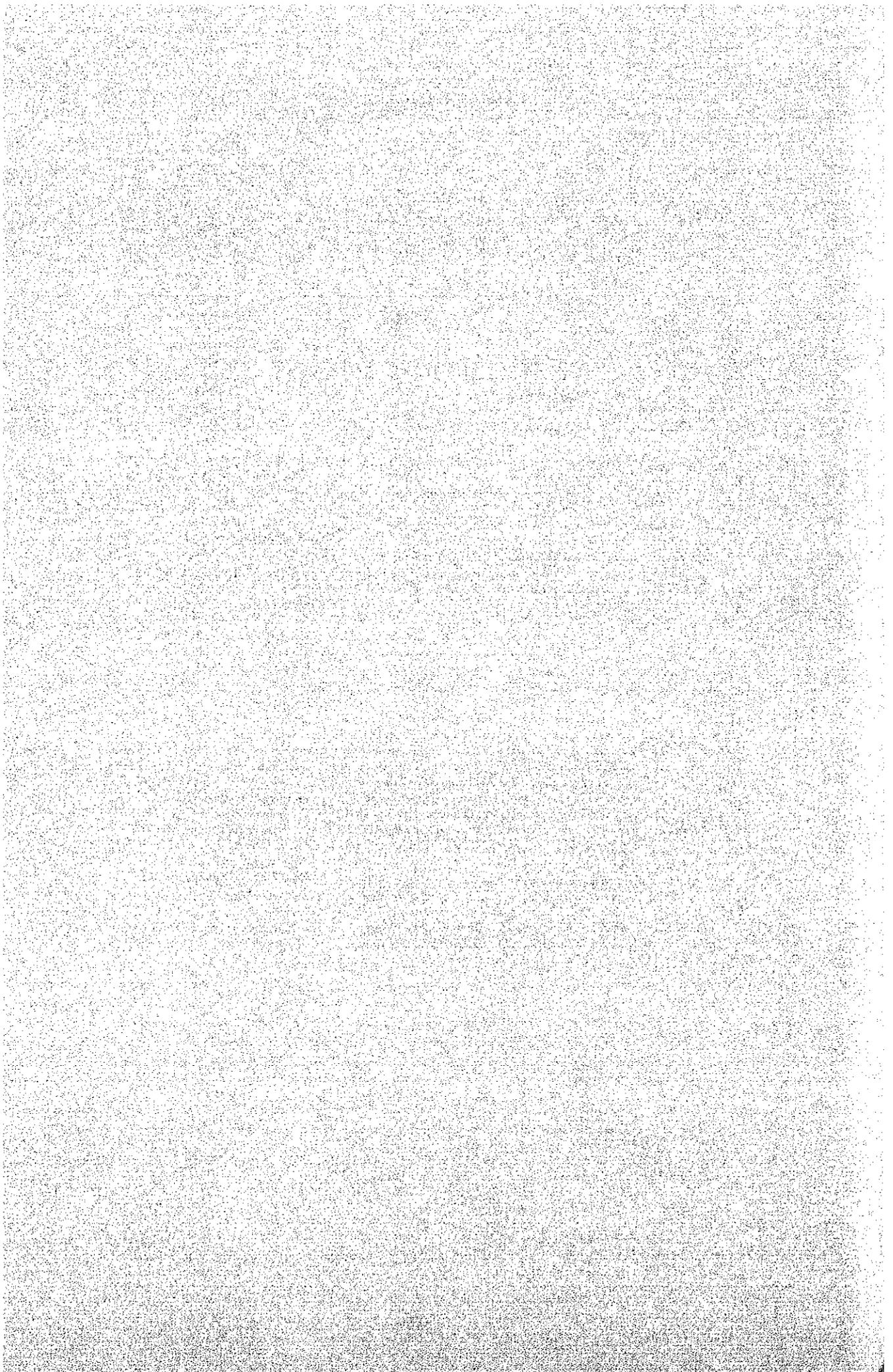


7-4 JSISTパンフレット





JAPAN-SINGAPORE INSTITUTE
OF
SOFTWARE TECHNOLOGY



POST-GRADUATE COURSES IN SYSTEMS ANALYSIS

CERTIFICATE COURSE IN
SYSTEMS ANALYSIS

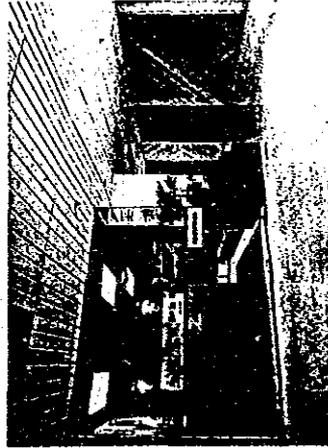
DIPLOMA COURSE IN
SYSTEMS ANALYSIS

Minicomputers

1. 1 NEC S100/80 with
— 256 Kb main storage
— 2 visual display terminals
2. 1 NEC S100/85 with
— 12 Mb main storage
— 7 visual display terminals
3. 3 NEC ASTRA 370VS with
— 3 Mb main storage
— 48 visual display terminals

Personal Computers

1. 14 NEC APC III
2. 10 NEC APC
3. 2 Texas Instrument
Business Pro
4. 7 Philips P200
5. 1 Philips P3100
6. 2 Olivetti M21
7. 10 Epson
8. 10 Commodore
9. 10 Fujitsu FM-16
10. 8 laptops
11. 90 APC IV



How to Apply
Application forms for both courses are available at:

Japan-Singapore Institute of Software Technology
1 Maritime Square #12-11
World Trade Centre Singapore 0409.
Tel. No. 2730777 Fax. No. 2731183

The study mode during the first 3 months of this course is mainly coursework. However, it is practical-orientated and concentrates on 4 topics. Besides lectures, the students will be involved in 3 group projects, that is, one project each for Systems Analysis and Design, Design of Database Systems and Design of Online Systems. As for Operating Systems, practical sessions will be arranged where students will interact with the Operating System of a mainframe computer.

During the last 3 months of the course, students will be attached, on an individual basis, to various companies where they will be involved in actual systems development work.

Entry Requirements

Applicants to this course must possess the Institute's post-graduate Certificate in Systems Analysis. Experienced Systems Analysts, without the Certificate, may also apply. However, they may be required to sit for a qualifying test and/or attend an interview.

