics firms in telephone service, electronics ticketing, smart card, network broadcasting and etc.

3.19 With the tremendous business opportunities ahead, local electronics companies will also face intense competition from both overseas companies and the mainland counterparts. It seems that one of the key strategies for local companies is to have sufficient qualified technical manpower for the emergent challenge. Thus, the demand for technologists and technicians would be gradually increased in the coming years.

Parts and Components Trends

3.20 In view of present strong demand of digital products such as MPEG Audio Layer 3 (MP3) players, digital cameras, digital camcorders, personal digital assistants (PDAs), mobile telecommunications products and other digital information appliances (like electronic dictionaries and translators), the sales of electronics parts and components will be expected to have a continuous increase. Also, with Bluetooth and wireless local area network (WLAN) becoming the popular wireless communication technologies, electronics manufacturers should have huge business in wireless modules and components used in telecommunication and computer products & peripherals.

3.21 Other than the various standard items such as resistors, capacitors, inductors, switches, quartz, transformers, discrete and active components, printed circuit boards (PCB) and display units, several key items like fine pitch high density multi-layered PCBs, liquid crystal displays, plasma displays, optical components, high density and long life batteries and memory cards/modules with different formats are expected in great demand. On the other hand, electronics parts and components for car industry are emerged and will become a great potential market. As a whole, it will stimulate faster development in their manufacturing technologies and packaging.

3.22 From the past experience, it is believed that Hong Kong should have the ability to facilitate developing and manufacturing high graded electronics parts and components to meet the world market needs. It is also confident that Hong Kong can continue as a major world trading centre of electronics parts and components.

Product Trends

Computer and Related Products

3.23 With the popularity of the Internet, information technology and broadband network, the conventional desktop personal computer (PC), laptop PC, palm-top (handheld) PC, personal digital assistant (PDA) and fast-growing tablet PC are most with built-in mobile communication access. They are widely used in office for business, school for teaching & learning and home for communication & entertainment. Also, the mobile computing equipment and its like related peripherals, such as storage devices and input-output devices, are in substantial growth. On the other hand, the computing devices equipped with local-language applications will continue to catch the huge Chinese market.

3.24 The other developments in this sector are tablet PC with more value-added features and media centre PC aiming at digital life not only in office, school and home but also becoming an essential device for personal daily & information, communication, entertainment, shopping and finance, etc.

Telecommunication Products

3.25 Bluetooth and WLAN (or called WiFi) have become the popular technologies in wireless access electronics products. Bluetooth-based equipment and various WLAN cards/modules used in various applications for industry, home and business sectors form a fasting-growing market. To take the advantage of these wireless technologies, many telecommunication products like mobile phones are gradually built-in with the technologies together with other functions of photo taking, voice recording, MP3 and radio as valued added features.

3.26 For the mobile communication, the 3G mobile technology is still the focal point worldwide. The 3G mobile handsets used to surf the Internet, send and receive e-mails, and transmit multi-media data, become more popular. Thus, in the coming years, Hong Kong exporters of related terminal equipment, parts and accessories for mobile phones would have to keep track of the latest development in 3G mobile technology.

Audio-visual Products

3.27 In the coming years, digitalization with portability and convergence is still the prominent trend of development in consumer electronics products, especially those in the audio-visual (AV) sector. Thus exports of AV equipment are expected to continue to grow rapidly in the near future. The market for digital video (DV) cameras, still picture digital cameras, digital camcorders and digital video players will continue to grow. The Internet-related items, such as MP3 players and TV set-top boxes for Internet access are still the popular AV products for Hong Kong. Following the increasing demand for digital video players, high quality speakers and good quality TV sets for home theatre entertainment are emerged. With digital TV broadcast which has been scheduled for the coming years (2006-2010) in Europe and USA, the market for multi-media and good quality products such as digital versatile disc (DVD) recorders, LCD TVs, digital TVs and plasma display TVs is expected to be optimistic. All the above will benefit Hong Kong's exporters of AV equipment in the longer run.

3.28 To take the advantage of the popularity of wireless communication technologies, many AV products such as digital cameras, digital camcorders and MP3 players are built-in with wireless connection capability as a value-added feature. Also, taking the advantage of cheap high density memory devices, some AV products are further built-in with features of digital voice recording, radio functions, text reading and photo storage in order to attract customers.

Electronic Toys and Games

3.29 With the continuous introduction of new video game stations with the capacity of Internet connection for e-mail, entertainment, shopping and other features, it is an opportunity for local electronics firms to develop new games for these stations. Also, with the advantages of its excellent telecommunication infrastructure, popular broadband facility as well as creative ideas, Hong Kong can further establish to be a game development centre. On the other hand, the electronic toys and games aiming at the adult consumer market as well as the educational and learning market for kids will continue to enjoy steady sales.

Future Manpower Requirement

3.30 With the continuous benefits from the mainland's growing economy and the revival in the global economy, Hong Kong's economy has no longer influenced by the SARS effect but is recovering steadily and will be expected to grow mildly in the coming years. Based on the business outlook, parts and components trends and product trends as described in paragraphs 3.6 to 3.29, the Training Board has a cautious optimistic view that the electronics industry will grow mildly and steadily in the coming years. Thus, the industry will need more manpower, especially at high skill levels, to adopt the rapidly changed new technologies to the industry.

3.31 Taking the above into consideration as well as employers' forecast on manpower requirement in 2005 collected from the survey, the Training Board considers that the technical manpower of Sector 4 will remain stable, a mild decrease in Sector 1, while a moderate growth in Sectors 2, 3 and 5 from 2005 to 2007.

3.32 Based on members' experience and knowledge of the manpower characteristics of the industry which is expected to have a low turn-over rate of manpower in the coming three years, the Training Board estimates the loss of manpower of the industry, in terms of a wastage rate for 2005-07, as below:

Table 3.B : Annual Wastage Rate for 2005-07

Skill Level	Annual Wastage Rate
Technologist	3.0%
Technician	3.0%
Craftsman	3.0%

3.33 The Training Board has also estimated the average annual training requirements at technologist, technician and craftsman levels from 2005 to 2007 by the electronics industry to cover both growth and wastage as below:

Table 3.C : Average Annual Training Requirement for 2005 - 2007

Skill Level	Average Annual Training Demand
Technologist	419 – 513
Technician	1 093 – 1 335
Craftsman	230 – 282

3.34 The Training Board will conduct another manpower survey of the electronics industry in 2006 to review and update the manpower requirements of the industry.

Annual Training Demands of the Electronics Industry (Appendix 8) and Number of First Year Students Enroled in Local Courses in Electronics Engineering Discipline

3.35 Based on the projected average annual training demand in para. 3.33, the Training Board works out in the following tables (Tables 3.D, 3.F and 3.H) the average annual training requirements in electronics engineering discipline by skill level from 2005 to 2007 with annual training demands of the electronics industry by principal job in Appendix 8. According to the information provided by local educational and training institutions, the Training Board also presents the number of first year students enroled in local courses by skill level in electronics engineering discipline in Tables 3.E, 3.G and 3.I for reference. It is necessary to point out that graduates of electronics engineering discipline not only serve the electronics industry but also other related industries and trades such as electrical and mechanical services, information technology, plastics, toys and electrical appliances industries etc.

Technologist Level

Table 3.D : Projected Average Annual Training Requirement of Technologists in Electronics Engineering Discipline for 2005 - 2007

Job Title	No. Employed at Date of Survey	Projected Average Annual Training Requirement
Electronics Engineer(1)	6 919	196 – 240
Manufacturing/Quality/ Assurance Engineer(2)	1 162	33 – 41
System Analyst(3)	4 710	134 – 164
Total :	12 791	363 – 445

Note : (1) Electronics Engineer also includes Electronics Sales/Support Engineer, and Telecommunications Engineer.

(2) Manufacturing/Quality Assurance Engineer also includes Industrial Engineer, and Quality Control Engineer.

(3) System analyst also includes Software Engineer.

Table 3.E : Number of First Year Students Enroled in Local Technologist Courses in Electronics Engineering Disciplines in 2004/2005

Institution	Course	No. of First Year Students Enroled
City University of Hong Kong	B Eng (Hons) in Computer Engineering	88
	B Eng (Hons) in Electronic & Communications Engineering	112
	B Eng (Hons) in Information Engineering	103
The Chinese University of Hong Kong	B Eng (Hons) in Computer Engineering	44
	B Eng (Hons) in Electronic Engineering	73
	B Eng (Hons) in Information Engineering	85
	B Eng (Hons) in Automation and Computer-Aided Engineering	51
	B Eng (Hons) in Systems Engineering and Engineering Management	67

Institution	Course	No. of First Year Students Enroled
The Hong Kong Polytechnic University	B Eng (Hons) in Electronic & Information Engineering	112
	B Sc (Hons) in Internet & Multimedia Tech	55
The Hong Kong University of Science & Technology	B Eng (Hons) in Computer Engineering	111
	B Eng (Hons) in Computer Science (Information Engineering)	26
	B Eng (Hons) in Electronic Engineering	93
	B Eng (Hons) in Electronic Engineering (Information & Communication Engineering)	44
The University of Hong Kong	B Eng (Hons) in Computer Engineering	25
	B Eng (Hons) in Electronic & Communications Engineering	37
	B Eng (Hons) in Information Engineering	10
	Total	1 136

Notes : (1) B Eng (Hons) = Bachelor of Engineering (Honours)

(2) B Sc (Hons) = Bachelor of Science (Honours)

Technician Level

Table 3.F : Projected Average Annual Training Requirement of Technicians in Electronics Engineering Discipline for 2005 - 2007

Job Title	No. Employed at Date of Survey	Projected Average Annual Training Requirement
Electronics Technician[1]	12 587	670 – 818
Draughtsman	89	4 – 6
Manufacturing/Quality/ Assurance Technician[2]	1 015	54 – 66
Programmer	4 105	218 – 266
Web Developer/Designer	646	34 – 42
Total :	18 442	980 – 1 198

Note : (1) Electronics Technician also includes Electronics Sales/Support Technician, Telecommunications Technician, Computer Technician, and Audio-Visual Technician.

(2) Manufacturing/Quality Assurance Technician also includes Quality Control Technician.

Table 3.G : Number of First Year Students Enroled in Local Technician Courses in Electronics Engineering Disciplines in 2004/2005

Institution	Programme	No. of First Year Students Enroled
City University of Hong Kong	ABA in Electronic Commerce & Web Technology	135
The Hong Kong Polytechnic University	HD in Computer Aided Engineering Design	55
	HD in Electronic & Information Engineering	110
	HD in Internet Technology & E-Commerce	45
	HD in Multimedia Design & Technology	135

Institution	Programme	No. of First Year Students Enroled
Hong Kong Institute of Vocational Education (IVE)	HD in Internet & Multimedia Engineering	123
	HD in Electronic Engineering with Business Management	62
	HD in Electronic & Communications Engineering	96
	HD in Entertainment Electronics	60
	HD in Computer & Information Engineering	62
Electronics Industry Training Centre	Technician Foundation Course in Electronics	117
Information Technology Training & Development Centre	Professional Diploma in Telecommunications Engineering	38
	Professional Diploma in IC Engineering	34
Hong Kong Institute of Vocational Education (IVE)	HD (PTE) in Electronic & Communications Engineering*	96
	HD (PTE) in Computer & Information Engineering*	41
	HC (PTE) in Electronic & Communications Engineering*	80
	C (PTE) in Electronic & Communications Engineering*	70
	Total	1 359

Note: (1) ABA = Associate of Business Administration
(2) HD = Higher Diploma
(3) HC = Higher Certificate
(4) C = Certificate
(5) FD = Foundation Diploma
(6) PTE = Part-time Evening
(7) * Most of the students of the above PTE courses are already in employment

Craftsman Level

Table 3.H : Projected Average Annual Training Requirement of Craftsmen in Electronics Engineering Discipline for 2005 - 2007

Job Title	No. Employed at Date of Survey	Projected Average Annual Training Requirement
Cable Jointer/Wireman	81	3 – 5
Electronics Mechanic*	3 956	191 – 233
Total :	4 037	194 – 238

Note * Electronics Mechanic also includes Audio Visual and Radio Frequercy Mechanic, Repairman (Electronics Manufacturing), and Equipment/Instrument Mechanic.

Table 3.I : Number of First Year Students Enroled in Local Craft Courses in Electronics Engineering Discipline in 2004/2005

Training Centre/Institution	Programme	No. of First Year Students Enroled
Electronics Industry Training Centre	Basic Craft Course in Electronics	138
The Hong Kong Institute of Vocational Education (IVE)	Craft Course in Electronic Servicing (PTE)**	69
	Total	207

Note ** Majority of the graduates of the part-time evening (PTE) Craft Course in Electronic Servicing are already in employment.

SECTION IV

RECOMMENDATIONS

4.1 In view of the revival in the global and local economies and taking into account the effect of China's accession to World Trade Organisation (WTO) and the Closer Economic Partnership Arrangement (CEPA), the Training Board has a cautious optimistic view that the electronics industry will grow mildly and steadily in the coming few years. However, the mainland and other Asian electronics manufacturers will continue to pose an increasing threat to the local electronics industry. Hong Kong manufacturers must therefore upgrade their products by adding more features and enriching their product assortment. In order to compete in the world markets, manufacturers also have to produce more innovative and higher value-added products. As a result, there will be a continued demand for properly trained manpower at higher skill levels. The Training Board recommends that employers should take measures to strengthen and upgrade their technical workforce.

Annual Intake of Technical Workers

4.2 At the time of the survey, there were 31 technologist, 153 technician and 231 craftsman trainees. Since it normally takes two years to train a technologist, four years a technician and three to four years a craftsman (the respective recommended training routes are given in paragraphs 4.5 to 4.15), it is evident that the current on-the-job training effort provided by employers to graduates at technologist and technician levels is inadequate to meet the forecasted manpower demand in the coming years.

4.3 To secure an adequate supply of well-trained technical manpower with a view to continuing the industry's current development, the industry as a whole should embark on a manpower training programme of a scale set out below:

Table 4.A : Recommended Number of Trinees to be Taken on Annually for 2005 - 2007

Skill Level	No. Employed at Date of Survey	Recommended Annual Trainee Intake
Technologist	14 768	419 – 513
Technician	20 556	1 093 – 1 335
Craftsman	4 787	230 – 282

A breakdown of the above figures into various principal jobs is given in Appendix 8.

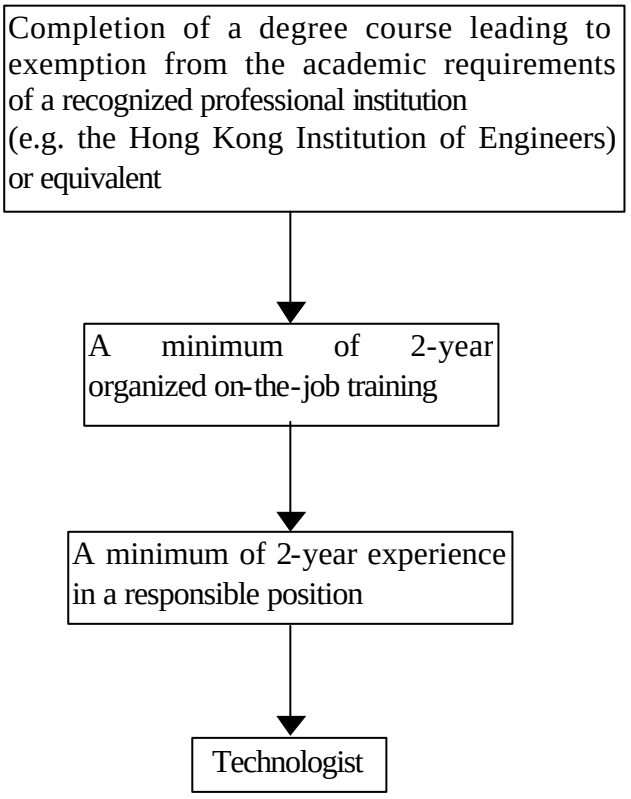
4.4 For manpower planning at the company level, employers should note that the number of trainees indicated above, when expressed in terms of existing manpower, represents an average annual intake of trainees of about 3.2%, 5.9% and 5.4% of the number of technologists, technicians and craftsmen respectively.

Training of Technologists

4.5 A technologist is a person who has the qualifications and experience equivalent to those required for corporate membership of a professional institution. He should be competent in analyzing and solving a wide range of technical problems. Furthermore he should be able to assume personal responsibility for the development and application of engineering principles, exercise original thought and judgement, follow progress in his field of technology, apply the latest techniques, supervise and develop his sub-ordinates.

4.6 Technologists play an important role in bringing about improvement in management and technological innovations. The Training Board recommends that technologists should be trained via the route shown in Figure 4.A:

Figure 4.A : Training of Technologists



4.7 The Chinese University of Hong Kong, The University of Hong Kong, The Hong Kong University of Science and Technology, The Hong Kong Polytechnic University and the City University of Hong Kong offer various degree courses in electronics engineering disciplines (details in paragraph 3.E).

Engineering Graduate Training Scheme (EGTS)

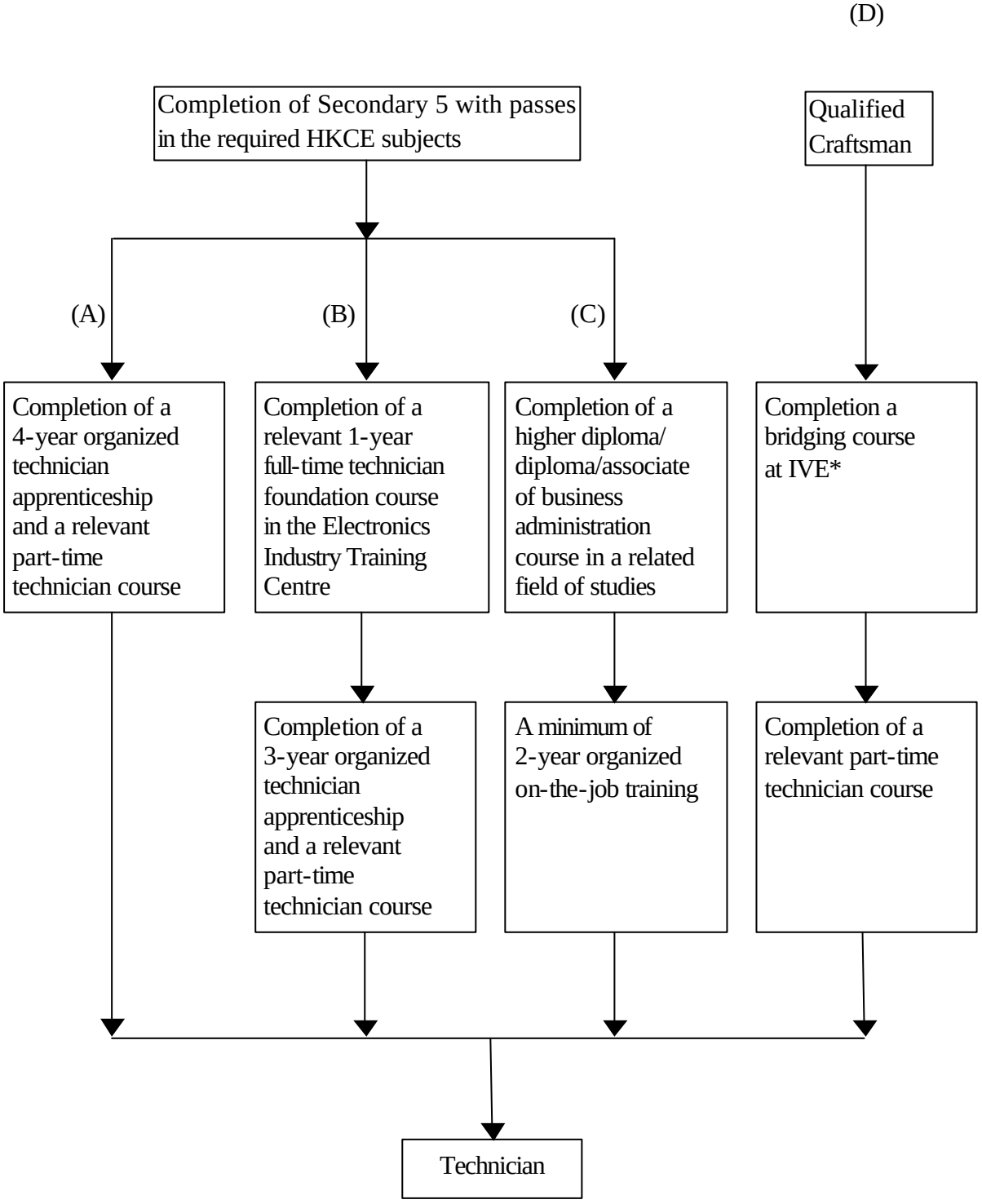
4.8 To bring about more well-structured practical training opportunities in local industries for engineering graduates, the Committee on Training of Technologists of the Vocational Training Council is operating a subsidized training scheme to provide engineering graduates with 18 months practical training of a standard acceptable for corporate membership of the Hong Kong Institution of Engineers. Each graduate receiving training under the scheme is granted a subsidy through his employer as part of his salary and the training progress is monitored by the Committee. The Technologist Training Unit of the Council operates a free placement service to help employers recruit graduates, and graduates obtain opportunities for training. The Unit also offers assistance to employers on all matters concerning the training of engineering trainees. The Training Board strongly recommends employers to contact this Unit and to participate in the scheme.