Course Fees*

Citizens and Permanent Residents of Singapore SS 700/-
Others SS1050/-

Intake

There is 1 intake per year, each intake not exceeding 50 students.

Current Computing Facilities

Mainframe Computers

1. 1 NEC SYSTEM 630 (4 mips) with
— 32 Mb main storage
— 7 units of dual disk drives (6.804 Mb)
— 2 line printers (1800 lpm)
— 1 page printer (1250 lpm)
— 4 magnetic tape drives
— 1 optical card reader
— 60 intelligent terminals (APC III)

2. 1 NEC SYSTEM 450 (2 mips) with
— 15 Mb main storage
— 12 disk drives (200 Mb each)
— 2 line printers (1800 lpm)
— 4 magnetic tape drives
— 64 terminals
— 4 intelligent terminals

*Subject to change

POST-GRADUATE COURSES IN SYSTEMS ANALYSIS

Introduction

The Japan-Singapore Institute of Software Technology was set up on 18 December 1980 under an agreement between the governments of Japan and Singapore. The aim of the Institute is to train information technologists for the software industry in Singapore. This objective is met by providing a variety of courses to meet the different levels of technical skills needed in the industry. Training is offered both to holders of A-level certificates as well as to graduates.

On a graduate level, a 2-module 9 months training is offered for non-Computer Science degree graduates as well as for experienced Systems Analysts. The first module is 3 months full-time, leading to the award of the Certificate in Systems Analysis, and is suitable for those with little or no knowledge in Information Technology. The second module is for 6 months full-time, leading to the award of the Diploma in Systems Analysis, and is suitable for those aspiring to be Systems Analysts.