Training of Technicians

4.9 A technician is a person whose education, practical training and experience enable him to apply proven techniques and procedures to carry out technical tasks normally under the supervision of a technologist.

4.10 The four normal routes (A-D) for training technicians are listed in Figure 4.B:

Figure 4.B: Training of Technicians



* the Hong Kong Institute of Vocational Education (IVE).

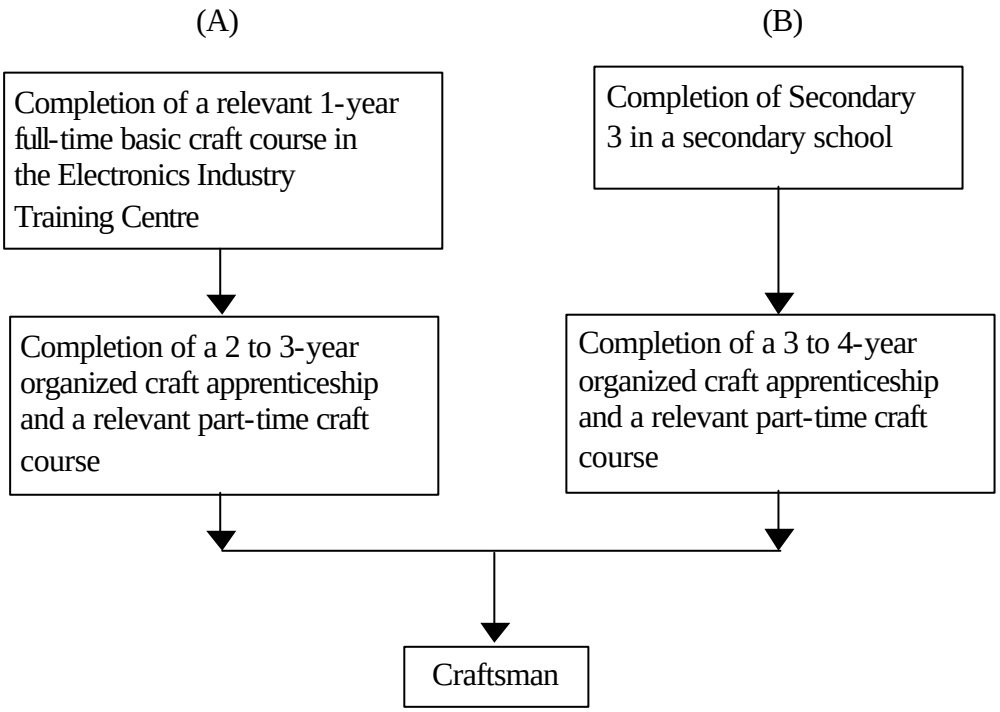
4.11 The City University of Hong Kong and The Hong Kong Polytechnic University offer the Associate Degree and the Higher Diploma courses in electronics engineering discipline. On the other hand, the Hong Kong Institute of Vocational Education (IVE) operated by the Vocational Training Council offers full-time higher diploma and diploma courses, part-time day release and part-time evening higher certificate and certificate courses as well as higher diploma courses in electronics engineering discipline (details in Table 3.G).

Training of Craftsmen

4.12 A craftsman is a worker who is able to apply a wide range of skills to his work with minimum direction and supervision. He requires not only practical skills, but also related theoretical knowledge to enable him to adapt himself to new technologies. A proper craft apprenticeship would contain both elements.

4.13 The two common routes, A and B, for training craftsmen are as follows:

Figure 4.C : Training of Craftsman



4.14 The Training Board recommends route (A) because the apprenticeship period is shorter and the apprentices have already undergone proper basic training and would be productive right from the start of their apprenticeship.

4.15 The Council's basic craft course in electronics engineering is offered by the Electronics Industry Training Centre. The IVE also offers part-time day release and part-time evening craft courses in electronics engineering and related disciplines.

Electronics Industry Training Centre

4.16 The Electronics Industry Training Centre, located in Kowloon Bay, provides pre-employment and upgrading training courses for the electronics industry, which are shown below:

Table 4.B : Courses Offered by the Electronics Industry Training Centre in 2004/2005

	Level	Duration
Full-time Courses		
Foundation Course for Electronics Technician (TFC)	Technician	1 year
Basic Craft Course in Electronics (BCC)	Craftsman	1 year
Part-time Training Courses		
Electronics Manufacturing Automation Courses (details in Table 4.C)	Technologist/ Technician	10 – 75 hours
Low Power Transmission and Reception	Technician	30 hours
Photocopier Principles and Maintenance	Technician	30 hours
PABX Principles and Maintenance	Technician	30 hours
Advanced PABX	Technician	40 hours
FAX Principles and Maintenance	Technician	30 hours
Digital Copier	Technician	20 hours
Small-to-Medium sized PC Network	Technician	30 hours

	Level	Duration
Intelligent Building Automation System Fundamentals	Technician	30 hours
Digital TV Fundamentals	Technician	30 hours
Scalable, Robust Computer Networks	Technician	20 hours
Tailor-made Electronics Course	Technician	16 hours
Audio-video Electronics	Craftsman	25 hours
Office Automation Equipment	Craftsman	25 hours
Magnetics and Mechanisms	Craftsman	30 hours
Incoming Quality Control	Craftsman	22 hours
Consumer Electronics Quality Assurance	Craftsman	30 hours
Quality Assurance Principles and Practice	Craftsman	30 hours

4.17 On completion of the 1-year full-time pre-employment courses (TFC and BCC), trainees will join the electronics industry as second year apprentices. The Training Board urges employers to employ these trainees and to provide them with the necessary on-the-job training. Employers are also advised to make good use of the various part-time and tailor-made courses offered by the Training Centre to upgrade their workforce.

Electronics Manufacturing Automation Workshop (EMAW)

4.18 The Electronics Manufacturing Automation Workshop of the Electronics Industry Training Centre at provides training in operation and maintenance of production equipment, assembly and design technique, process and quality control/assurance in the area of Surface Mount Technology (SMT), in-circuit testing and other automated manufacturing technologies. With the installation of a multi-function/high precision pick-and-place machine and a real-time X-ray inspection system, the EMAW is capable to provide training in high-density packaging and product miniaturisation technologies such as chip scale packaging, chip on glass, flip chip, ball grid array and 0.5mm quad flat pack. Currently, the EMAW is offering some sixteen short part-time courses, one full-time short course and some tailor-made courses, which are well received by in-service engineers and technicians. Besides, special short courses on electronics manufacturing automations are also organized for TFC trainees of the Electronics Industry Training Centre, higher diploma, diploma and higher certificate students of the IVE and undergraduates of local universities. The Training Board reviews regularly the courses offered by the EMAW in the light of changing industry demand. Again, employers are earnestly requested to sponsor their staff to update and upgrade themselves by attending EMAW short courses.

4.19 The training courses being offered by the EMAW at technologist and technician levels are shown below:

Table 4.C : Courses Offered by the EMAW

Part-time Evening Course	Duration
In-circuit Tester : Operating Principles and Programming	20 hours
In-circuit Tester: Maintenance Practice & Fixture Design	10 hours
Surface Mount Technology Equipment & Tools: Selection Criteria and Cost Effectiveness	15 hours
State-of-art Pick-and-place Machine : operating and Maintenance Principles	24 hours
State-of-art Pick-and-place Machine : Effective Programming	30 hours
Surface Mount Components and Materials : Standards and a Market Insight	12 ½hours
Introduction to Servicing State-of-art Surface-Mount-Boards	15 hours
Design-for-Manufacturability of Surface-Mount-Boards	20 hours
MACHATRONICS Principles and Practices	30 hours
Evaluating High Precision Automated Assembly System for Micro BGA/CSP and Flip Chip	20 hours
Key Steps In Defect-Free Implementation of 0.5mm Fine-Pitch Surface Mount Technology	25 hours
1mm-Pitch Ball Grid Array and Further Miniaturization technologies	20 hours
Optimal (Computerized) Material Scheduling	25 hours
Effective (Computerized) Inventory Control	25 hours
Understanding of Business-to-Business (B2B) Exchanges: Challenges and Opportunities	15 hours
Exploiting e-Work Techniques and Knowledge	10 hours

Full-time Short Course	Duration
Advance Technology in Electroncis	75 hours
Tailor-made: Surface Mount Technology Workershops	3 – 6 hours

Electronic Design and Information Technologies Training

4.20 The Information Technology Training & Development Centre of the Vocational Training Council has been offering Professional Diploma courses in IC, Electronics and Telecommunications Engineering. The courses were timely launched to meet the development needs of IC, electronics and telecommunications in line with the development and of IC design works in Hong Kong.

4.21 In recognising the rapid development in electronics design especially in IC industry, the Centre has also set up CaST (Chip and System Technology Centre) in the Hong Kong Science Park. The objectives of the CaST are two folds. One is to provide practical training ground for IC design and engineering to support the development of IC industry. Second is to establish an open and free platform for IC, layout and electronics designers to develop and innovate design services in IC and related industries. Design services include IC/IP design and verification, IC layout and applications.

Hong Kong Science & Technology Park Corporation

4.22 The Hong Kong Science and Technology Parks Corporation (HKSTP) was inaugurated in May 2001 as a statutory body set up by the Government of the Hong Kong Special Administrative Region. The HKSTP is to facilitate the development of technologically-oriented companies by building the physical and intellectual infrastructure which will stimulate their growth. The HKSTP provides advanced facilities and support services for high technology companies that include an IC Design/Development Support Centre and a Photonics Development Support Centre for its tenants and incubatees as well as access to the best scientific and business minds that Hong Kong, China and the world have to offer. The Training Board urges employers to make good use of the facilities and services offered by the HKSTP, especially, those for IC design.

New Technology Training Scheme

4.23 Since 1992, the Vocational Training Council has been operating the New Technology Training Scheme to provide assistance to companies in Hong Kong that wish to have their staff trained in a technology that would be useful to their business. In the context of the scheme, new technologies include those which are not widely applied in Hong Kong and the absorption and application of which will benefit Hong Kong. Any employer in Hong Kong wishing to acquire a new technology for industrial and commercial application may apply for training grant under the scheme. The Council, with the assistance of the Hong Kong Productivity Council and other organizations, also offers assistance to employers in identifying suitable training opportunities. The Training Board urges employers to make good use of the scheme.

Educational Institutions

4.24 The Hong Kong Polytechnic University, the City University of Hong Kong and the Vocational Training Council's Hong Kong Institute of Vocational Education offer a wide range of courses, including short-term, full-time, part-time day release and part-time evening courses at the technician and craft levels for the electronics industry. Employers are urged to take advantage of these courses to upgrade their employees.

Industrial Training Division of the Vocational Training Council

4.25 In addition to operating the Engineering Graduate Training Scheme and New Technology Training Scheme, the Industrial Training Division of the Vocational Training Council also assists employers in organizing training schemes, in particular, apprenticeship schemes for training technicians and craftsmen. A free apprentice placement service is also provided. The Training Board recommends employers to contact the Division for assistance in setting up training schemes and the recruitment of trainees.

電子業二○○四年人力調查報告摘要

目的

是次調查由職業訓練局屬下電子業及電訊業訓練委員會於二○○四年五、六月間進行，以蒐集電子業主要職務的最新人力資料。

調查範圍

2. 調查採用分層隨機抽樣法，從大約 4 210 間機構中，選出 636 間為調查對象。調查包括以下五類機構：

第一類：製造（579 間機構）

下列產品的製造商：

(a) 計算機及計算設備 (HSIC 3822)；
(b) 晶體管收音機 (HSIC 3831)；
(c) 電視機及通訊設備 (HSIC 3832)；
(d) 音響重播及錄音器材 (HSIC 3833)；
(e) 唱機、唱片及錄音帶 (HSIC 3834)；
(f) 電子零件及元件 (HSIC 3840)；
(g) 電子玩具 (HSIC 3852)；
(h) 工業用電子器材 (HSIC 3868)；
(i) 其他電子產品 (HSIC 3873)。

第二類：貿易及服務（2 183 間機構）

(a) 防盜警鐘及內部通訊系統裝置公司 (HSIC 5516)；
(b) 下列產品的進出口貿易公司：
  (1) 科學及專業儀器 (HSIC 631805)；+
  (2) 電話系統 (HSIC 631821)；+
  (3) 電訊服務 (HSIC 631822)；+
  (4) 電器 (HSIC 631823)；+
  (5) 電腦、電腦週邊設施及套裝軟件 (HSIC 631824)；+
  (6) 辦公室器材 (HSIC 631825)；+

(c) 資料處理及製表服務公司 (HSIC 8333)；+

(d) (a)至(c)以外的其他電子工程服務公司。

第三類：電訊服務（145間機構）

(a) 有線固定通訊網絡服務公司 (HSIC 732101)；

(b) 其他固定通訊網絡服務公司 (HSIC 732199)；

(c) 傳呼服務公司 (HSIC 7322)；

(d) 流動通訊服務 (HSIC 732901)；

(e) 互聯網接駁服務公司 (HSIC 732902)；

(f) 衛星通訊服務公司 (HSIC 732903)；

(g) 電台、電視台及錄製室 (HSIC 9411)。

第四類：批發（1 269間機構）

下列批發公司：

(a) 電話系統 (HSIC 611821)；

(b) 電訊設備（不包括電話系統） (HSIC 611822)；

(c) 電器(不包括機械、辦公室及電訊器材) (HSIC 611823)；

(d) 電腦、電腦週邊設施及套裝軟件 (HSIC 611824)；

(e) 辦公室器材（不包括電腦、傢具及固定裝置） (HSIC 611825)。

第五類：設計公司、教育院校及政府有關部門（34間機構）

(a) 電子設計公司；

(b) 本地教育院校有關部門；

(c) 有關政府部門。

附註：(1) HSIC — 香港標準行業分類

(2) +不包括僱用 10 名以下職員的機構，因這些機構技術人員不多。

調查結果

3. 是次調查顯示，二○○四年六月時，電子業共僱用 111 143 人，其中 46 594 人擔任電子工程及有關門類的主要職務。

4. 各類機構各技能等級的僱員分布情況如下：

技能等級	第一類機構	第二類機構	第三類機構	第四類機構	第五類機構	總數	
	製造	貿易及服務	電訊服務	批發	設計公司及政府部門	人數	百分率
技師	1 086	10 551	2 101	506	524	14 768	31.7%
技術員	2 268	12 329	3 958	929	1 072	20 556	44.1%
技工	496	3 211	720	84	276	4 787	10.3%
操作工	5 835	438	131	68	11	6 483	13.9%
總數	9 685	26 529	6 910	1 587	1 883	46 594	100%
	(20.8%)	(56.9%)	(14.8%)	(3.4%)	(4.1%)	(100%)	

5. 根據僱主填報的資料，調查期間有受訓者 415 人，空缺有 1 040 個，分別佔僱員總數的 0.89%及 2.2%。此外，僱主亦預測，到二○○五年六月時，業內需要僱用 48 238 名員工，較二○○四年六月增加 3.5%。

未來人力需求（二○○五至○七年）

6. 本港經濟持續受惠於內地經濟增長和全球經濟復甦，現已擺脫 SARS 的影響，並在穩步復甦中，預期未來數年會有溫和增長。參考業務前景、零件及元件和產品發展趨勢，本會對電子業發展持審慎樂觀態度，相信未來數年電子業將受惠於本港經濟復甦，增長溫和。此外，電子業需增聘人手，特別是較高級技術人才，以應付將新技術帶進電子業發展的需要。

7. 基於上述因素，以及僱主對二○○五年人力需求的預測，本會認為二○○五至○七年間，第四類機構的技術人力會維持穩定，第一類機構的人力會輕微減少，第二、第三及第五類機構的人力則有溫和增長。

8. 本會參考委員的經驗，以及對電子業人力的認識，並假定未來數年員工大多會留守本業（即業內技術人員的流動率頗低），推算出電子業人力流失情況（流失率）如下：

流失率

技能等級	流失率
技　師	3.0%
技術員	3.0%
技　工	3.0%

9. 本會推算二〇〇五至〇七年間，電子業為應付增長及填補流失率，每年平均須增聘各技能等級人手如下：

二〇〇五至〇七年每年平均須增加的僱員人數

技能等級	每年平均需求
技　師	419 - 513
技術員	1 093 - 1 335
技　工	230 - 282

10. 鑑於全球經濟復甦緩慢，以及中國加入世界貿易組織等因素，本會相信未來幾年電子業仍會穩定增長。不過，內地及區內其他電子廠商亦在擴展中，與本地電子業的競爭越趨激烈，廠商必須突出產品，加強產品特色及種類；此外，亦須生產更具創意及高增值的產品，以提升在國際市場的競爭力。因此，業內會繼續需要受過良好訓練的較高級技術人才。僱主應採取措施以提高技術人員的質素。

11. 本會將於二〇〇六年再進行人力調查，檢討電子業的人力需求情況及搜集最新資料。

第一章

緒　論

電子業及電訊業訓練委員會

1.1　電子業及電訊業訓練委員會隸屬職業訓練局，由香港特別行政區政府委任，負責確定電子業的人力及訓練需求，並向局方提出建議，以發展訓練設施，應付有關需要。本會委員乃由主要行業公會、專業學會、訓練及教育機構，以及政府部門提名出任。本會委員名單載於附件 1。

人力調查

1.2　本會按職權規定，於二〇〇四年五月二十八日至六月三十日期間，為電子業進行人力調查，收集最新資料，以便作下列用途：

(i) 評估業內主要職務的人力及訓練需求；
(ii) 提出應付本業人力及訓練需求的措施。

1.3　是次調查在政府統計處協助下進行，旨在請列為對象的僱主提供下列資料：

(a) 調查期間的僱員人數；
(b) 受訓僱員人數；
(c) 現有空缺額；
(d) 預測二〇〇五年六月時的僱員總數；
(e) 僱員的平均收入；
(f) 僱員宜有的教育程度、訓練方式及訓練期。

1.4　本會亦請僱主填報調查進行前十二個月內，派往香港以外地區工作超過六個月的技師、技術員及技工人數。

調查範圍

1.5 **是次調查包括以下五類機構：**

第一類：製造

下列產品的製造商：

(a) **計算機及計算設備** (HSIC 3822)；

(b) **晶體管收音機** (HSIC 3831)；

(c) **電視機及通訊設備** (HSIC 3832)；

(d) **音響重播及錄音器材** (HSIC 3833)；

(e) **唱機、唱片及錄音帶** (HSIC 3834)；

(f) **電子零件及元件** (HSIC 3840)；

(g) **電子玩具** (HSIC 3852)；

(h) **工業用電子器材** (HSIC 3868)；

(i) **其他電子產品** (HSIC 3873)。

第二類：貿易及服務

(a) **防盜警鐘及內部通訊系統裝置公司** (HSIC 5516)；

(b) **下列產品的進出口貿易公司：**

(1) **科學及專業儀器** (HSIC 631805)；+

(2) **電話系統** (HSIC 631821)；+

(3) **電訊服務** (HSIC 631822)；+

(4) **電器** (HSIC 631823)；+

(5) **電腦、電腦週邊設施及套裝軟件** (HSIC 631824)；+

(6) **辦公室器材** (HSIC 631825)；+

(c) **資料處理及製表服務公司** (HSIC 8333)；+

(d) (a)至(c)**以外的其他電子工程服務公司**。

第三類：電訊服務

(a) 有線固定通訊網絡服務公司 (HSIC 732101)；

(b) 其他固定通訊網絡服務公司 (HSIC 732199)；

(c) 傳呼服務公司 (HSIC 7322)；

(d) 流動通訊服務 (HSIC 732901)；

(e) 互聯網接駁服務公司 (HSIC 732902)；

(f) 衛星通訊服務公司 (HSIC 732903)；

(g) 電台、電視台及錄製室 (HSIC 9411)。

第四類：批發

下列批發公司：

(a) 電話系統 (HSIC 611821)；

(b) 電訊設備（不包括電話系統） (HSIC 611822)；

(c) 電器(不包括機械、辦公室及電訊器材) (HSIC 611823)；

(d) 電腦、電腦週邊設施及套裝軟件 (HSIC 611824)；

(e) 辦公室器材（不包括電腦、傢具及固定裝置） (HSIC 611825)。

第五類：設計公司、教育院校及政府有關部門

(a) 電子設計公司；

(b) 本地教育院校有關部門；

(c) 有關政府部門。

附註：(1) HSIC — 香港標準行業分類

(2) +不包括僱用 10 名以下職員的機構，因這些機構技術人員不多。

調查方法

1.6 上述五個門類共有機構 4 210間，當中並不包括第二門類內僱用 10人以下的機構，因這些機構甚少僱用有關技術人員。鑑於調查資源有限，本會採用分層隨機抽樣方法，從第一至四各門類中選出機構；但包括全部第五門類機構。總共 636 間機構為調查對象。該等機構約僱用業內整體人力的 63.3%。