CERTIFICATE IN SYSTEMS ANALYSIS

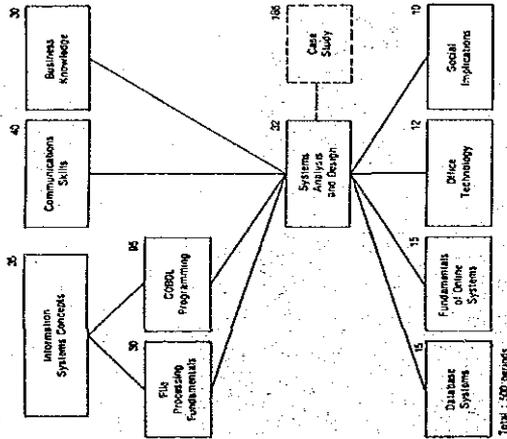
Aim of Course

The aim of this course is to train and equip end-user analysts who will be able to assist in the analysis, design and implementation of effective information systems. Graduates of this course will be expected to return to their fields of specialisation, and in their own capacities, to assist the EDP staff in the development and implementation of information systems.

Course Duration

This course is conducted full-time for a period of 3 months.

Course Curriculum



This course covers topics which are fundamental to information systems processing and file processing, programming know-how using COBOL, knowledge and skills which complement analysis work such as Business Knowledge and Communications Skills where students will practise interviewing skills. This course also introduces the different tools and techniques used in Systems Analysis and Design work with emphasis on a structured methodology, technology which is applicable in an office environment, the effect of information technology on society, as well as specialised topics such as Databases and Online Systems will also be covered. A Systems Analysis and Design Case Study is conducted where students, working on a group basis, will be assisted in analysing and developing an information system.

Entry Requirements

Applicants to this course must be non-Computer Science graduates/professionals, preferably with some working experience. Applicants may be required to attend an interview.

Course Fees*
Citizens and Permanent Residents of Singapore S\$550/-
Others S\$750/-

Intake
There are 2 intakes per year, each intake not exceeding 50 students.

DIPLOMA IN SYSTEMS ANALYSIS

This course is designed to upgrade graduates from the Certificate in Systems Analysis course, preferably after some relevant working experience, and is also suitable for practising systems analysts. The students will be trained for work as systems designers/engineers capable of independent software design and development work.

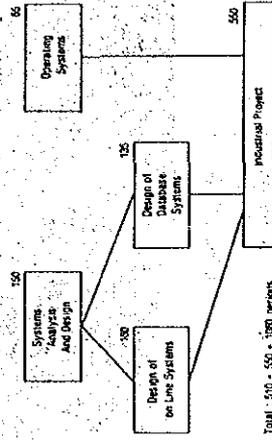
Aim of Course

The aim of this course is to train and equip EDP professionals/graduates, or its equivalent to function as Systems Analysts in a systems development environment.

Course Duration

This course is conducted full-time for a period of 6 months, consisting of 3 months course work followed by a 3-month industrial project.

Course Curriculum



*Subject to change



JAPAN-SINGAPORE INSTITUTE
OF
SOFTWARE TECHNOLOGY



ADVANCED DIPLOMA IN SOFTWARE TECHNOLOGY

A Twelve-Month Full-time Course

(i) 1 NEC ACOS 450 Multiprocessor System (2 MIPS) with

- 14 Megabytes main storage
- 12 disk drives of 200 Megabytes disk storage each
(Total 2400 Megabytes)
- 2 line printers (each 1800 lines per minute)
- 4 magnetic tape drives
- 64 Visual Display Terminals
- 4 Intelligent Terminals

2. Mini-Computers

- (i) 1 NEC S100/60 mini-computer with
 - 256K Bytes main storage
 - 2 Visual Display Terminals

- (ii) 1 NEC S100/85 mini-computer with
 - 512K Bytes main storage
 - 3 Visual Display Terminals

3. Personal Computers

- (i) 14 NEC APC III
- (ii) 10 NEC APC
- (iii) 2 Texas Instruments Business - Pro
- (iv) 7 Philips P2200
- (v) 1 Philips P3100
- (vi) 2 Olivetti M21
- (vii) 10 EPSON
- (viii) 10 COMMODORE
- (ix) 10 FUJITSU FM-16

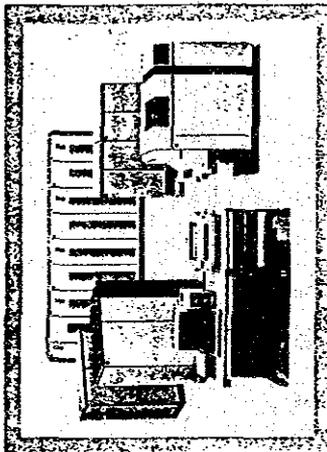
Intake

This course is very practical-oriented and involves close supervision. As such, the first intake is limited to 25 students. The first course shall begin on 3 Aug 1987.