1.7 實地調查進行前兩星期，本會將調查表連同附註及業內電子工程及相關門類主要職務的工作說明(見附件 3至 5)寄予選出的機構。

1.8 實地調查期間，政府統計處派員到各機構收回填妥的調查表，並於有需要時，協助僱主填寫表格。

1.9 收回的調查表均經詳細審核，如有需要，會與填覆機構核對，然後交由政府統計處處理。第一至四門類的調查資料其後以統計方法倍大，以反映調查期間業內的整體人力情況。

宣傳

1.10 本會在調查前發出新聞稿，並請有關僱主協會向屬下會員宣傳是次調查。

調查反應分析

1.11 636間選出的機構中，448間填覆調查表，18間拒絕作答，而其餘 170 間，則已結束營業、搬遷、與其他機構合併，或已改變業務性質。是次調查的實際填覆率約 96.1%。

1.12 部份機構只有提供粗略的資料，並無詳細列出調查進行時的僱員每月收入、受訓者數目和空缺數目。他們的理由是業務繁忙和不願披露機構的機密資料。

調查報告

1.13 本報告書詳載是次調查結果、本會對電子業的人力需求預測，以及針對這些需求所提出的建議。報告書內，「人力」及「僱員」均指所列各主要職務的從業員總數，但不包括受訓者；「受訓者」則指正在接受各種形式訓練的人士，包括已簽署學徒合約的註冊學徒。

第二章

調查結果摘要

僱員人數

2.1 是次調查顯示，二○○四年六月時，電子業共僱用 111 143 人，其中 46 594 人擔任電子工程及有關門類的主要職務，數字摘要見下列各段。

各類機構各技能等級的僱員人數

2.2 各類機構各技能等級的僱員分布情況見表 2.A 及圖 1、2。

表 2.A： 各類機構各技能等級的僱員分布情況

技能等級	第一類機構	第二類機構	第三類機構	第四類機構	第五類機構	總數	
	製造	貿易及服務	電訊服務	批發	設計公司及政府部門	人數	百分率
技　師	1 086	10 551	2 101	506	524	14 768	31.7%
技術員	2 268	12 329	3 958	929	1 072	20 556	44.1%
技　工	496	3 211	720	84	276	4 787	10.3%
操作工	5 835	438	131	68	11	6 483	13.9%
總　數	9 685	26 529	6 910	1 587	1 883	46 594	100%
	(20.8%)	(56.9%)	(14.8%)	(3.4%)	(4.1%)	(100%)	

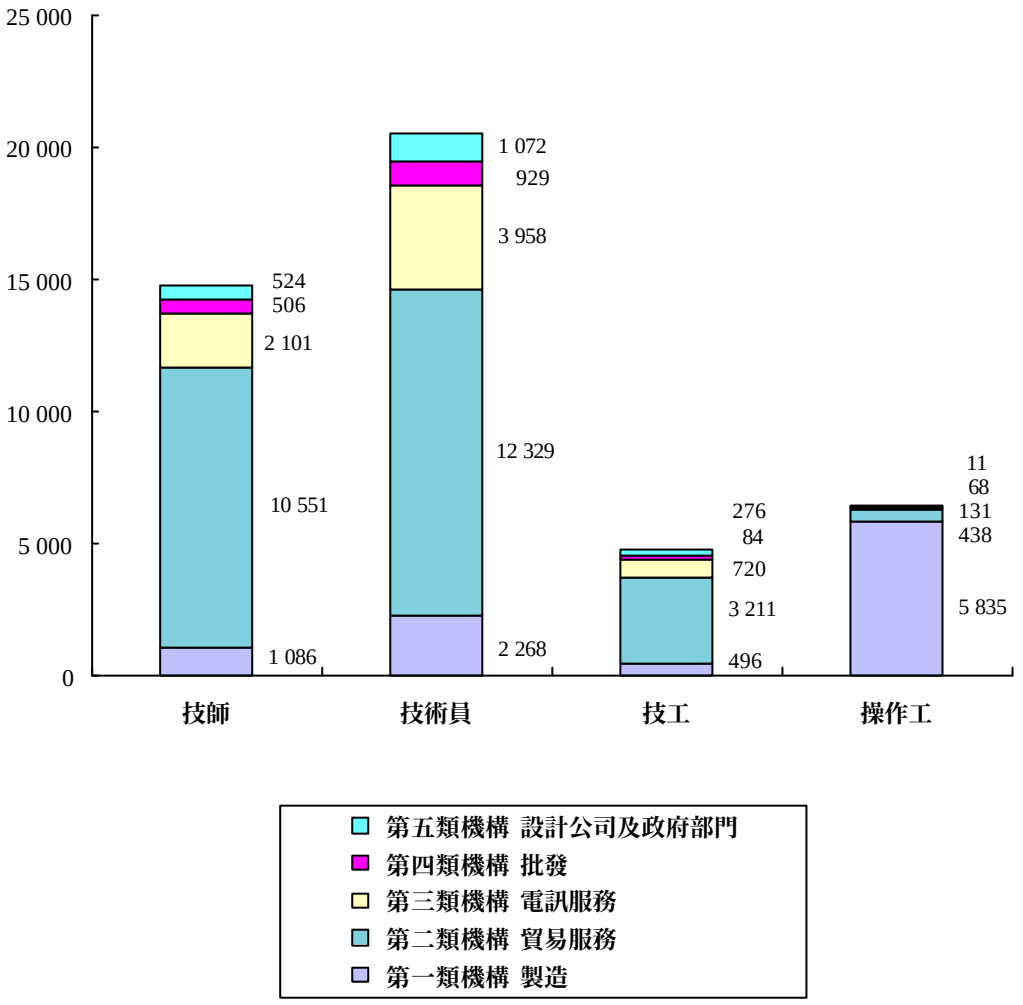


圖 1： 各技能等級的僱員分布情況

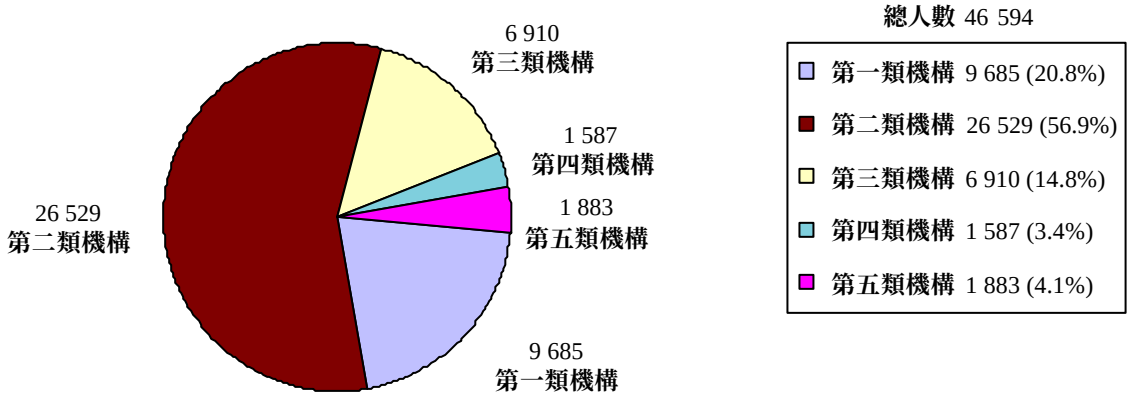


圖 2： 各類機構的僱員分布情況

僱員人數最多的職務

2.3 各技能等級僱員人數最多的主要職務見表 2.B。

表 2.B： 各技能等級僱員人數最多的職務

技能等級	職　稱	僱員人數
技　師	電子工程師	6 919
技術員	電子技術員	12 587
技　工	電子技工	3 956
操作工	操作員	6 483

受訓者人數

2.4 調查期間，業內共有受訓者 415 人，按各技能等級劃分的分布情況見表 2.C，按各類機構劃分的受訓者人數詳載於附錄 1 至 5。

表 2.C： 各技能等級的受訓者分布情況

技能等級	僱員總數	受訓者人數	佔同級僱員總數百分率
技　師	14 768	31	0.21%
技術員	20 556	153	0.74%
技　工	4 787	231	4.83%
操作工	6 483	0	0%
總　數	46 594	415	0.89%

2.5 各技能等級受訓者最多的主要職務見表 2.D。

表 2.D： 各技能等級受訓者最多的主要職務

技能等級	職　稱	受訓者人數
技　師	電子工程師	31
技術員	電子技術員	152
技　工	電子技工	231

現有空缺數目及僱主預測至
二○○五年六月時的僱員總數
（附錄 1至 6）

2.6 僱主填報共有空缺 1 040個，佔業內僱員總數的 2.2%。僱主所填報各技能等級的空缺數目見表 2.E 及圖 3，按各類機構劃分的分布情況詳載於附錄 1至 5。

2.7 僱主亦預測，至二○○五年六月時，業內電子工程及有關門類共需僱用 48 238名員工，按技能等級劃分的分布情況見表 2.E 及圖 3，各類機構僱員人數預測詳載於附錄 1至 5。

表 2.E： 二○○四年六月時僱主報稱的空缺數目及預測至二○○五年六月時的僱員人數

技能等級	二○○四年六月時的僱員人數	二○○四年六月時僱主報稱的空缺數目	僱主預測至二○○五年六月時的僱員總數
技　師	14 768	347	15 315
技術員	20 556	465	21 304
技　工	4 787	90	4 977
操作工	6 483	138	6 642
總　數	46 594	1 040	48 238

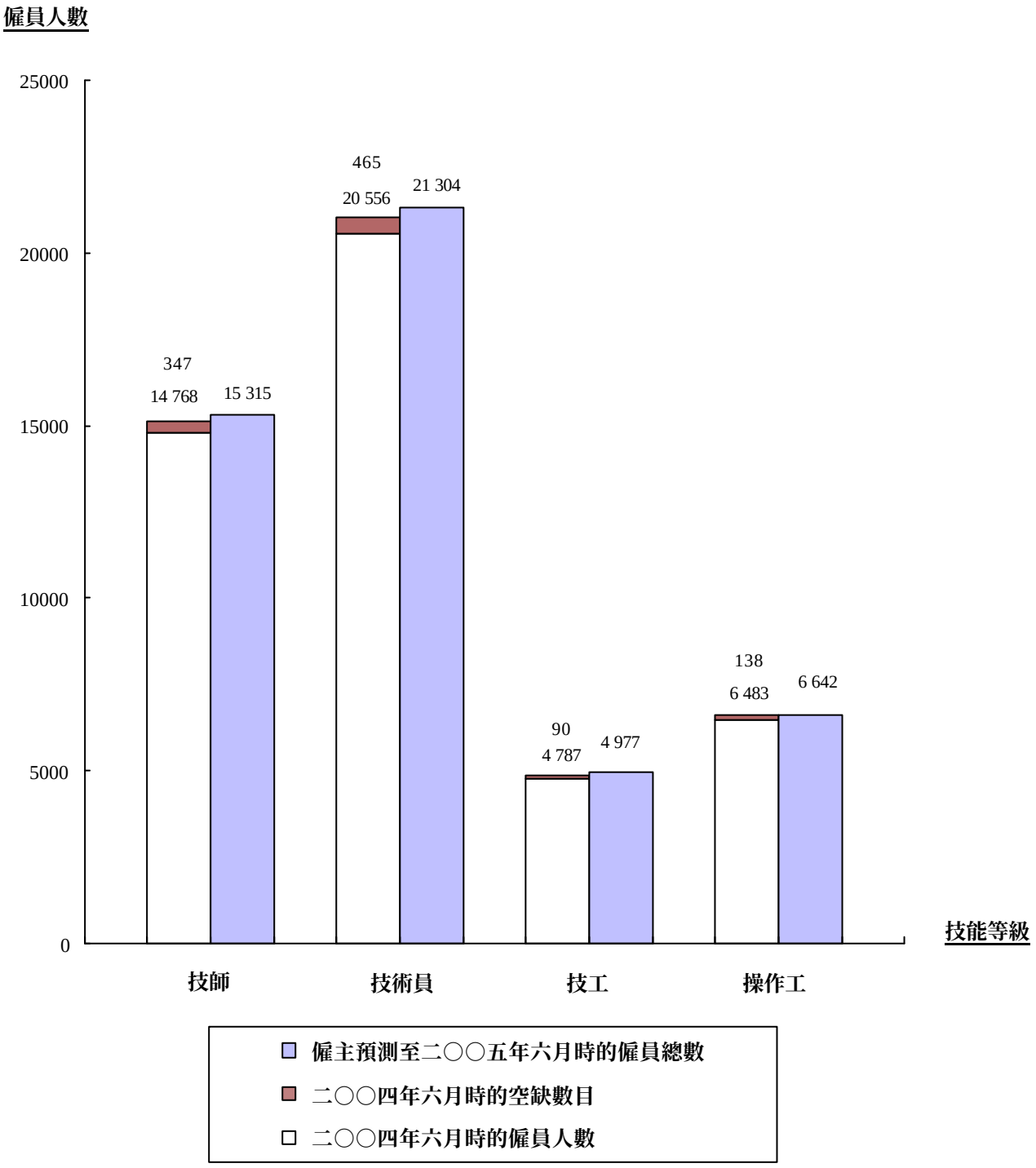


圖 3： 二○○四年六月各技能等級僱員人數及空缺數目與僱主預測二○○五年六月僱員人數的比較

僱員宜有的教育程度

2.8 表 2.F 及圖 4 列出僱主認為技師、技術員及技工級僱員宜有的教育程度。

表 2.F： 僱主對僱員宜有教育程度的意見

技能等級	僱員人數	大學學位、院士或同等學歷	高級文憑	文憑	高級證書	證書	中五	技工證書	中三或以下	未有說明
技 師	14 768	11 804	1 650	271	61	-	-	-	-	982
技術員	20 546	5 168	2 485	3 326	1 835	4 859	585	-	-	2 288
技 工	4 787	-	-	-	-	1 482	929	3 070	195	7
總 數	40 101	16 972	4 135	3 597	1 964	6 341	1 514	3 070	195	3 277

僱員人數

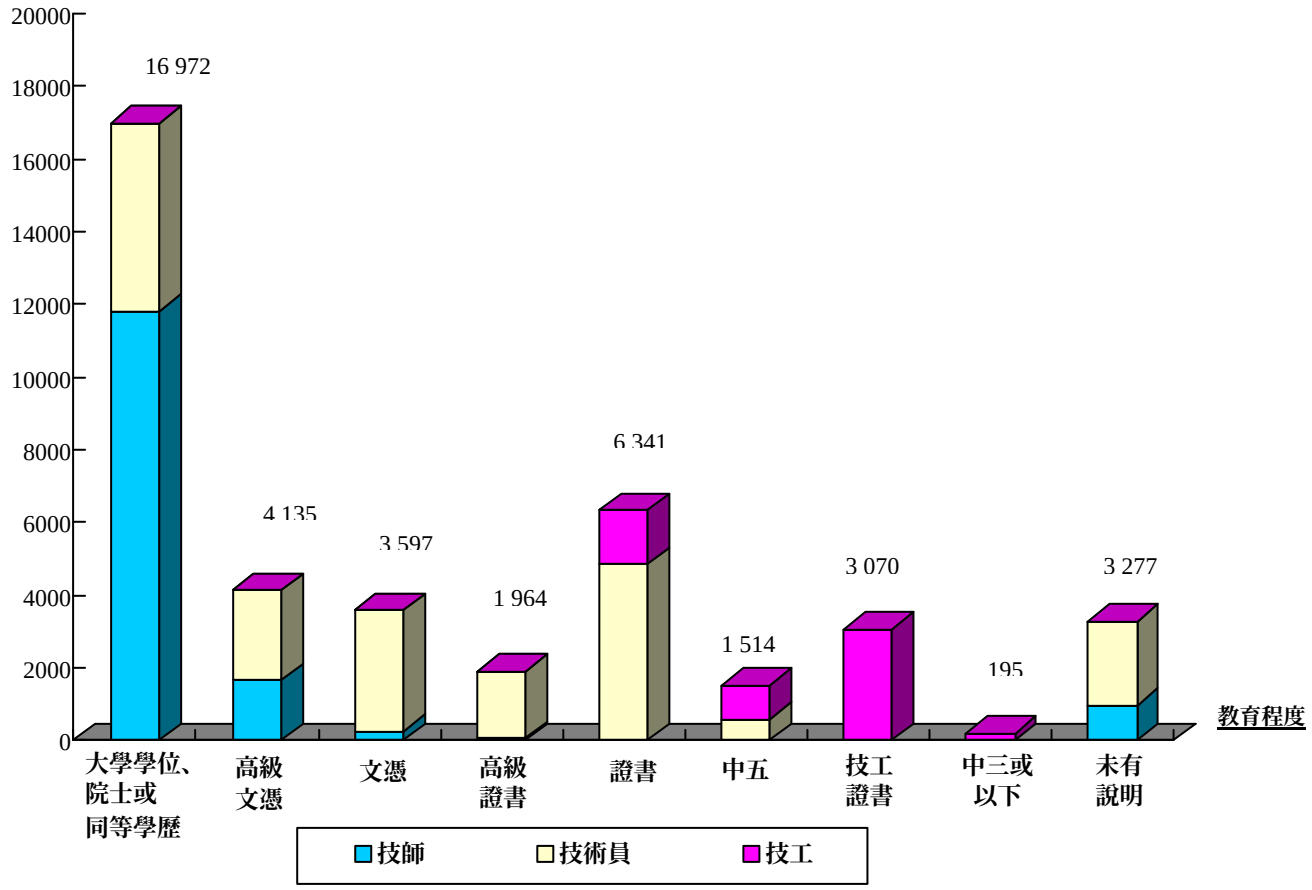


圖 4： 僱主認為僱員宜有的教育程度

2.9 表 2.G 及圖 5 列出僱主認為技師、技術員及技工級僱員宜有的訓練方式。

表 2. G： 僱主對僱員宜有訓練方式的意見

技能等級	僱員人數	訓練方式				
		工科畢業生	在職訓練	學徒訓練	職外訓練	未有說明
技 師	14 768	712	12 934	-	-	1 122
技術員	20 546	-	16 677	1 545	22	2 302
技 工	4 787	-	3 370	1 106	304	7
總 數	40 101	712	32 981	2 651	326	3 431

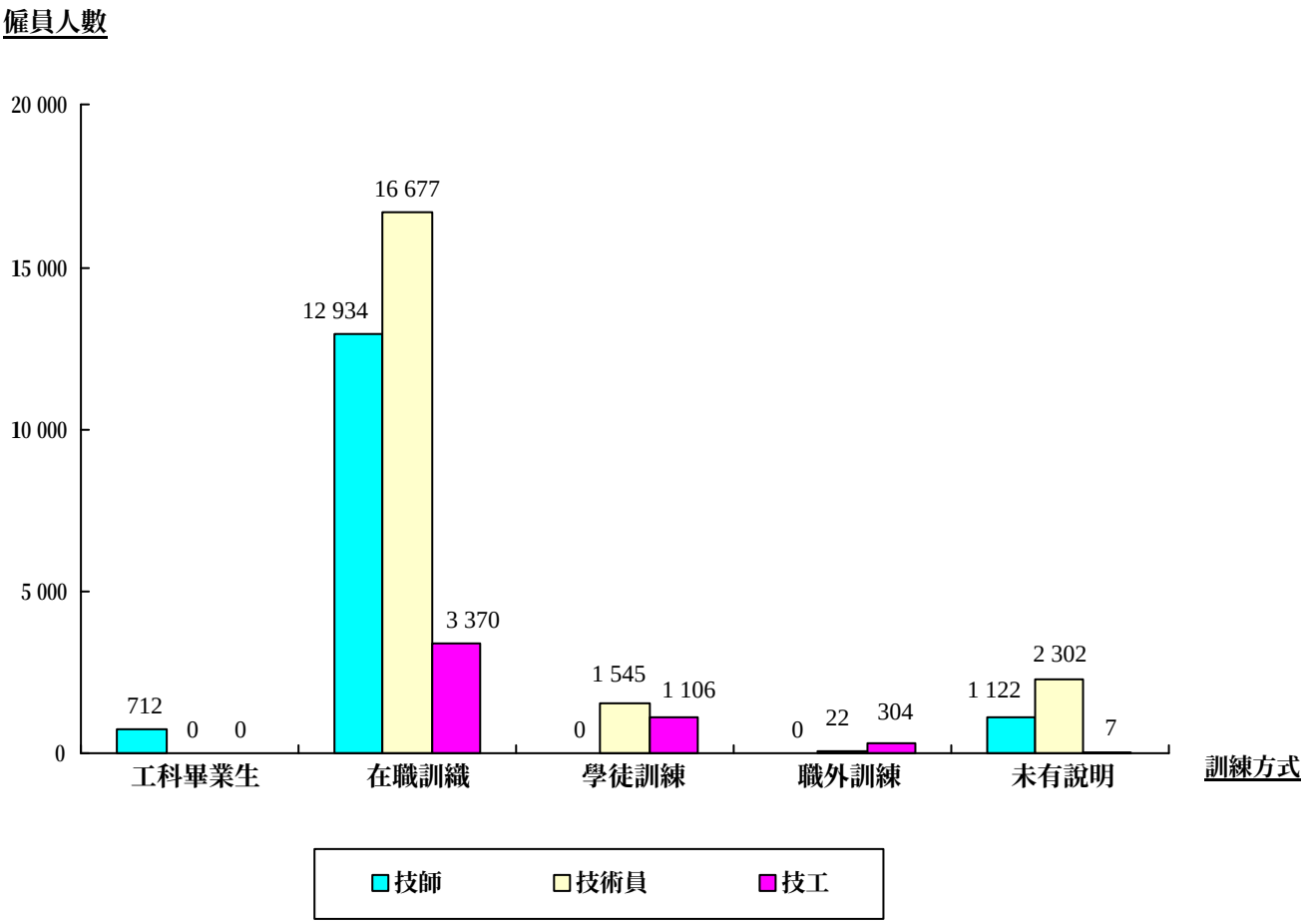


圖 5： 僱主屬意的訓練方式

2.10 僱主對各技能等級所需訓練期的意見載於表 2.H 及圖 6。

圖 2.H： 僱主對僱員宜有訓練期的意見

技能等級	僱員人數	四年或以上	三年至四年以下	兩年至三年以下	一年至兩年以下	六個月至十二個月以下	六個月以下	未有說明
技 師	14 768	5 229	3 534	3 977	280	150	81	1 217
技術員	20546	691	3 415	6 300	7 699	130	39	2 302
技 工	4 787	331	94	1 804	2 282	261	8	7
總 數	40 101	6 551	7 043	12 081	10 231	541	128	3 526

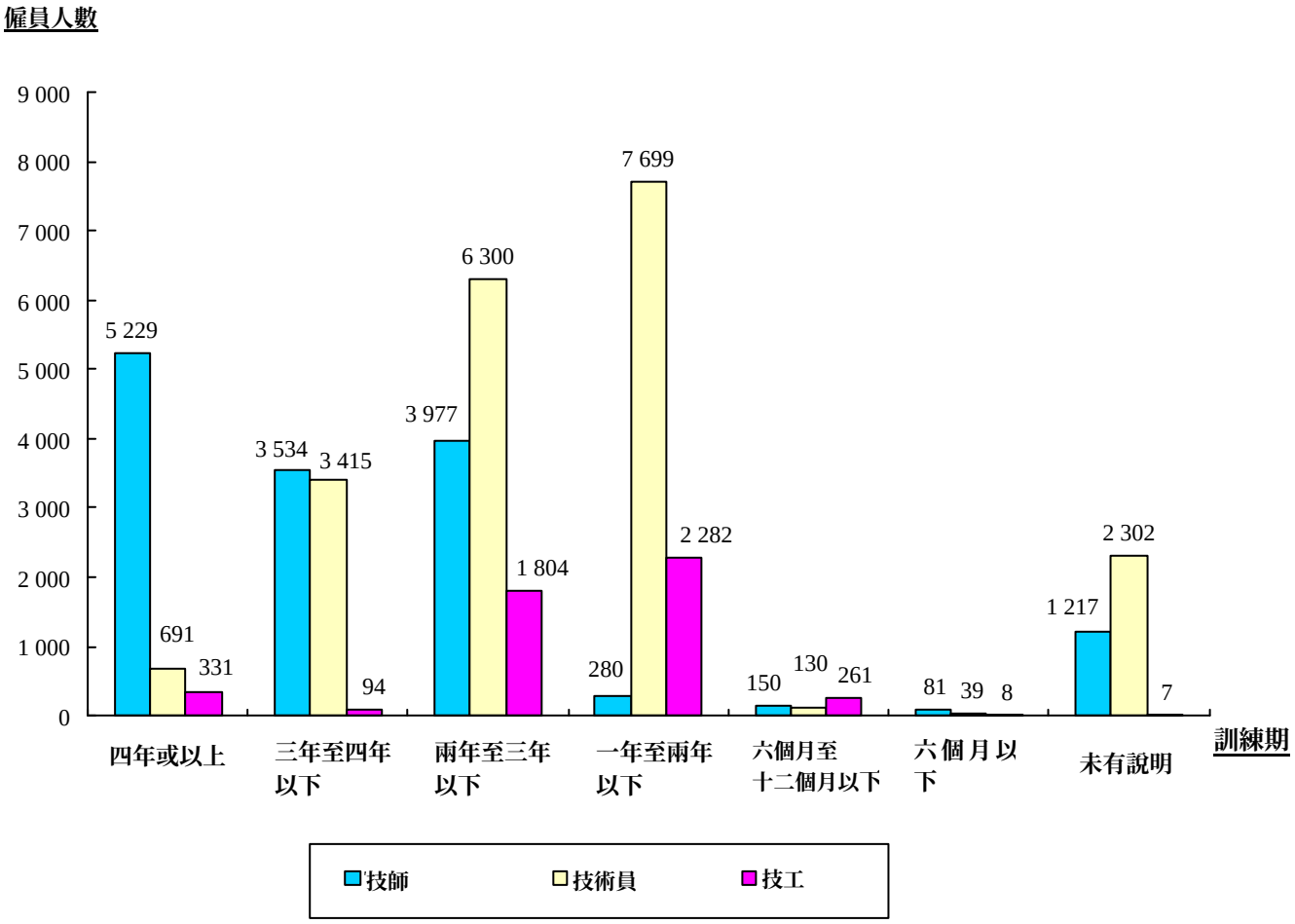


圖 6： 僱主對訓練期的意見

僱員每月收入幅度
（附錄 7）

2.11 業內電子工程及有關門類各主要職務每月收入幅度的分布情況，載於附錄 7；數字摘要見表 2.I 及圖 7。

圖 2.I： 僱員每月收入幅度的分布情況

技能等級	$6,001以下	$6,001-$8,000	$8,001-$10,000	$10,001-$15,000	$15,001-$20,000	$20,001-$25,000	$25,001-$30,000	$30,000以上	未有說明
技師	-	-	36	1 217	2 420	2 638	1 833	3 418	3 206
技術員	30	303	2 649	5 892	4 214	1 532	1 564	314	4 058
技工	11	826	1 702	2 064	119	-	-	-	65
操作工	1 746	3 513	1 074	25	-	-	-	-	125
總數	1 787	4 642	5 461	9 198	6 753	4 170	3 397	3 732	7 454

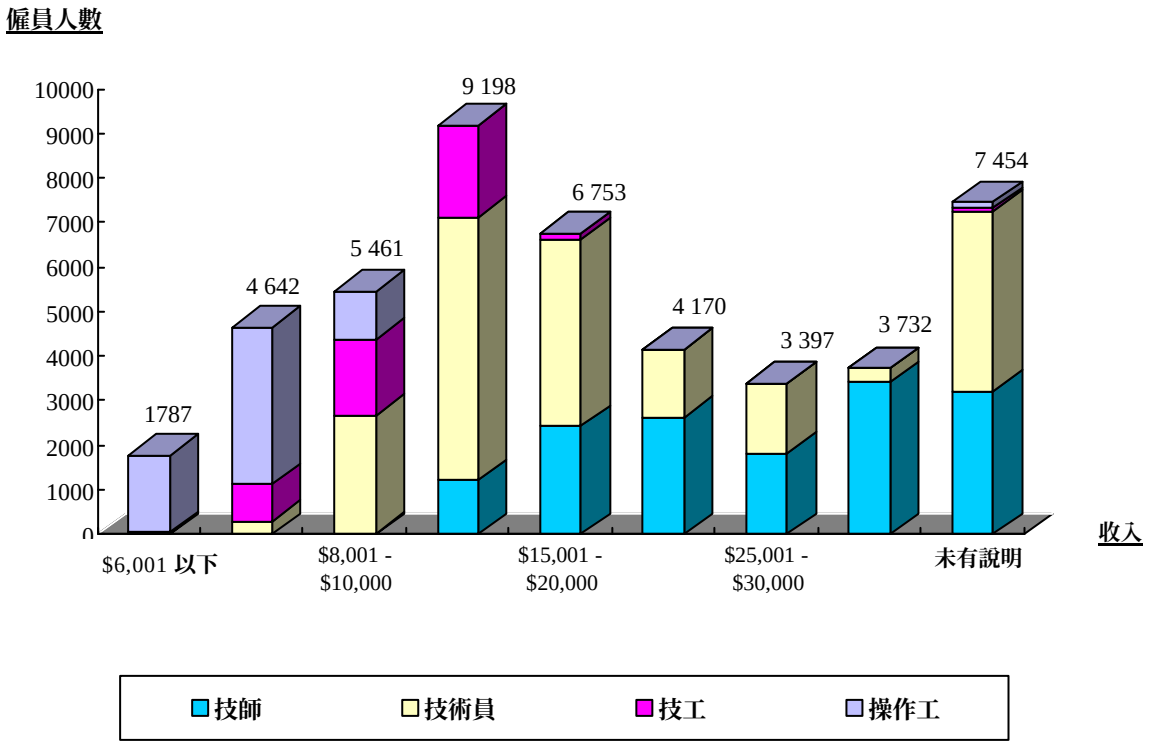


圖 7： 僱員每月收入幅度的分布情況

內部晉升人數

2.12 調查前十二個月內，業內有 205 名僱員獲內部晉升，擔任較高技能等級的工作，有關情況見表 2.J。

表 2.J：各機構的內部晉升情況

技能等級	獲晉升僱員人數	佔該較高等級僱員總數的百分率
由技術員晉升至技師	152	1.03%
由技工晉升至技術員	41	0.20%
由操作工晉升至技工	12	0.25%
總　數	205	0.51%

派駐香港以外地區工作的技術人員

2.13 截至二〇〇四年六月的十二個月內，本業共有 1 437 名技師、533 名技術員及 108 名技工曾在香港以外地區工作超過六個月，分別佔同級僱員總數的 9.7%、2.6% 和 2.3%。但有關數字並未能反映整個行業的情況，因調查所包括的大、中型機構，有部分並未提供這方面的資料。

第三章

結　論

概況

3.1　本會詳細分析調查結果後，認為有關資料大致能反映調查期間電子業的就業情況。

人力比較

3.2　電子業及相關行業主要職務的僱員總人數由二○○二年的 49 094 人減少至二○○四年的 46 594 人，平均每年減少 2.6%。有關各類機構各技能等級僱員人數增減的詳細分析，請見以下各段。由於第二和第四類機構的業務和人力需求性質接近，本會決定將兩類機構的人力需求比較和分析一併處理。表 3.A 列出各技能等級各門類二○○二及二○○四年僱員人數的分布及比較。

表 3.A：按技能等級及機構類別比較二○○四年及二○○二年（括號內數字）人力需求

技能等級	第一類機構	第二及第四類機構	第三類機構	第五類機構	總數	年增減
	製造	貿易服務及批發	電訊服務	設計公司及政府部門		
技師	1 086 (1 828)	11 057 (13 812)	2 101 (2 014)	524 (528)	14 768 (18 182)	**-9.9%**
技術員	2 268 (1 813)	13 258 (11 377)	3 958 (3 756)	1 072 (902)	20 556 (17 848)	**+7.3%**
技工	496 (763)	3 295 (2 446)	720 (444)	276 (260)	4 787 (3 913)	**+10.6%**
操作工	5 835 (7 009)	506 (1 959)	131 (154)	11 (29)	6 483 (9 151)	**-15.8%**
總數	9 685 (11 413)	28 116 (29 594)	6 910 (6 368)	1 883 (1 719)	46 594 (49 094)	**-2.6%**
年增減	**-7.9%**	**-2.5%**	**+4.2%**	**+4.7%**	**-2.6%**	

各類機構的人力情況

3.3 二○○三年的 SARS 疫情和隨之而來的經濟不景對電子業帶來了重大打擊。從表 3.A 可見，電子業的總僱員人數在過去兩年平均每年下跌了 2.6%。製造業機構（第一類）僱員人數的年跌幅是 7.9%；貿易及服務機構（第二類）錄得 1.0%的輕微下跌；批發業機構（第四類）僱員人數銳減，年跌幅達 21.0%。另一方面，電訊服務機構（第三類）和設計公司、教育院校及政府有關部門（第五類）兩類機構的僱員人數均有增加，平均年增幅分別為 4.2%和 4.7%。

3.4 以下是各機構類別的人力需求出現變化的原因：

(i) 製造業的主要工序（工程和產品設計）北移，以及二○○三年爆發的 SARS 疫情，令第一類機構的人力需求持續減少。

(ii) 第二和第四類機構的人力需求輕微減少，顯示這兩個界仍未自二○○三年 SARS 疫情中完全復甦過來，而市場對電子器材及系統的需求增長仍然緩慢。

(iii) 第三類機構是本港基建的重要組成部分，其人力需求微增，反映界別持續為市民提供新的電訊服務。

(iv) 由於集成電路設計業務持續擴張，第五類機構的人力需求微增。

各技能級別的人力情況

3.5 調查顯示，電子業對技師的需求銳減，對技術員的需求較大，而出人意表的是對技工的需求有所增加。以下是人力需求轉變的成因：

(i) 過去兩年，可能由於僱主因應營商環境調整了技師和技術員的工資，導致技師的需求平均每年下跌 9.9%。期間，僱主一般會聘用技術員取代被遣散或退休的技師。

(ii) 技術員的需求錄得頗大的升幅（每年 7.3%），原因與(i)所述同。

(iii) 第三類機構推出新服務，需要更多技工負責安裝工程，導致技工需求大增，年增幅達 10.6%。另一方面，第二類機構有 900 名操作工獲提升為技工。

業務前景

整體

3.6 過去兩年，電子業經營不易，但仍是本港最大的商品出口行業，在二○○三年佔全港總出口的 42%。二○○二年，以價值計香港是全球最大的電話出口地。二○○四年一月至九月間，本港的電子產品出口增加了 25%，主要市場有中國內地、美國、歐洲、東盟和日本。

製造業

3.7 來年製造業機構（第一類）的增長前景並不樂觀。僱主持續縮減本港業務的規模，將工序遷往外地，並在當地聘請更多的技術僱員。內地有經驗的技術僱員供應充足，工資又比本港僱員低，相信本港公司會聘請更多的內地人取代目前在國內工作的香港人員。

3.8 除了內地企業外，其他亞洲廠商亦為本港的電子製造業帶來越來越大的挑戰。為保持市場佔有率，很多本地廠商都增加產品的種類和特色，令出品更多元化。

3.9 由於競爭激烈，本地廠商越來越注重原創設計業務的發展，作為提供予客戶的增值服務。為了提高競爭力，廠商在設計和製造產品時，也採用了更多新技術。

貿易及服務與批發機構

3.10 受惠於現時本港經濟的發展，以及內地實施個人遊政策，未來幾年貿易及服務機構（第二類）將有溫和增長，而業內的人力需求亦會因此輕微增加。

3.11 營商環境好轉，批發機構（第四類）亦因而受惠，但由於很多公司為了提升效益，在招聘時都非常謹慎，故此預計人力需求將與現時水平相若。

電訊服務機構

3.12 在二○○四年一月，一家主要電訊服務供應商推出了第三代流動電話（3G）服務，另外兩家 3G 服務供應商亦快將加入市場。其他電訊服務也將陸續投入服務，包括在二○○六／○七年推出的數碼電視廣播，以及用於電話服務的互聯網傳音協定（VoIP）技術。綜合以上所述，預計未來數年電訊服務機構（第三類）將會有溫和增長。

3.13 另一方面，由於主要的電訊公司繼續外判技術工作，業內全職空缺的增長將會有限；然而，電訊服務業是本港重要的服務行業，僱主仍要增聘人手應付業務增長所需。故此，未來數年業內對技術僱員仍有需求，以提供新服務和維修及提升現有系統。

設計公司、教育院校及政府部門

3.14 未來數年，本港集成電路設計業將會持續增長，設計公司將需要增聘人手。預計業界需要更多技術僱員（特別是掌握高技術的僱員）以應付增長所需。

3.15 另一方面，來年政府部門和大學將會繼續緊縮人手。

中國加入世貿所帶來的挑戰

3.16 中國於二○○一年十二月加入世界貿易組織後，便逐步開放市場，為本港電子業帶來商機。內地降低關稅及取消配額對本港出口有利。內地開放貿易及分銷行業，為本港的電子公司（特別是元件及零件廠商）提供龐大市場。此外，內地逐步取消外資企業的內銷限制，為本港公司提供更多開拓內地市場的機會。

3.17 《更緊密經貿關係安排》（CEPA）自二○○四年一月起實施，由香港出口電子零件、元件及產品到內地可享零關稅待遇，在本港生產相關產品的電子公司因而受惠。此外，自二○○五年一月一日起，根據 CEPA 第二階段協議（CEPA II），將有其他電子產品可以零關稅進入內地。

3.18 北京將於二〇〇八年舉辦奧運會，相關場館和設施正在興建中。當局希望為奧運會設立一家高科技中心，內設 3G 服務和數碼電視廣播等電訊設施。有關計劃可為本港從事電話服務、電子票務、聰明卡業務和網絡廣播的公司帶來重大商機。

3.19 縱然商機處處，但本港電子公司也要面對來自內地和海外的激烈競爭。要突圍而出，本港公司必須聘用足夠的合資格技術人員。預計未來數年技師和技術員的需求將會逐漸增加。

<u>零件及元件發展趨勢</u>

3.20 市場對數碼產品需求強勁，當中包括 MP3 機、數碼相機、專業數碼攝錄機、電子手帳、流動電訊產品和其他數碼資訊產品（例如電子字典和翻譯機），預期會帶動電子零件及元件的銷售持續上升。此外，由於無線通訊技術藍牙和無線區域網（WLAN）越來越受歡迎，用於電訊和電腦產品及週邊設備的無線組件及元件的需求亦會增加，生產該類零件的電子廠家相信會有美好的業務前景。

3.21 預期市場對一些器材的需求將會很大，包括一些常見的器材，例如電阻器、電容器、電感器、開關、石英、變壓器、離散及主動元件、印刷電路板（PCB）和顯示器外，以及其他重點器材，例如微細間距高密度多層 PCB、液晶顯示屏、等離子顯示屏、光學元件、高密度及長壽電池和不同格式的記憶卡／組件。另一方面，汽車業對電子零件及元件的需求增加，將形成一個龐大的市場。總的來說，這個趨勢將加快製造和包裝技術的發展。

3.22 根據經驗，相信香港有能力促進高級電子零件及元件的開發製造，應付國際市場需求，繼續成為全球電子零件及元件的貿易中心。

<u>產品發展趨勢</u>

<u>電腦及有關產品</u>

3.23 互聯網、資訊科技和寬頻上網越趨普及，傳統桌面個人電腦、手提電腦、掌上電腦、電子手帳和發展迅速的平板電腦大都有內置的流動通訊裝置，在辦公室、學校和家居都有廣泛應用，可應付業務、教學和通訊及娛樂的要求。流動電腦器材及相關週邊設備的需求增長極快（例如儲存裝置和輸入輸出設備）；而設有中文應用軟件的電腦裝置亦會攻佔龐大的中國市場。

3.24 此外，有更多增值特色的平板電腦和為數碼生活而設計的媒體中心個人電腦已經不再局限於辦公室、學校和家居使用，漸漸成為日常生活、資訊、通訊、娛樂、購物和財經等方面的必需品。

電訊產品

3.25 藍牙和 WLAN（或稱為 WiFi）已經成為流行的無線上網電子產品技術。使用藍牙技術的設備，以及應用於工業、家庭和商業的各類 WLAN 卡／組件，形成一個快速增長的市場。為充分利用這個熱潮，越來越多廠商在電訊產品中（如手提電話）內置這些技術，並加入攝影、錄音、MP3和收音機等增值功能。

3.26 流動通訊方面，3G 流動科技仍是全球的焦點；可供上網、收發電郵和發送多媒體資料的 3G 手機越趨流行。未來數年，出口相關終端設備和手提電話零件及配件的廠商必須留意本門類的最新發展。

影音產品

3.27 對於消費電子產品（特別是影音產品），數碼化加上可攜性及匯聚融入功能，仍然是未來數年的主要發展趨勢。預期影音器材出口在不久將來會持續迅速增長。數碼攝錄機、定格數碼相機、專業數碼錄像機及數碼影碟播放機的市場正在擴大。互聯網相關產品，例如 MP3機及供上網用的電視機頂盒仍是本地受歡迎的影音產品。隨著數碼影碟播放機、高質素揚聲器及優質電視機的需求不斷增加，家庭影院娛樂亦大有市場。未來數年（二〇〇六至一〇年）歐洲和美國將會推出數碼電視廣播，預期多媒體及高質素產品，例如數碼影碟播放機、液晶體顯示屏電視、數碼電視及等離子電視的銷情將會理想。長遠而言，本港影音產品的出口將會增加。

3.28 為充分利用無線通訊科技的熱潮，廠商都在影音產品中內置無線連結裝置，為產品增值。這些產品包括數碼相機、專業數碼錄像機和 MP3機。此外，由於高容量記憶裝置價格便宜，有廠商在影音產品中加入數碼錄音、收音機、文字讀取和相片儲存等功能，以吸引買家。

電子玩具及遊戲

3.29 市場不斷推出具有電郵、娛樂、購物及其他功能的新式可上網電腦遊戲平台，本地電子公司可為這些平台開發新遊戲。憑著優良的電訊基建、普及的寬頻設施和創意，香港可進一步發展成一個遊戲開發中心。另一方面，以成人為對象和供小童教學用途的電子玩具及遊戲亦會持續有穩定的銷路。

未來人力需求

3.30 內地經濟增長和全球經濟復甦持續為香港經濟帶來幫助。本地經濟已經走出 SARS 的陰霾並平穩復甦，預期未來數年將有溫和增長。基於第 3.6 至 3.29 段提及的業務前景、零件及元件發展趨勢和產品發展趨勢，本會相信電子業將受惠於本港經濟復甦，並在未來數年穩定增長。面對日新月異的技術發展，業內的人力需求將會增加，以高技術人員的需求尤為需要。

3.31 基於上述因素，以及僱主對二〇〇五年人力需求的預測，本會認為二〇〇五至〇七年間，第四類機構的技術人力會維持穩定，第一類機構的人力會輕微減少，第二、三及五類機構的人力則有溫和增長。

3.32 本會參考委員的經驗，以及對電子業人力的認識，並預期未來三年電子業的流失人數將會偏低，推算出電子業人力流失情況（流失率）如下：

表 3.B： 每年流失率（2005-07）

技能等級	每年流失率
技　師	3.0%
技術員	3.0%
技　工	3.0%

3.33 本會推算二○○五至○七年間，電子業為應付增長及填補流失率，每年平均須增聘各技能等級人手如下：

表 3.C： 二○○五至○七年每年平均須增加的培訓人數

技能等級	每年平均培訓需求
技 師	419 - 513
技術員	1 093 - 1 335
技 工	230 - 282

3.34 本會將於二○○六年再進行人力調查，檢討電子業的人力需求情況及搜集最新資料。

電子業每年培訓需求（附錄 8）及入讀本地電子工程課程的一年級學生人數

3.35 根據第 3.33段的每年平均培訓需求預測，本會推算出二○○五至○七年間，各技能等級每年平均須增加的之電子工程訓練名額（見表 3.D, 3.F 及 3.H）。附錄 8按主要職務列出電子業的每年訓練。表 3.E, 3.G 及 3.I 則按技能等級列出由本地院校提供的本地電子工程學科的一年級學生人數。必須指出，電子工程學生畢業後的出路很多，除本行外，還有加入機電服務、資訊科技、塑膠、玩具和電機器材等相關行業的。

技師級

表 3.D： 二○○五至○七年電子工程技師每年平均培訓需求預測

職 稱	調查期間僱員人數	預計每年平均培訓需求
電子工程師(1)	6 919	196 - 240
製造／品質保證工程師(2)	1 162	33 - 41
系統分析員(3)	4 710	134 - 164
總 數：	12 791	363 - 445

註：(1) 電子工程師包括電子銷售／支援工程師及電訊工程師。
(2) 製造／品質保證工程師包括工業工程師及品質控制工程師。
(3) 系統分析員包括軟件工程師。

表 3.E ： 二○○四／○五年度本地電子工程技師課程
一年級學生註冊人數

院校	課程名稱	一年級學生註冊人數
香港城市大學	電子計算機工程學（榮譽）工學士	88
	電子及通訊工程學（榮譽）工學士	112
	資訊工程學（榮譽）理學士	103
香港中文大學	計算機工程學（榮譽）工學士	44
	電子工程學（榮譽）工學士	73
	訊息工程學（榮譽）工學士	85
	自動化與計算機輔助工程學（榮譽）工學士	51
	系統工程與工程管理學（榮譽）工學士	67
香港理工大學	電子及資訊工程學（榮譽）工學士	112
	互聯網及多媒體（榮譽）工學士	55
香港科技大學	電腦工程學（榮譽）工學士	111
	電腦科學（資訊工程）（榮譽）工學士	26
	電子工程（榮譽）工學士	93
	電子工程（資訊及通訊工程）（榮譽）工學士	44
香港大學	電腦工程學（榮譽）工學士	25
	電子及通訊工程學（榮譽）工學士	37
	資訊工程學（榮譽）工學士	10
	總數	1 136

技術員級

表 3.F ： 二〇〇五至〇七年
電子工程技術員每年平均培訓需求預測

職　稱	調查期間僱員人數	預計每年平均培訓需求
電子技術員(1)	12 587	670 – 818
繪圖員	89	4 – 6
製造／品質保證技術員(2)	1 015	54 – 66
程序編製員	4 105	218 – 266
網站開發員／設計員	646	34 – 42
總　數：	18 442	980 – 1 198

註：(1) 電子技術員包括電子銷售／支援技術員、電訊技術員、電腦技術員及影音技術員。

(2) 製造／品質保證技術員包括品質控制技術員。

(3)

表 3.G： 二〇〇四／〇五年度本地電子工程技術員課程一年級學生註冊人數

院 校	課程名稱	一年級學生註冊人數
香港城市大學	電子商貿及萬維網科技副商學士	135
香港理工大學	電腦輔助工程設計高級文憑	55
	電子及資訊工程高級文憑	110
	互聯網科技及電子商貿高級文憑	45
	多媒體設計及科技高級文憑	135
香港專業教育學院	互聯網及多媒體工程高級文憑	123
	電子工程暨工商管理高級文憑	62
	電子及通訊工程高級文憑	96
	影視及娛藝電子高級文憑	60
	電腦及資訊工程高級文憑	62
電子業訓練中心	技術員基礎課程	117
資訊科技培訓發展中心	電訊工程專業文憑	38
	集成電路（IC）工程專業文憑	34
香港專業教育學院	電子及通訊工程高級文憑（夜間制）*	96
	電腦及資訊工程高級文憑（夜間制）*	41
	電子及通訊工程高級證書（夜間制）*	80
	電子及通訊工程證書（夜間制）*	70
	總數	1 359

註* 上述夜間課程的學生，大部分已在電子業任職。

技工級

表 3.H ： 二○○五至○七年電子工程技工
每年平均培訓需求預測

職 稱	調查期間僱員人數	預計每年平均培訓需求
電纜接駁技工／駁線技工	81	3 – 5
電子技工*	3 956	191 – 233
總 數：	4 037	194 – 238

註*：電子技工包括影音及無線電技工、修理技工(電子製造)及裝備／儀器工。

表 3.I： 二○○四／○五年度本地電子工程技工課程
一年級學生註冊人數

訓練中心／院校	課程名稱	一年級學生註冊人數
電子業訓練中心	電子基本技術課程	138
香港專業教育學院	電子設備修理技工證書課程**	69
	總數	207

註** 電子設備修理技工證書課程的畢業生，大部分已在電子業任職。

第四章

建　議

4.1　考慮到全球和本港經濟復甦、中國加入世界貿易組織和內地與香港簽訂了 CEPA 等因素，本會對電子業的發展感到審慎樂觀，相信未來幾年這個界別將有穩定增長。不過，內地和其他亞洲電子廠商與本地電子業的競爭日益激烈，廠商必須突出產品，加強產品特色及種類；此外，亦須生產更具創意及高增值的產品，以提升在國際市場的競爭力。因此，業內會繼續需要受過良好訓練的較高級技術人才。僱主應採取措施以提高技術人員的質素。

每年增聘人數

4.2　調查期間，本業有技師級受訓者 31 人、技術員級受訓者 153 人，以及技工級受訓者 231 人。一般而言，技師訓練需時兩年，技術員需四年，技工則需三至四年（有關建議訓練途徑見第 4.5 至 4.15 段）；因此，本業目前由僱主向技師及技術員畢業生提供的在職培訓資源，不足以應付未來幾年的人力需求。

4.3　電子業如要有足夠受過適當訓練的技術人才維持現有發展，整體所推行的人力培訓計劃，規模應如表 4.A 所示：

表 4.A：二〇〇五至〇七年間
建議每年增聘的受訓者人數

技能等級	調查期間僱員人數	建議每年增聘受訓人數
技師級	14 768	419 – 513
技術員級	20 556	1 093 – 1 335
技工級	4 787	230 – 282

附錄 8 列出各主要職務每年建議招聘人數。

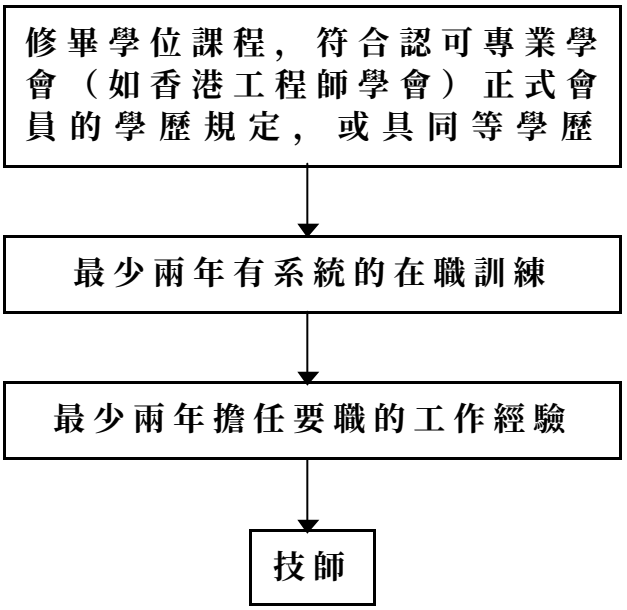
4.4 僱主為其機構策劃人力時，請注意表 4.A 所列的受訓者人數，分別約佔現有技師、技術員及技工人數的 3.2% 、5.9% 及 5.4% 。

技師訓練

4.5 技師須具有相當於專業學會正式會員所需的資歷和經驗，能夠分析和解決各種技術問題。此外，技師亦須負責發展及運用工程原理，具創見和判斷力；留意科技發展，運用最新技術，以及督導和培訓下屬。

4.6 技師在改善管理、革新科技方面，佔有重要地位。僱主宜採用圖 4.A 所示途徑訓練技師：

圖 4.A ：技師訓練



4.7 香港中文大學、香港大學、香港科技大學、香港理工大學及香港城市大學，均辦有各類電子工程及有關學科的學位課程（詳情見表 3.E）。

工科畢業生訓練計劃

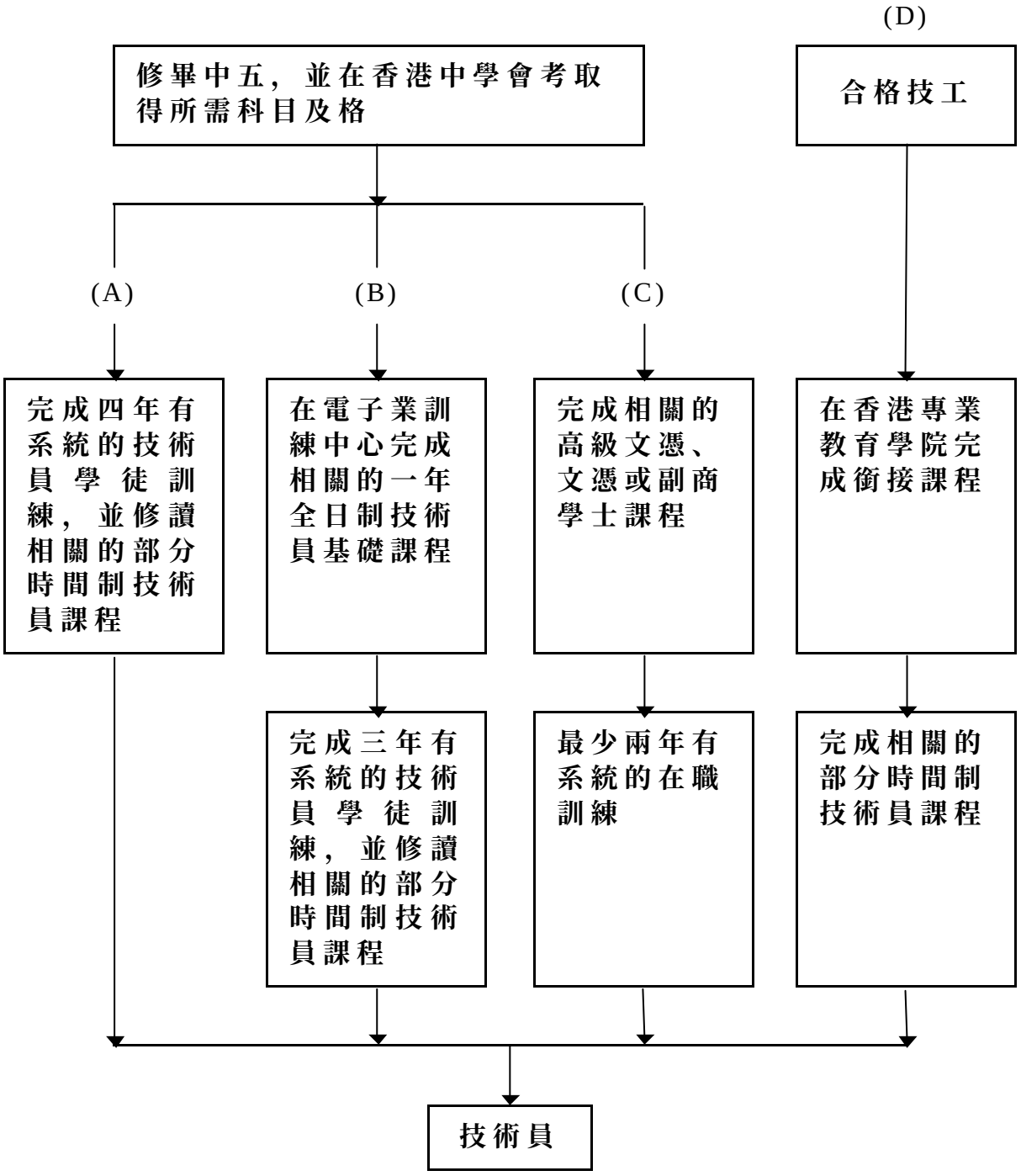
4.8 職業訓練局屬下技師訓練委員會現正推行工科畢業生訓練計劃，為工科畢業生提供更多有系統的工業實務訓練機會。有關訓練屬資助性質，為期十八個月，程度符合香港工程師學會正式會員的要求。受訓者每月可透過僱主獲得津貼，作為部分薪金，而技師訓練委員會則負責監察訓練進度。此外，職業訓練局的技師訓練組亦提供免費的工科畢業生職位介紹服務，協助僱主招聘畢業生，同時幫助畢業生取得受訓機會。該組亦會就各種有關事宜，向僱主提供協助。籲請僱主聯絡該組，參與是項計劃。

技術員訓練

4.9 技術員憑著本身經驗，以及曾接受的教育、實務訓練，能夠在技師督導下，運用已確立的技術及程序完成工作。

4.10 圖 4.B 為訓練技術員常用的四種途徑（A 至 D）：

圖 4.B：技術員訓練



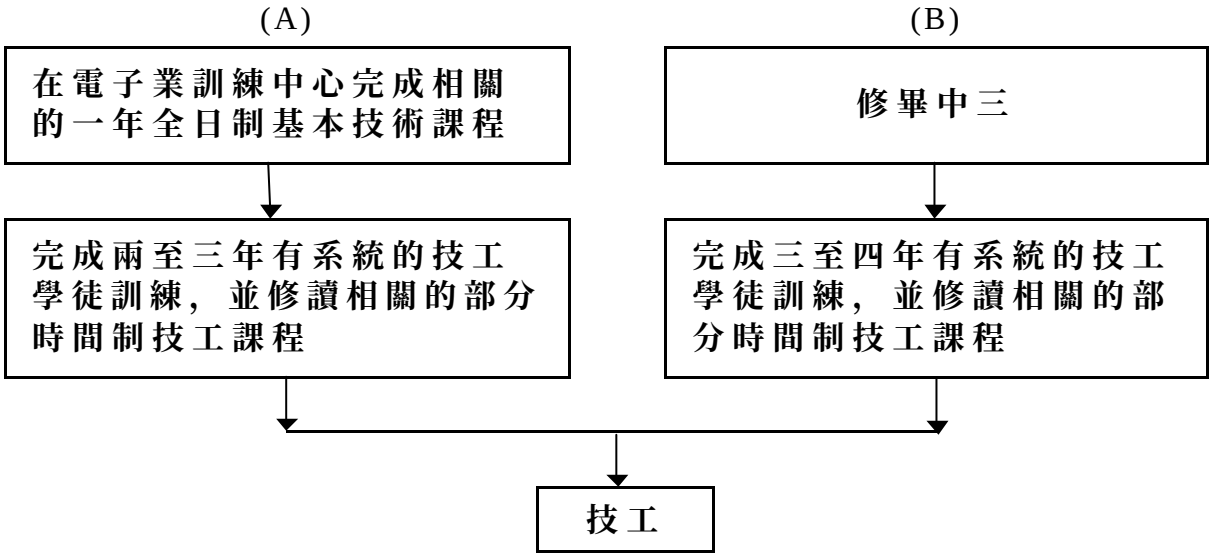
4.11 香港城市大學及香港理工大學辦有電子工程學副學士及高級文憑課程。另一方面，職業訓練局屬下香港專業教育學院，亦辦有與電子工程有關的全日制高級文憑及文憑課程、日間部分時間給假調訓制和夜間制高級證書、證書及高級文憑課程（詳情見表 3.G）。

技工訓練

4.12 技工能夠在極少指導和監督下，將多方面的技能應用到工作上。技工除須具備實際技能外，亦須有相關的理論知識，才能適應科技發展。完善的技工學徒訓練會兩者兼顧。

4.13 訓練技工的一般途徑（A 與 B）如下：

圖 4.C ：技工訓練



4.14 本會推薦(A) 途徑，原因是訓練期較短，加上學徒已受過適當基本訓練，在開始接受學徒訓練時，即能投入生產。

4.15 職業訓練局屬下電子業訓練中心，辦有與電子工程有關的基本技術課程。另一方面，香港專業教育學院亦有提供日間部分時間給假調訓制、夜間制電子工程及有關學科的技工課程。

電子業訓練中心

4.16 電子業訓練中心位於九龍灣，為業內提供職前及增修訓練課程，詳情見下表：

表 4.B ：電子業訓練中心二〇〇四／〇五年度課程

全日制課程	程度	修讀期
電子技術員基礎課程（TFC）	技術員	1年
電子基本技術課程（BCC）	技　工	1年
部分時間制課程		
電子生產自動化（詳情見表 4.C）	技師／技術員	10至75小時
低功率發射及接收研習	技術員	30小時
影印機原理及維修	技術員	30小時
電話機(PABX)原理及維修	技術員	30小時
PABX先進科技	技術員	40小時
圖文傳真機(FAX)原理及維修	技術員	30小時
數碼影印機課程	技術員	20小時
中小型企業個人電腦網絡基礎課程	技術員	30小時
智慧型大廈監察系統基礎課程	技術員	30小時
數碼電視基礎課程	技術員	30小時
Scalable-Robust電腦網絡	技術員	20小時
度身訂造電子課程	技術員	16小時
影音器材基礎課程	技　工	25小時
文儀設備基礎課程	技　工	25小時
磁場及機動組合（錄音機／錄影機）研習課程	技　工	30小時
來料品質檢查進修課程	技　工	22小時
電子消費品品質課程	技　工	30小時
品質保證理論及實踐課程	技　工	30小時

4.17 學員修畢一年全日制職前課程（TFC 及 BCC）後，可投身電子業，直接參加第二年學徒訓練。僱主宜僱用這些學員，為他們提供所需在職訓練。此外，僱主應盡量利用訓練中心所辦的部分時間制及度身訂造課程，提高屬下員工的質素。

電子製造自動化工場

4.18 電子業訓練中心設有電子製造自動化工場，提供多方面訓練，包括生產設備的操作及維修、裝配及設計技術、表面安裝技術的工序及品質控制與保證、內電路測試技術，以及其他自動化製造技術。工場亦裝設了多功能／精密元件安裝機及實時X光檢查系統等先進設備，加強高密度裝嵌及產品微型化技術方面的訓練，例如晶片刻度包裝、玻璃上晶片、倒裝晶片、球柵陣列及 0.5mm 四列扁平封裝技術等。目前，工場舉辦約 16 項部分時間制短期課程、1 項全日制短期課程和若干度身訂造課程，廣受在職工程師及技術員歡迎。此外，工場亦開辦有關電子製造自動化的專門短期課程，對象是電子業訓練中心技術員基礎課程（TFC）學員、香港專業教育學院相關高級文憑、文憑及高級證書課程的學生，以及本地各大學相關學科的本科生。本會定期檢討工場所辦課程，以配合業內最新需求。僱主宜派送員工到電子製造自動化工場修讀短期課程，增進員工知識，提高他們的質素。

4.19 下表列出電子製造自動化工場所提供的技師／技術員訓練課程：

表 4.C：**電子製造自動化工場課程**

夜間制課程	**修讀期**
自動線內測試儀 In-circuit Tester:工作原理及編寫程式	20 小時
自動線內測試儀 In-circuit Tester:維修及夾具設計	10 小時
表面安裝 SMT生產機組及工具：甄選準則	15 小時
取放機組 Pick-and-place Machine: 工作原理及維修概念	24 小時
取放機組（編寫程式及有效運作）	30 小時
統籌表面安裝配件 SMT Devices:規格及供應情況剖析	12½小時
精密表面安裝 SMT 線路板維修初階	15 小時
統籌表面安裝線路板：符合高質量生產原則之設計	20 小時
機電融合學原理及實務	30 小時

夜間制課程	修讀期
研習微型化零件（Micro-BGA/CSP）及倒裝晶片之高精度自動取放機組	20小時
高密度表面安裝技術（0.5mm Fine Pitch Defect-Free SMT）之關鍵因素	25小時
1mm-Pitch BGA科技及持續微型化技術	20小時
物料優化規劃	25小時
高效益庫存管制	25小時
企業相互電子交易（B2B）之挑戰及契機課程	15小時
數碼時代工作模式應用課程	10小時

全日制課程	修讀期
高級電子技術	75小時
度身訂造課程：表面安裝技術工作坊	3-6小時

電子設計及資訊科技訓練

4.20 職業訓練局屬下資訊科技培訓發展中心提供有關集成電路、電子和電訊工程的專業文憑課程。課程推出的時間正好應付集成電路、電子和電訊等方面的發展所需，亦配合香港的集成電路設計行業的發展。

4.21 因應電子設計科技的迅速發展（特別是集成電路工業的發展），培訓發展中心在香港科技園成立了芯片及系統中心（CaST）。成立CaST有兩個目的。第一是為集成電路設計和工程提供實習場地，以支援集成電路工業的發展。第二是為集成電路、格式和電子設計師提立一個開放及自由的平台，供他們研發集成電路及相關行的產品和服務，包括集成電路／互聯網通訊協定的設計和認證、集成電路格式和應用產品。

香港科學園公司

4.22 香港科技園是香港特別行政區政府成立的法定機構，於二○○一年五月正式開始運作。科技園的成立，為以科技為主要業務的公司提供了相關的設備和資訊，為它們發展業務帶來幫助。香港科技園為各高科技公司提供各種先進設施和支援服務，其中包括一個集成電路設計/開發支援中心和一個光電子開發支援中心，給所有入駐之科技公司和培育項目使用。科技園亦集中了全香港、全中國、以至全世界最優秀的科技和商業人才。僱主應多加使用科技園提供的支援，特別是集成電路設計方面的設備和服務，以協助公司業務發展。

新科技培訓計劃

4.23 自一九九二年起，職業訓練局一直負責推行新科技培訓計劃，向本地僱主提供協助，鼓勵他們派送僱員學習對業務有幫助的新科技。就該計劃而言，新科技指未在香港廣泛應用的科技，而吸納和應用這些科技有助本港工商業發展。本地僱主如欲引進新科技作工商業用途，可申請計劃的訓練津貼。此外，職訓局在香港生產力促進局及其他機構協助下，亦會幫助僱主物色合適的訓練機會。僱主宜充分利用這項計劃。

教育機構

4.24 香港理工大學、香港城市大學，以及職業訓練局屬下香港專業教育學院辦有各類為電子業而設的課程，包括短期、全日制、日間部分時間給假調訓制及夜間制技術員及技工課程；僱主宜利用這些課程提升員工質素。

職業訓練局工業訓練科

4.25 職業訓練局屬下工業訓練科，除推行工科畢業生訓練計劃及新科技培訓計劃外，亦協助僱主籌辦訓練計劃，特別是培訓技術員及技工的學徒訓練計劃。該科亦提供免費的學徒就業輔導服務。僱主可與該科職員聯絡，請其協助成立訓練計劃及招聘受訓者。

MANPOWER STATISTICS OF THE ELECTRONICS INDUSTRY
電子業人力統計數字

Sector 1: Manufacturing (**製造**)

Job Title **職稱**	Number of Workers Employed **僱員人數**	Number of Trainees **受訓者人數**	Number of Vacancies at Date of Survey **調查期間空缺數目**	Forecast of Total Workers by June 2005 **預測至二○○五年六月時的僱員總數**
TECHNOLOGIST LEVEL **技師級**				
Electronics Engineer **電子工程師**	424	-	18	442
Electrical Engineer **電機工程師**	73	-	2	75
Mechanical Engineer **機械工程師**	136	-	6	142
Manufacturing/Quality Assurance Engineer **製造／品質保證工程師**	365	-	19	384
Chemical Engineer **化學工程師**	9	-	1	10
Product/Graphic Designer **產品／平面設計員**	35	-	4	39
System Analyst **系統分析員**	44	-	2	46
Sub-total **小 計**	1 086	-	52	1 138
TECHNICIAN LEVEL **技術員級**				
Electronics Technician **電子技術員**	824	-	12	836
Mechanical Technician **機械技術員**	489	-	-	489
Draughtsman **繪圖員**	32	-	5	37
Manufacturing/Quality Assurance Technician **製造／品質保證技術員**	438	-	4	442
Supervisor/Foreman/Leader **監督／管工／組長**	426	-	3	412
Programmer **程序編製員**	58	-	3	61
Web Developer/Designer **網站開發員／設計員**	1	-	-	1
Sub-total **小 計**	2 268	-	27	2 278
CRAFTSMAN LEVEL **技工級**				
Cable Jointer/Wireman **電纜接駁技工／駁線技工**	-	-	-	-
Electronics Craftsman **電子技工**	301	-	15	316
Electrician **電氣技工**	41	-	-	41
Mechanic **技工**	154	-	1	155
Sub-total **小 計**	496	-	16	512
OPERATIVE LEVEL **操作工級**				
Operator **生產線操作工**	5 835	-	94	5 949
Sub-total **小 計**	5 835	-	94	5 949
GRAND TOTAL **總 計**	**9 685**	**-**	**189**	**9 877**

MANPOWER STATISTICS OF THE ELECTRONICS INDUSTRY
電子業人力統計數字

Sector 2: Trading and Services (**貿易及服務**)

Job Title **職稱**	Number of Workers Employed **僱員人數**	Number of Trainees **受訓者人數**	Number of Vacancies at Date of Survey **調查期間空缺數目**	Forecast of Total Workers by June 2005 **預測至二○○五年六月時的僱員總數**
TECHNOLOGIST LEVEL **技師級**				
Electronics Engineer **電子工程師**	4 347	2	153	4 545
Electrical Engineer **電機工程師**	306	-	-	306
Mechanical Engineer **機械工程師**	576	-	25	601
Manufacturing/Quality Assurance Engineer **製造／品質保證工程師**	789	-	11	810
Chemical Engineer **化學工程師**	89	-	-	89
Product/Graphic Designer **產品／平面設計員**	587	-	21	608
System Analyst **系統分析員**	3 857	-	54	4 054
Sub-total **小 計**	10 551	2	264	11 013
TECHNICIAN LEVEL **技術員級**				
Electronics Technician **電子技術員**	6 676	108	128	6 921
Mechanical Technician **機械技術員**	407	-	24	431
Draughtsman **繪圖員**	40	-	-	40
Manufacturing/Quality Assurance Technician **製造／品質保證技術員**	504	-	2	516
Supervisor/Foreman/Leader **監督／管工／組長**	503	-	-	503
Programmer **程序編製員**	3 663	-	169	3 976
Web Developer/Designer **網站開發員／設計員**	536	-	28	554
Sub-total **小 計**	12 329	108	351	12 941
CRAFTSMAN LEVEL **技工級**				
Cable Jointer/Wireman **電纜接駁技工／駁線技工**	71	-	-	71
Electronics Craftsman **電子技工**	2 665	150	13	2 780
Electrician **電氣技工**	165	-	-	165
Mechanic **技工**	310	-	-	310
Sub-total **小 計**	3 211	150	13	3 326
OPERATIVE LEVEL **操作工級**				
Operator **生產線操作工**	438	-	44	483
Sub-total **小 計**	438	-	44	483
GRAND TOTAL **總 計**	**26 529**	**260**	**672**	**27 763**

MANPOWER STATISTICS OF THE ELECTRONICS INDUSTRY
電子業人力統計數字

Sector 3: Telecommunications Services (**電訊服務**)

Job Title **職稱**	Number of Workers Employed **僱員人數**	Number of Trainees **受訓者人數**	Number of Vacancies at Date of Survey **調查期間空缺數目**	Forecast of Total Workers by June 2005 **預測至二○○五年六月時的僱員總數**
TECHNOLOGIST LEVEL **技師級**				
Electronics Engineer **電子工程師**	1 419	-	8	1 424
Electrical Engineer **電機工程師**	32	-	-	32
Mechanical Engineer **機械工程師**	15	-	-	15
Manufacturing/Quality Assurance Engineer **製造／品質保證工程師**	3	-	-	3
Chemical Engineer **化學工程師**	-	-	-	-
Product/Graphic Designer **產品／平面設計員**	22	-	4	26
System Analyst **系統分析員**	610	-	2	612
Sub-total **小 計**	2 101	-	14	2 112
TECHNICIAN LEVEL **技術員級**				
Electronics Technician **電子技術員**	3 567	-	6	3 564
Mechanical Technician **機械技術員**	18	-	-	18
Draughtsman **繪圖員**	11	-	-	11
Manufacturing/Quality Assurance Technician **製造／品質保證技術員**	25	-	-	25
Supervisor/Foreman/Leader **監督／管工／組長**	122	-	2	124
Programmer **程序編製員**	179	-	5	184
Web Developer/Designer **網站開發員／設計員**	36	-	1	37
Sub-total **小 計**	3 958	-	14	3 963
CRAFTSMAN LEVEL **技工級**				
Cable Jointer/Wireman **電纜接駁技工／駁線技工**	10	-	2	12
Electronics Craftsman **電子技工**	670	-	54	724
Electrician **電氣技工**	38	-	3	41
Mechanic **技工**	2	-	-	2
Sub-total **小 計**	720	-	59	779
OPERATIVE LEVEL **操作工級**				
Operator **生產線操作工**	131	-	-	131
Sub-total **小 計**	131	-	-	131
GRAND TOTAL **總 計**	**6 910**	**-**	**87**	**6 985**

MANPOWER STATISTICS OF THE ELECTRONICS INDUSTRY
電子業人力統計數字

Sector 4: Wholesale (**批發**)

Job Title **職稱**	Number of Workers Employed **僱員人數**	Number of Trainees **受訓者人數**	Number of Vacancies at Date of Survey **調查期間空缺數目**	Forecast of Total Workers by June 2005 **預測至二○○五年六月時的僱員總數**
TECHNOLOGIST LEVEL **技師級**				
Electronics Engineer **電子工程師**	294	-	13	307
Electrical Engineer **電機工程師**	12	-	-	12
Mechanical Engineer **機械工程師**	34	-	-	34
Manufacturing/Quality Assurance Engineer **製造／品質保證工程師**	4	-	-	4
Chemical Engineer **化學工程師**	-	-	-	-
Product/Graphic Designer **產品／平面設計員**	4	-	-	4
System Analyst **系統分析員**	158	-	1	159
Sub-total **小 計**	506	-	14	520
TECHNICIAN LEVEL **技術員級**				
Electronics Technician **電子技術員**	650	12	60	720
Mechanical Technician **機械技術員**	-	-	-	34
Draughtsman **繪圖員**	2	-	-	2
Manufacturing/Quality Assurance Technician **製造／品質保證技術員**	34	-	-	34
Supervisor/Foreman/Leader **監督／管工／組長**	14	-	2	16
Programmer **程序編製員**	157	-	1	158
Web Developer/Designer **網站開發員／設計員**	72	-	-	72
Sub-total **小 計**	929	12	63	1 036
CRAFTSMAN LEVEL **技工級**				
Cable Jointer/Wireman **電纜接駁技工／駁線技工**	-	-	-	-
Electronics Craftsman **電子技工**	72	-	2	74
Electrician **電氣技工**	12	-	-	12
Mechanic **技工**	-	-	-	-
Sub-total **小 計**	84	-	2	86
OPERATIVE LEVEL **操作工級**				
Operator **生產線操作工**	68	-	-	68
Sub-total **小 計**	68	-	-	68
GRAND TOTAL **總 計**	**1 587**	**12**	**79**	**1 710**

MANPOWER STATISTICS OF THE ELECTRONICS INDUSTRY
電子業人力統計數字

Sector 5: Design Houses, and Relevant Departments in Universities and the Government **(設計公司、大學及政府有關部門)**

Job Title **職稱**	Number of Workers Employed **僱員人數**	Number of Trainees **受訓者人數**	Number of Vacancies at Date of Survey **調查期間空缺數目**	Forecast of Total Workers by June 2005 **預測至二○○五年六月時的僱員總數**
TECHNOLOGIST LEVEL **技師級**				
Electronics Engineer **電子工程師**	435	29	3	443
Electrical Engineer **電機工程師**	32	-	-	32
Mechanical Engineer **機械工程師**	10	-	-	10
Manufacturing/Quality Assurance Engineer **製造／品質保證工程師**	1	-	-	1
Chemical Engineer **化學工程師**	2	-	-	2
Product/Graphic Designer **產品／平面設計員**	3	-	-	3
System Analyst **系統分析員**	41	-	-	41
Sub-total **小 計**	524	29	3	532
TECHNICIAN LEVEL **技術員級**				
Electronics Technician **電子技術員**	870	32	7	877
Mechanical Technician **機械技術員**	21	-	-	21
Draughtsman **繪圖員**	4	-	-	4
Manufacturing/Quality Assurance Technician **製造／品質保證技術員**	14	-	1	15
Supervisor/Foreman/Leader **監督／管工／組長**	114	-	-	114
Programmer **程序編製員**	48	-	2	54
Web Developer/Designer **網站開發員／設計員**	1	1	-	1
Sub-total **小 計**	1 072	33	10	1 086
CRAFTSMAN LEVEL **技工級**				
Cable Jointer/Wireman **電纜接駁技工／駁線技工**	-	-	-	-
Electronics Craftsman **電子技工**	248	81	-	246
Electrician **電氣技工**	-	-	-	-
Mechanic **技工**	28	-	-	28
Sub-total **小 計**	276	81	-	274
OPERATIVE LEVEL **操作工級**				
Operator **生產線操作工**	11	-	-	11
Sub-total **小 計**	11	-	-	11
GRAND TOTAL 總 計	**1 883**	**143**	**13**	**1 903**

MANPOWER STATISTICS OF THE ELECTRONICS INDUSTRY (ALL SECTORS)
電子業人力統計數字（各門類）

Job Title **職稱**	Number of Workers Employed **僱員人數**	Number of Trainees **受訓者人數**	Number of Vacancies at Date of Survey **調查期間空缺數目**	Forecast of Total Workers by June 2005 **預測至二○○五年六月時的僱員總數**
TECHNOLOGIST LEVEL **技師級**				
Electronics Engineer **電子工程師**	6 919	31	195	7 161
Electrical Engineer **電機工程師**	455	-	2	457
Mechanical Engineer **機械工程師**	771	-	31	802
Manufacturing/Quality Assurance Engineer **製造／品質保證工程師**	1 162	-	30	1 202
Chemical Engineer **化學工程師**	100	-	1	101
Product/Graphic Designer **產品／平面設計員**	651	-	29	680
System Analyst **系統分析員**	4 710	-	59	4 912
Sub-total **小 計**	14 768	31	347	15 315
TECHNICIAN LEVEL **技術員級**				
Electronics Technician **電子技術員**	12 587	152	213	12 918
Mechanical Technician **機械技術員**	935	-	24	993
Draughtsman **繪圖員**	89	-	5	94
Manufacturing/Quality Assurance Technician **製造／品質保證技術員**	1 015	-	7	1 032
Supervisor/Foreman/Leader **監督／管工／組長**	1 179	-	7	1 169
Programmer **程序編製員**	4 105	-	180	4 433
Web Developer/Designer **網站開發員／設計員**	646	1	29	665
Sub-total **小 計**	20 556	153	465	21 304
CRAFTSMAN LEVEL **技工級**				
Cable Jointer/Wireman **電纜接駁技工／駁線技工**	81	-	2	83
Electronics Craftsman **電子技工**	3 956	231	84	4 140
Electrician **電氣技工**	256	-	3	259
Mechanic **技工**	494	-	1	495
Sub-total **小 計**	4 787	231	90	4 977
OPERATIVE LEVEL **操作工級**				
Operator **生產線操作工**	6 483	-	138	6 642
Sub-total **小 計**	6 483	-	138	6 642
GRAND TOTAL **總 計**	**46 594**	**415**	**1 040**	**48 238**

DISTRIBUTION OF EMPLOYEES BY MONTHLY INCOME RANGE (ALL SECTORS)
根據每月總收入幅度的僱員人數分布情況（各門類）

Job Title **職稱**	Unspecified **未有說明**	Below $6,001 **以下**	$6,001 - $8,000	$8,001 - $10,000	$10,001 - $15,000	$15,001 - $20,000	$20,001 - $25,000	$25,001 - $30,000	Over $30,000 **以上**
TECHNOLOGIST LEVEL **技師級**									
Electronics Engineer **電子工程師**	1 429	-	-	34	387	1 104	1 314	698	1 953
Electrical Engineer **電機工程師**	58	-	-	-	56	74	131	21	115
Mechanical Engineer **機械工程師**	129	-	-	-	68	226	164	98	86
Manufacturing/Quality Assurance Engineer **製造／品質保證工程師**	115	-	-	-	125	239	303	199	181
Chemical Engineer **化學工程師**	-	-	-	-	7	83	2	-	8
Product/Graphic Designer **產品／平面設計員**	79	-	-	-	95	221	61	54	141
System Analyst **系統分析員**	1 396	-	-	2	479	473	663	763	934
Sub-total **小 計**	3 206	-	-	36	1 217	2 420	2 638	1 833	3 418
TECHNICIAN LEVEL **技術員級**									
Electronics Technician **電子技術員**	2 952	30	281	1 445	3 632	2 198	594	1 157	298
Mechanical Technician **機械技術員**	11	-	5	411	172	161	143	24	8
Draughtsman **繪圖員**	9	-	13	39	21	-	7	-	-
Manufacturing/Quality Assurance Technician **製造／品質保證技術員**	54	-	4	301	348	275	33	-	-
Supervisor/Foreman/Leader **監督／管工／組長**	78	-	-	163	330	428	49	131	-
Programmer **程序編製員**	908	-	-	256	949	1 072	668	252	-
Web Developer/Designer **網站開發員／設計員**	46	-	-	34	440	80	38	-	8
Sub-total **小 計**	4 058	30	303	2 649	5 892	4 214	1 532	1 564	314
CRAFTSMAN LEVEL **技工級**									
Cable Jointer/Wireman **電纜接駁技工／駁線技工**	-	-	10	71	-	-	-	-	-
Electronics Craftsman **電子技工**	57	11	780	1 467	1 540	101	-	-	-
Electrician **電氣技工**	-	-	6	59	173	18	-	-	-
Mechanic **技工**	8	-	30	105	351	-	-	-	-
Sub-total **小 計**	65	11	826	1 702	2 064	119	-	-	-
OPERATIVE LEVEL **操作工級**									
Operator **生產線操作工**	125	1 746	3 513	1 074	25	-	-	-	-
Sub-total **小 計**	125	1 746	3 513	1 074	25	-	-	-	-
GRAND TOTAL 總 計	**7 454**	**1 787**	**4 642**	**5 461**	**9 198**	**6 753**	**4 170**	**3 397**	**3 732**

RECOMMENDED NUMBER OF TRAINEES
TO BE TAKEN ON ANNUALLY FOR THE NEXT FEW YEARS
建議未來幾年應取錄的受訓者人數

Job Title **職稱**	No. of Workers Employed at Time of Survey (2004) **調查期間（2004 年）僱員人數**	Recommended Number of Trainees to be Taken on Annually Starting from 2005 **建議由二○○五年起每年取錄的受訓者人數**
TECHNOLOGIST LEVEL **技師級**		
Electronics Engineer **電子工程師**	6 919	***196 – 240***
Electrical Engineer **電機工程師**	455	***13 – 15***
Mechanical Engineer **機械工程師**	771	***21 – 26***
Manufacturing/Quality Assurance Engineer **製造／品質保證工程師**	1 162	***33 – 41***
Chemical Engineer **化學工程師**	100	***3 – 4***
Product/Graphic Designer **產品／平面設計員**	651	***19 – 23***
System Analyst **系統分析員**	4 710	***134 – 164***
Sub-total **小　計**	**14 768**	***419 – 513***
TECHNICIAN LEVEL **技術員級**		
Electronics Technician **電子技術員**	12 587	***670 – 818***
Mechanical Technician **機械技術員**	935	***50 – 60***
Draughtsman **繪圖員**	89	***4 – 6***
Manufacturing/Quality Assurance Technician **製造／品質保證技術員**	1 015	***54 – 66***
Supervisor/Foreman/Leader **監督／管工／組長**	1 179	***63 – 77***
Programmer **程序編製員**	4 105	***218 – 266***
Web Developer/Designer **網站開發員／設計員**	646	***34 – 42***
Sub-total **小　計**	**20 556**	***1 093 – 1 335***
CRAFTSMAN LEVEL **技工級**		
Cable Jointer/Wireman **電纜接駁技工／駁線技工**	81	***3 – 5***
Electronics Craftsman **電子技工**	3 956	***191 – 233***
Electrician **電氣技工**	256	***13 – 15***
Mechanic **技工**	494	***23 – 29***
Sub-total **小　計**	**4 787**	***230 – 282***

Annex 1

Membership of the
Electronics and Telecommunications Training Board
(as at 15.12.2004)

Chairman:

Mr TANG Chung-yen, Tom	(nominated by the Federation of Hong Kong Industries)

Vice-Chairman:

Mr LAM Kwok-luen	(nominated by a broadcasting company)

Members:

Mr CHAN Yan-tim	(nominated by the Hong Kong and Kowloon Electronics Industry Employees' General Union)
Mr CHU Tak-sunh	(nominated by an electronics trading/ engineering services company)
Mr HO Yue-wai	(representing the Executive Director of the Vocational Training Council)
Mr KWONG Wai-hung	(nominated by a telecommunication company - the fixed telecommunication network services sector)
Mr LEUNG Tsun-ho, Michael	(representing the Director of Electrical and Mechanical Services)
Mr LEUNG Wai-ming, Frank	(nominated by the Hong Kong Productivity Council)
Mr MAK Ming-cheong, Michael	(nominated by an electronics manufacturing company - computers and related peripherals)
Mr SIU Wan-sing	(nominated by the Chinese Manufacturers' Association of Hong Kong)
Mr SO Tat-foon	(representing the Director-General of Telecommunications)

Mr SO Yat-kai, Walter	(representing the Director - General of Trade and Industry)
Mr SZE Tak-wei, John	(nominated by the Hong Kong Institution of Engineers)
Dr WONG Wai-tak, Mike	(nominated by The Hong Kong Polytechnic University)
Mr YEUNG Chi-hung, Johnny	(nominated by the Hong Kong Electronic Industries Association)
Mr YUEN Kwan-lok, Mark	(nominated by an electronics manufacturing company - telecommunication)
Mr ZAU Shou-chung, Bernard	(nominated by an electronics manufacturing company - components/parts)

Secretary:

Mr CHENG Tai-man	(Vocational Training Council)

In Attendance:

Mr CHU Kwai-luen	(Principal, Hong Kong Institute of Vocational Education (Kwai Chung))

附件 1

電子業及電訊業訓練委員會委員名單
（二○○四年十二月十五日）

主席：

唐慶年先生	（香港工業總會提名）

副主席：

林國聯先生	（某間廣播公司提名）

委員：

陳潤添先生	（港九電子工業職工總會提名）
朱德宣先生	（某間電子貿易/工程服務公司提名）
何如偉先生	（職業訓練局執行幹事代表）
鄺偉雄先生	（某間固定電訊網絡服務公司提名）
梁駿豪先生	（機電工程署署長代表）
梁偉明先生	（香港生產力促進局提名）
麥銘昌先生	（某間電腦及有關週邊裝置製造公司提名）
蕭雲昇先生	（香港中華廠商聯合會提名）
蘇達寬先生	（電訊管理局局長代表）
蘇逸佳先生	（工業貿易署署長代表）
施德威先生	（香港工程師學會提名）
黃偉德博士	（香港理工大學提名）
楊志雄先生	（香港電子業商會提名）
袁均樂先生	（某間電訊器材製造公司提名）
邵守忠先生	（某間電子元件及配件製造公司提名）

秘書：

鄭泰民先生	（職業訓練局）

列席者：

朱桂鑾先生	（香港專業教育學院(葵涌分校)院長）

Annex 2

Electronics and Telecommunications Training Board

Terms of Reference

1. To determine the manpower demand of the industry, including the collection and analysis of relevant manpower and student/trainee statistics and information on socio-economic, technological and labour market developments.

2. To assess and review whether the manpower supply for the industry matches with the manpower demand.

3. To recommend to the Vocational Training Council the development of vocational education and training facilities to meet the assessed manpower demand.

4. To advise the Hong Kong Institute of Vocational Education (IVE) and training & development centres on the direction and strategic development of their programmes in the relevant disciplines.

5. To advise on the course planning, curriculum development and quality assurance systems of the IVE and training & development centres.

6. To prescribe job specifications for the principal jobs in the industry defining the skills, knowledge and training required.

7. To advise on training programmes for the principal jobs in the industry specifying the time a trainee needs to spend on each skill elements.

8. To tender advice in respect of skill assessments, trade tests and certification for in-service workers, apprentices and trainees, for the purpose of ascertaining that the specified skill standards have been attained.

9. To advise on the conduct of skill competitions in key trades in the industry for the promotion of vocational education and training as well as participation in international competitions.

10. To liaise with relevant bodies on matters pertaining to the development and promotion of vocational education and training in the industry, including employers, employers' associations, trade unions, professional institutions, training and educational institutions and government departments.

11. To organize seminars/conferences/symposia on vocational education and training for the industry.

12. To advise on the publicity relating to the activities of the Training Board and relevant vocational education and training programmes of the VTC.

13. To submit to the Council an annual report on the Training Board's work and its recommendations on the strategies for programmes in the relevant disciplines.

14. To undertake any other functions delegated by the Council in accordance with Section 7 of the Vocational Training Council Ordinance.

電子業及電訊業訓練委員會

職權範圍

1. 確定業內的人力需求，包括收集、分析相關的人力和學生／學員統計數字，以及關於社會經濟、科技及人力市場發展的資料。

2. 評估及研究本業的人力供求是否平衡。

3. 就發展業內專業教育及訓練設施應付人力需求，向職業訓練局提供意見。

4. 就相關學科的課程發展方向及策略，向香港專業教育學院(IVE)、訓練及發展中心提出建議。

5. 就 IVE、訓練及發展中心的課程策劃、課程發展及質素保證制度提供意見。

6. 擬訂本業主要職務的工作範圍，界定所需的技能、知識及訓練。

7. 建議本業主要職務訓練方案，訂定每種技能所需的訓練期。

8. 對技術評估、技能測驗及證書頒發制度提供意見，以確定從業員、學徒及見習員的技能水平。

9. 就本業主要行業舉辦技能比賽提供意見，以推廣專業教育與訓練和派員參加國際賽事。

10. 就本業專業教育及訓練的發展與推廣事宜，與僱主、僱主聯會、工會、專業團體、訓練及教育機構、政府部門等聯絡。

11. 為本業舉辦有關專業教育及訓練的研討會與會議。

12. 就業內訓練委員會工作、有關職訓局專業教育及訓練課程的宣傳事宜提供意見。

13. 每年向局方呈交訓練委員會工作報告，以及相關學科課程發展策略建議。

14. 根據《職業訓練局條例》第 7 條，負責局方所委派的其他工作。

CONFIDENTIAL
WHEN DATA ENTERED
填入數據後即成
機密文件

VOCATIONAL TRAINING COUNCIL
職業訓練局

THE 2004 MANPOWER SURVEY OF THE ELECTRONICS INDUSTRY
電子業二零零四年人力調查

QUESTIONNAIRE
調查表

PLEASE READ THE EXPLANATORY NOTES BEFORE COMPLETING THIS QUESTIONNAIRE
填表前，請參閱附註

For official use only: 此欄毋須填寫	Rec. Type	Survey Code	Industry Code	Establishment No.	Enumerator's No.	Editor's No.	Check Digit	No. of Employees Covered by the Questionnaire
	1	0 5						
	1	2 3	4 5 6 7 8 9	10 11 12 13 14 15	16 17	18 19	20 21 22	23 24 25 26 27

NAME OF ESTABLISHMENT:
機構名稱 _____

ADDRESS:
地址 _____

TYPE OF PRODUCT/SERVICE:
產品／服務 _____

TOTAL NUMBER OF PERSONS ENGAGED:
僱員總人數 _____

NAME OF PERSON TO CONTACT:
聯絡人姓名 _____ (28 – 47)

POSITION:
職位 _____

TEL. NO.:
電話 _____ (48 – 55) - _____ (56 – 63)

FAX NO.:
圖文傳真 _____

E-MAIL:
電郵 _____ (64 – 98)

VTC-EC-01

Part I

	(A) Job 工作			(B) Average Monthly Income 每月平均收入	(C) Number Employed at Date of Survey (excl. trainees) 現有僱員人數 (受訓者除外)	(D) Forecast of Number Employed 12 Months from Now (excl. trainees) 預計十二個月後僱員人數 (受訓者除外)	(E) Number of Vacancies at Date of Survey (excl. trainees) 現有空缺額 (受訓者除外)	(F) No. of Trainees at Date of Survey 現有受訓者人數
	Title 職稱	Rec. Type	Job Code 職位編號	Code 編號				
	For Official Use Only → 此欄毋須填寫	1	8-10	11	12-15	16-19	20-22	23-25
	TECHNOLOGIST LEVEL 技師級							
1	Electronics Engineer 電子工程師	2	1 0 1					
2	Electrical Engineer 電機工程師	2	1 0 2					
3	Mechanical Engineer 機械工程師	2	1 0 3					
4	Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	2	1 0 4					
5	Chemical Engineer 化學工程師	2	1 0 5					
6	Product/Graphic Designer 產品／平面設計員	2	1 0 6					
7	System Analyst 系統分析員	2	1 0 7					
	TECHNICIAN LEVEL 技術員級							
8	Electronics Technician 電子技術員	2	2 0 1					
9	Mechanical Technician 機械技術員	2	2 0 2					
10	Draughtsman 繪圖員	2	2 0 3					
11	Manufacturing/Quality Assurance Technician 製造／品質保證技術員	2	2 0 4					
12	Supervisor/Foreman/Leader 監督／管工／組長	2	2 0 5					
13	Programmer 程式編製員	2	2 0 6					
14	Web Developer/Designer 網站開發員／設計員	2	2 0 7					
	CRAFTSMAN LEVEL 技工級							
15	Cable Jointer/Wireman 電纜接駁技工／駁線技工	2	3 0 1					
16	Electronics Craftsman 電子技工	2	3 0 2					
17	Electrician 電氣技工	2	3 0 3					
18	Mechanic 技工	2	3 0 4					
	OPERATIVE LEVEL 操作工級							
19	Operator 生產線操作工	2	4 0 1					
20		2						
21		2						
22		2						
23		2						
24		2						
25		2						

Average Monthly Income 每月平均收入

Enter in column B employee's average monthly income range according to the following code :

請將僱員的每月平均收入幅度按照下列類別編號填入B欄內：

Code 編號	Average Monthly Income Range 每月平均收入幅度
1	Under $6,001 以下
2	$6,001 - $8,000
3	$8,001 - $10,000
4	$10,001 - $15,000
5	$15,001 - $20,000
6	$20,001 - $25,000
7	$25,001 - $30,000
8	Over $30,000 以上

Remark 備註

Note 1 If additional lines are necessary, please tick here ☐ and enter on supplementary sheet(s).

附註一 如此頁填滿，請先將（u）號填入此 ☐ 內，然後在附頁繼續填寫。

Note 2 The term 'trainees' includes all trainees receiving any form of training and apprentices under a contract of apprenticeship.

附註二 「受訓者」包括正在接受各種訓練的人士，以及簽有學徒合約的登記學徒。

Part II

1. Internal Promotion
內部晉升

Please fill in the no. of internal promotion in the past 12 months
請填寫過去十二個月內，內部晉升的人數

Rec. Type	From Technician to Technologist 由技術員晉升至技師	From Craftsman to Technician 由技工晉升至技術員	From Others to Craftsman 由其他職級晉升至技工
3			
1	8 9 10	11 12 13	14 15 16

2. Hong Kong Technical Personnel Dispatched Outside Hong Kong
遣派香港以外的香港技術人員

Please enter below the number of technical personel paid by Hong Kong who had been dispatched to work for more than half year outside Hong Kong during the 12 months prior to the survey.
請填寫調查前十二個月內，由香港支薪而被派往外地工作超過半年的技術人員數目

Number of Technologists 技師人數	Number of Technicians 技術員人數	Number of Craftsmen 技工人數
17 18 19 20	21 22 23 24	25 26 27 28

3. Education and Training an Employee Should Have
僱員宜有的教育及訓練

Technologist 技師			Technician 技術員			Craftsman 技工		
Education 教育	Training Mode 訓練方式	Training Period 訓練時間	Education 教育	Training Mode 訓練方式	Training Period 訓練時間	Education 教育	Training Mode 訓練方式	Training Period 訓練時間
29	30	31	32	33	34	35	36	37

Please enter in the boxes the education and training an employee should have according to the following codes:
請將僱員宜有的教育及訓練按照下列類別編號填入格內：

Code 編號	Education 教育
1	Degree/Associateship or equivalent 大學學位／院士或同等學歷
2	Higher Diploma 高級文憑
3	Diploma 文憑
4	Higher Certificate 高級證書
5	Certificate 證書
6	Secondary 5 中五
7	Craft Certificate 技工證書
8	Secondary 3 or below 中三或以下

Code 編號	Training Mode 訓練方式
1	Graduate traineeship 工科畢業生訓練
2	On-the-job training 在職訓練
3	Apprenticeship 學徒訓練
4	Off-the-job training 職外訓練
5	Others 其他

Code 編號	Training Period 訓練時間
1	4 years or above 四年或以上
2	3 to less than 4 years 三年至四年以下
3	2 to less than 3 years 二年至三年以下
4	1 to less than 2 years 一年至二年以下
5	6 to less than 12 months 六至十二個月以下
6	Below 6 months 六個月以下

Annex 4
附 件 4

The 2004 Manpower Survey of the
Electronics Industry
電 子 業 二 零 零 四 年 人 力 調 查

Explanatory Note
附 註

1. Please ignore the numbers of the row immediately beneath the headings. They are purely for data processing.
每行標題下的號碼只供資料處理用，請毋須理會。

2. Before completing the questionnaire, please read carefully the job titles and job descriptions in Appendix C.
填寫調查表前，請先詳閱附錄 C 所列的職稱與工作說明。

3. Please complete the columns ('A' to 'F') of the questionnaire and insert a zero (0) for any column not applicable to your establishment.
請填寫表內各欄（「A」至「F」），並在不適用於貴機構的各欄內填入（0）符號。

4. Please fill in information as accurate as possible because the information collected from this survey is vital for determining the manpower requirements of the industry in order that the Electronics Industry Training Board can make meaningful recommendations to Government on how to meet training needs.
請填入準確資料，因是項資料對於確定本業的人力需求極為重要，而電子業訓練委員會亦將以此為根據，向政府提供解決訓練需求的建議。

5. Internal Promotion
內部提晉升
An internal promotion is the promotion of an employee to a higher level job by virtue of his performance or abilities. Please fill in the no. of internal promotion from "Technician to Technologist", from "Craftsman to Technician" and from "Others to Craftsman" in the past 12 months in the respective columns.
內部晉升指一名僱員由於表現良好或具工作才能而獲晉升至較高級職位。請將過去十二個月貴機構內部由技術員晉升至技師、由技工晉升至技術員，以及由其他職級晉升至技工的人數填入所屬欄內。

6. Job Titles - Column 'A'

職稱 —— 「A」欄

(a) Please enter into column 'A' those job titles together with their appropriate code numbers specified in Appendix C, applicable to your establishment in order of their skill levels (i.e. technologist level jobs first followed by technician, craftsman, operative and unskilled level jobs).

請將貴機構內的職務名稱，連同附錄 C 所載的編號，按照技能等級次序（先填技師，其次為技術員、技工、操作工及非技術工人）填入調查表「A」欄內。

(b) Please add in column 'A' titles of any technical jobs not mentioned in Appendix C, and briefly describe them and indicate their skill levels.

如貴機構另有技術性職務名稱未載於附錄 C 者，請一併填入「A」欄內，並扼要說明其工作性質及技能等級。

(c) Please classify an employee according to his main duty irrespective of any additional secondary duties he may be required to perform (e.g. a technician, who works mainly as an electronics technician but is also required to perform the work of a draughtsman occasionally, should be classified as an electronics technician and not as a draughtsman).

請根據僱員的主要職務分類，而不以其兼任的其他職務分類（例如，一名技術員的主要職務為電子技術員，但有時須擔任繪圖員的工作，則應歸類為電子技術員而非繪圖員）。

7. Average Monthly Income - Column 'B'

每月平均收入 —— 「B」欄

Please enter into this column the code for average monthly income range for each type of employees. The income should include basic wages, guranteed year-end bonus, regular overtime pay, cost of living allowance, meal allowance etc., if any. If you have more than one employee doing the same job, please enter the average figure. (Please refer to the codes in the last column of the questionnaire.)

請在「B」欄填入每類僱員的每月平均收入編號，這包括底薪固定發放的年終花紅、定期超時工作工資、生活津貼、膳食津貼等。若從事同類工作的僱員多於一名，則請取其平均數字。（請參閱調查表最後一欄的類別編號）

8. Number Employed (Excluding Trainees) - Column 'C'

僱員人數（受訓者除外） —— 「C」欄

Please fill in the total number of employees (excluding trainees and apprentices) in your establishment.

請將貴機構目前所僱用的全部僱員人數（受訓者及學徒除外）填入此欄。

9. Forecast of Number Employed 12 Months from now (Excluding Trainees) - Column 'D'

預計十二個月後的僱員人數（受訓者除外） —— 「D」欄

The forecast of number employed means the likely number of employees (excluding trainees and apprentices) you will be employing 12 months from now.

預計僱員人數指貴機構於十二個月後可能僱用的員工總數（受訓者及學徒除外）。

10. Number of Vacancies at Date of Survey
(Excluding Trainees) - Column 'E'
現有空缺額（受訓者除外） —— 「E」欄
Please fill in the number of existing vacancies (excluding those for trainees and apprentices).
請填入貴機構現有的空缺額（受訓者及學徒的空缺數目除外）。
'Existing vacancies' refer to those unfilled, immediately available job openings for which the establishment is actively trying to recruit personnel at date of survey.
「現有空缺額」是指該職位仍懸空，須立刻填補，而現正積極招聘人員填補。

11. Number of Trainees at Date of Survey - Column 'F'
現有受訓人數 —— 「F」欄
Please fill in the total number of employees undergoing training.
請將正在受訓的僱員人數填入此欄。

12. Hong Kong Technical Personnel Dispatched Outside Hong Kong
遣派香港以外的香港技術人員
Please enter below the number of technologists, technicians and craftsmen paid by Hong Kong who had been dispatched to work for more than half year outside Hong Kong during the 12 months prior to the survey.
請填寫調查之前十二個月內，由香港支薪而被遣派往外地，工作超過半年的技師、技術員及技工數目。

13. Education and Training an Employee Should Have
僱員應有的教育程度及訓練
The purpose of this column is to solicit your view on the education and training which an employee in a particular job should have if he were to carry out his work competently. (Please refer to the codes in the same page of the questionnaire.)
此欄目的在調查貴機構的意見：各類職位的僱員宜具備何種教育程度及訓練，才能勝任其工作。（請參閱調查表同一頁的類別編號）。

14. Example
例子
To facilitate proper completion, an example is given below for your reference.
為協助閣下填表，現將例子附錄於後，以供參考。

Example
舉例

	(A) Job 工作 Title 職稱	Rec. Type	Job Code 職位編號	(B) Average Monthly Income 每月平均收入 Code 編號	(C) Number Employed at Date of Survey (excl. trainees) 現有僱員人數 (受訓者除外)	(D) Forecast of Number Employed 12 Months from Now (excl. trainees) 預計十二個月後僱員人數 (受訓者除外)	(E) Number of Vacancies at Date of Survey (excl. trainees) 現有空缺額 (受訓者除外)	(F) No. of Trainees at Date of Survey 現有受訓者人數
	For Official Use Only → 此欄毋須填寫	1	8-10	11	12-15	16-19	20-22	23-25
	TECHNOLOGIST LEVEL 技師級							
1	Electronics Engineer 電子工程師	2	1 0 1	8	5	6	1	1
2	Electrical Engineer 電機工程師	2	1 0 2	7	2	2	0	1
3	Mechanical Engineer 機械工程師	2	1 0 3	7	2	2	0	0
4	Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	2	1 0 4	7	1	1	0	0
5	Chemical Engineer 化學工程師	2	1 0 5					
6	Product/Graphic Designer 產品／平面設計員	2	1 0 6					
7	System Analyst 系統分析員	2	1 0 7					
	TECHNICIAN LEVEL 技術員級							
8	Electronics Technician 電子技術員	2	2 0 1	6	3	4	1	1
9	Mechanical Technician 機械技術員	2	2 0 2	5	1	1	0	0
10	Draughtsman 繪圖員	2	2 0 3	4	2	2	0	0
11	Manufacturing/Quality Assurance Technician 製造／品質保證技術員	2	2 0 4					
12	Supervisor/Foreman/Leader 監督／管工／組長	2	2 0 5					
13	Programmer 程式編製員	2	2 0 6					
14	Web Developer/Designer 網站開發員／設計員	2	2 0 7					
	CRAFTSMAN LEVEL 技工級							
15	Cable Jointer/Wireman 電纜接駁技工／駁線技工	2	3 0 1					
16	Electronics Craftsman 電子技工	2	3 0 2	3	3	4	1	1
17	Electrician 電氣技工	2	3 0 3	3	1	1	0	0
18	Mechanic 技工	2	3 0 4					
	OPERATIVE LEVEL 操作工級							
19	Operator 生產線操作工	2	4 0 1	2	5 0	5 5	5	0
20		2						
21		2						
22		2						
23		2						
24		2						
25		2						

Average Monthly Income
每月平均收入

Enter in column B employee's average monthly income range according to the following code :

請將僱員的每月平均收入幅度按照下列類別編號填入B欄內：

Code 編號	Average Monthly Income Range 每月平均收入幅度
1	Under $6,001 以下
2	$6,001 - $8,000
3	$8,001 - $10,000
4	$10,001 - $15,000
5	$15,001 - $20,000
6	$20,001 - $25,000
7	$25,001 - $30,000
8	Over $30,000 以上

Remark
備註

Note 1 If additional lines are necessary, please tick here ☐ and enter on supplementary sheet(s).
附註一 如此頁填滿，請先將（u）號填入此 ☐ 內，然後在附頁繼續填寫。

Note 2 The term 'trainees' includes all trainees receiving any form of training and apprentices under a contract of apprenticeship.
附註二 「受訓者」包括正在接受各種訓練的人士，以及簽有學徒合約的登記學徒。

JOB DESCRIPTIONS OF PRINCIPAL JOBS IN THE ELECTRONICS INDUSTRY
電子業主要職務工作說明

Job Code **職位編號**	Job Title **職稱**	Job Description **工作說明**
TECHNOLOGIST LEVEL		**技師級**
101	Electronics Engineer [Electronics Sales/ Support Engineer, Telecommunications Engineer]	Carries out one or more of the following activities: research into electronic engineering/telecommunication engineering problems, design of, technical sales/support, and advice on electronic equipment and systems, components and products, and planning and supervision of their development, production, construction, installation, operation and maintenance. Usually specialises in one or more of the following: (a) computer systems; (b) consumer electronic products; (c) electronic instruments and equipment; (d) semiconductor and electronic components; (e) telecommunication systems; (f) other electronic engineering fields.
	電子工程師 [電子推銷／支援工程師，電訊工程師]	**擔任下列一項或多項工作：研究電子工程／研究電訊工程方面的問題；負責電子設備及系統、零件及產品的設計、技術推銷／支援及顧問工作；策劃及督導電子設備及系統、零件及產品的發展、生產、構造、安裝、操作及保養工作。通常與下列專門範疇有關：** (a) **電腦系統；** (b) **電子消費產品；** (c) **電子儀器及設備；** (d) **半導體及電子零件；** (e) **電訊系統；** (f) **電子工程其他方面的工作。**
102	Electrical Engineer	Designs and advises on electrical equipment and systems, and plans, and supervises their development, construction, installation, operation, maintenance and repair.
	電機工程師	**設計電器及電機系統，並就該方面提供意見；策劃及監督電器及電機系統的發展、構造、安裝、操作、保養及維修。**

Job Code **職位編號**	Job Title **職稱**	Job Description **工作說明**
TECHNOLOGIST LEVEL (Continued) **技師級（續）**		
103	Mechanical Engineer **機械工程師**	Designs and advises on plant, mechanical parts, moulds and equipment, machinery and tools, and plans and supervises their development, construction, installation, operation, maintenance and repair. **設計廠房、機械配件、工模及設備、機器及工具，並就該方面提供意見；策劃與監督其中的發展、構造、安裝、操作、保養及維修。**
104	Manufacturing / Quality Assurance Engineer [Industrial Engineer, Quality Control Engineer] **製造／品質保證工程師 [工業工程師，品質控制工程師]**	Carries one or more of the following activities: (i) Plans, directs and supervises all technical aspects of the manufacturing process to ensure the most efficient and economical means of operation and the maintenance of quality standards; (ii) Plans, directs and supervises the quality assurance/ control at all phases of manufacturing, including testing and measurement, of incoming materials and parts, work-in-progress, and finished products to ensure compliance with standards, specifications, safety and environmental regulations. **擔任以下一項或多項工作：** (i) **策劃、指導及監督製造程序的各種技術工作，確保採用最快捷經濟的生產方式，並且保持品質標準；** (ii) **策劃、指導及監督各製造階段的品質保證／控制工作，包括測試及量度交來物料與配件、半製成品及製成品，確保產品符合標準、規格、安全與環保條例。**
105	Chemical Engineer **化學工程師**	Designs and advises on manufacturing processes in which chemical changes occur, and plans and supervises their development, construction, installation, operation and maintenance to ensure compliance with standards, specifications, and safety and environmental regulations. **設計能產生化學變化的製造程序，並就該方面提供意見；策劃及監督其發展、構造、安裝、操作及保養，確保符合標準、規格、安全與環保條例。**

Job Code **職位編號**	Job Title **職稱**	Job Description **工作說明**
TECHNOLOGIST LEVEL (Continued) **技師級（續）**		
106	Product / Graphic Designer **產品／平面設計員**	Originates and develops ideas to design, create, modify and arrange the form of manufactured products, layouts and containers for the products based on factors such as design-function relationship, knowledge of design, art concepts, market and pricing characteristics, client specifications, method and cost of production to achieve aesthetically pleasing and functional effect for the products. **能根據設計與功能的關係、設計知識、美術概念、市場與價格特性、顧客規格、生產方法及成本等因素進行創作，並加以發揮，以便設計、創作、修改及安排製成品的形狀、結構及包裝，務求產品既美觀又實用。**
107	System Analyst [Software Engineer] **系統分析員** **[軟件工程師]**	Carries one or more of the following activities: (i) Works closely with user personnel to identify problems, review methods and specify and evaluate information technology (IT) solutions; (ii) In accordance with product specifications, designs system firmware/software using high level and/or assembler languages for microcomputers, microprocessors and electronics systems. **擔任以下一項或多項工作：** (i) **與用戶部門緊密合作，確定問題、檢討方法、說明和評估資訊科技的解決辦法；** (ii) **依據產品規格，使用高階語言及／或匯編語言，為微型電腦、微處理器及電子系統設計系統軟件／軟件。**
TECHNICIAN LEVEL **技術員級**		
201	Electronics Technician [Electronics Sales/ Support Technician, Telecommunications Technician, Computer Technician, Audio-Visual Technician]	Performs technical tasks, normally under the direction and supervision of an electronics/telecommunications engineers, contributory to design, development, manufacture, technical sales/support, construction, installation, operation, maintenance and repair of: (i) Electronic and electrical components, products, equipment and systems; (ii) Telecommunication systems and equipment, such as telephone, broadcasting, radio/ microwave/ satellite communication, mobile communication and data communication systems; (iii) Computer networks, systems and peripherals; (iv) Audio-visual and associated equipment and systems.

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
TECHNICIAN LEVEL (Continued)		技術員級（續）
	電子技術員 〔電子推銷／支援技術員，電訊技術員，電腦技術員，影音技術員〕	通常在電子／電訊工程師的督導下擔任技術工作，如參與設計、發展、製造、技術推銷／支援、構造、安裝、操作、保養、修理： (i) 電子及電機零件、產品、器材及系統； (ii) 電訊系統及器材，例如電話、廣播、無線電／微波／衛星通訊、流動通訊及數據通訊系統； (iii) 電腦網絡、系統及周邊設備； (iv) 影音及附屬設備與系統。
202	Mechanical Technician 機械技術員	Performs technical tasks, normally under the direction and supervision of a mechanical engineer, contributory to design, development, construction, installation, operation, maintenance and repair of plant, mechanical parts and equipment, machinery and tools. 通常在機械工程師的督導下擔任技術工作，如參與設計、發展、構造、安裝、操作、保養、修理廠房、機械配件及設備、機器及工具。
203	Draughtsman 繪圖員	Prepares detail and assembly drawings and circuit diagrams according to design specifications. 按照設計規格繪製明細圖、裝配圖及線路圖。
204	Manufacturing/ Quality Assurance Technician [Quality Control Technician] 製造／品質保證技術員 [品質控制技術員]	Performs technical tasks, normally under the direction and supervision of a manufacturing/industrial or a quality assurance/control engineer, contributory to: (i) The efficient and economical operation of the manufacturing process and the maintenance of quality standards; (ii) Quality assurance/control at all phases of manufacturing including testing and measurement of in-coming materials and parts, work-in-progress, and finished products to ensure compliance with standards and specifications, and safety and environmental regulations. 通常在製造／工業或品質保證／控制工程師的監督下擔任： (i) 製造程序中的技術工作，協助以最快捷經濟的方式運作，並且維持產品質素； (ii) 技術工作，協助各製造階段的品質保證／控制事項，包括測試及量度來料與配件、半製成品及製成品，確保產品符合標準、規格、安全與環保條例。

Job Code **職位編號**	Job Title **職稱**	Job Description **工作說明**
TECHNICIAN LEVEL (Continued)		**技術員級（續）**
205	Supervisor / Foreman / Leader [Junior Supervisor] **監督／管工／組長** **[初級監督]**	Performs supervisory duties contributory to the planning and allocation of tasks to workers and trainees, and to the production, inspection, installation, operation, maintenance and repair of components, products, equipment and systems; OR Organises and takes charge of a group or groups of operatives in a section, normally under the direction of a supervisor/foreman. **擔任監督工作，如參與策劃、向工人及受訓者分配工作，以及參與生產、檢查、安裝、操作、保養、修理零件、產品、器材與系統；** **或** **通常在監督／管工指導下，安排及主管部門內一組或多組操作工的工作。**
206	Programmer **程式編製員**	Develops computer programmes to implement software design, normally under the direction and supervision of a systems analyst/software engineer. **通常在系統分析員／軟件工程師的督導下研究電腦程式，以便推行電腦軟件設計。**
207	Web Developer / Designer **網站開發員／設計員**	In the mixed technical and creative works, uses tool set to design and create web pages, animation graphics and/or other multimedia contents for integration to IT applications according to business requirement, strategy and direction. **按照業務要求、策略及方向，結合科技與創作，使用工具套設計及製作網頁、動畫或其他多媒體內容，以便配合電腦應用軟件使用。**
CRAFTSMAN LEVEL		**技工級**
301	Cable Jointer / Wireman **電纜接駁技工／駁線技工**	Lays, joints, connects, terminates and maintains underground, submarine, surface and aerial telecommunication cables and wires. **敷設、接駁、端接及保養地底、海底、地面及架空電訊電纜。**

Job Code **職位編號**	Job Title **職稱**	Job Description **工作說明**
CRAFTSMAN LEVEL (Continued) **技工級（續）**		
302	Electronics Craftsman [Audio Visual and Radio Frequency Mechanic, Repairman (Electronics Manufacturing), Equipment / Instrument Mechanic] **電子技工 [影音及無線電技工, 修理技工（電子製造）, 裝備／儀器工]**	Carries out one or more of the following activities: (i) Installs, services and repairs radio, television receivers, consumer audio-video equipment and community antenna systems; (ii) Diagnoses, locates and repairs faults in the manufacture of electronic devices and products, systematically records these faults and recommends changes to minimize such occurrence; (iii) Assembles, inspects, tests, repairs, calibrates and maintains electronic, electrical and mechanical instruments, meters and equipment. **擔任以下一項或多項工作：** (i) **安裝、保養及修理收音機、電視機、影音設備及公用天線系統；** (ii) **在製造電子裝置及產品的過程中，查出及修理所出現的毛病，有系統地記錄下來，並且建議如何盡量減少毛病出現；** (iii) **裝配、查驗、測試、修理、校準及保養電子、電機及機械儀器、儀錶及設備。**
303	Electrician **電氣技工**	Installs, maintains, tests and repairs electrical wiring, devices and equipment, and building services in buildings and other structures in accordance with regulations and specifications. **按照條例及規格安裝、保養、測試及修理屋宇電線、電器及其他設備。**
304	Mechanic [Maintenance Mechanic / Fitter / Machinist, Tool and Die Maker, Mould and Die Maker and Repairer]	Carries one or more of the following activities: (i) Fits, assembles, installs, repairs and maintains plant and machinery and makes replacement parts when required; (ii) Sets up and operates machine tools to produce components according to specifications; (iii) Makes, maintains and repairs press tools, dies, cutting tools, gauges, jigs and fixtures according to drawings and other specifications; (iv) Makes, maintains and repairs moulds and dies for plastics processing machines according to drawings and other specifications.

Job Code **職位編號**	Job Title **職稱**	Job Description **工作說明**
CRAFTSMAN LEVEL (Continued) **技工級（續）**		
	技工 **[保養技工／裝配打磨技工，機床工，工具及工模製造技工，工模製造及修理技工]**	**擔任以下一項或多項工作：** (i) **打磨、裝配、安裝、修理、保養廠房及機器，並於需要時製作更換配件；** (ii) **按照規格裝設及操作機床，以生產零件；** (iii) **按照圖則及其他規格，製造及維修啤孔工具、工模、切削工具、量規及夾具；** (iv) **按照圖則及其他規格，製造及修理塑膠機的工模。**
OPERATIVE LEVEL **操作工級**		
401	Operator [Assembler, Soldering Worker, Aligner/Tester, Quality, Assurance/Control Operator, Machine Operator/Attendant, Packer, Stock Handler, Electronic Data Processing Operator, General Worker]	Carries any one of the operative jobs in assembly line in the areas of: (i) Assembles parts in the manufacture of electronics components (semiconductor, computer memory plane etc.) or assembles parts and components into printed circuit boards, modules and finished products, prepares materials by cutting, coats and paints protective or decorative materials onto parts or components; (ii) Performing proper soldering at all solder joints by hand or machine; (iii) Aligns, tests and inspects electronics products on production lines; (iv) Assists the quality assurance/control technician in the inspection of incoming parts and finished products before packaging according to a predetermined quality standard; (v) Operates various previously set-up processing machines, fixtures, continuous plating and etching baths, polishing machine and coil winding machines etc; (vi) Packs finished products into boxes, crates or other containers; (vii) Handles components, parts issued to and returned from assembly line. (viii) Sets, operates and controls data processing and/or data-switching systems, including all peripheral units according to operating instructions; operates data entry machines, which translate manually prepared data into computer readable format and store them into media, verifies/corrects entry data according to standard procedure; (ix) To handle odd jobs and undertake other manual work.

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
OPERATIVE LEVEL (Continued)		操作工級（續）
	生產線操作工 [裝配工，焊錫工，校整／測試工，品質保證／控制工，機器操作工／看值工，包裝工，物料搬運工，電腦操作員／雜工]	擔任以下一項或多項工作： (i) 裝配各種零件以製造電子元件（半導體、記憶板等等）或將零件及元件裝配在印刷線路板、模組及製成品上；切割材料；塗膠及髹保護或裝飾塗料於零件或元件上； (ii) 用手或機器焊接所有焊點； (iii) 校整、測試及檢查生產線上的電子產品； (iv) 協助品質保證／控制技術員，依照預定的品質標準檢查交來配件，並在包裝前檢查製成品； (v) 操作各類已調校妥當的加工機械、夾具、連續運作電鍍及蝕刻設備、磨光機及繞線機等等； (vi) 以木箱、紙盒或其他容器包裝製成品； (vii) 負責搬運裝配工場的元件及零件； (viii) 根據工作指示，調校、操作及控制數據處理及／或數據交換系統，包括周邊設備；操作數據輸入機（可將人手編製的數據翻譯為可供電腦閱讀的資料，並將數據貯存在電腦卡、磁帶、紙帶或磁盤內）；根據標準程序核對／更正輸入的數據； (ix) 擔任雜務及其他勞力工作。

Remark: [ ] Equivalent

註： [ ] **其他名稱**