How to apply

If you are interested in enrolling for this course, please come to us for an application form. Our address is:

Japan-Singapore Institute of Software Technology
1 Maritime Square #12-11
World Trade Centre
Singapore 0409
Tel. No. 2730777
Fax. No. 2731183



**CURRENT COMPUTING FACILITIES
AT JSIST**

- 1. Mainframe Computers
 - (i) 1 NEC SYSTEM 630 (4 MIPS) with
 - 32 Megabytes main storage
 - 7 units of dual disk drives
(Total 6,804 megabytes)
 - 2 line printers (each 1800 lines per minute)
 - 1 page printer (1250 lines per minute)
 - 4 magnetic tape drives
 - 1 Optical Character Reader
 - 60 Intelligent Terminals (APC III)

ADVANCED DIPLOMA IN SOFTWARE TECHNOLOGY (A Twelve-Month Full-Time Course)

Introduction

The first batch of our Diploma in Programming and Systems Analysis course graduated in 1984. Since then, many batches of our Analyst/Programmer Diploma students have graduated too. Our graduates are now gainfully employed in many companies that have computer installations. However, software technology is advancing very rapidly. Thus, if our graduates are not being upgraded, they will still be using obsolete, ineffective and inefficient software technology. Set in this backdrop of an ever advancing software technology, JSIST has set up the Advanced Diploma in Software Technology course. This is a continuation course designed mainly for our Analyst/Programmer Diploma graduates. However, other computer software professionals who meet our entry requirements may be admitted. The curriculum has been designed to cover Japan's MITI (Ministry of International Trade and Industry) Type I Examination. Equal emphasis will be placed on both the applications and the systems aspects in software system development projects.

Certification

Upon successful completion of the course, students will be awarded the Singapore Polytechnic-JSIST Advanced Diploma in Software Technology.

Study Mode

The Advanced Diploma in Software Technology course will be conducted on a full-time basis, for a period of one year. During this one year, students will spend the first 9 months undergoing institutional training and the last 3 months working on selected industrial projects.

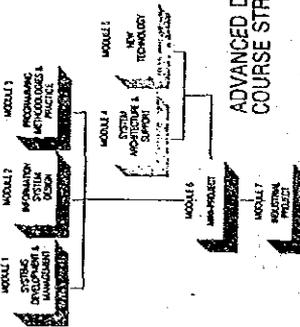
Aim of Course

The aim of this course is to upgrade the Analyst/Programmers to play a leading part in the development of system programs and large-scale application programs in the field of computer software technology by providing the practical and theoretical training on the advanced programming and systems analysis techniques.

Course Outline

The Advanced Diploma course is made up of 7 modules. 5 modules are on coursework. 1 module is on Mini-Project and the last module is on Industrial Project.

The following diagram shows the course structure:



Module 1 provides an overall starting point for the whole course. Specifically, the successful completion of this module enables students to plan and manage computer-based information systems. The subjects in this module are:

1. System Development Techniques
2. Project Management
3. Software Quality Control
4. Computer Security & EDP Auditing

Module 2 provides the technical 'know-how' for software professionals to build on-line database information systems methodically. The subjects in this module are:

1. Specification Methods
2. System Design Methodologies
3. Database Management
4. On-line Systems Design

Module 3 deals with programming, its methodologies and practice. Advanced program design techniques will be covered. The subjects in this module are:

1. Program Design and Documentation
2. Programming Techniques and Practice

Module 4 provides the knowledge of computer system architecture and system software. Those interested in systems programming will benefit from this module. The subjects in this module are:

1. Computer Architecture
2. Systems Programming
3. Network Architecture

Module 5 deals with the current interest in the information processing industry — Artificial Intelligence. Students will be learning both the theoretical and practical aspects of artificial intelligence. The subjects in this module are:

1. Logic Programming
2. Artificial Intelligence

Module 6 is on developing a miniaturised large-scale Administrative Information System. This is a 3-month long mini-project. Students will be guided in the use of some selected system design methodologies to design and develop a large-scale on-line database system. In addition, they will be able to test such a large-scale information system.

Module 7 is on Industrial Project. This module is to be done during the last 3 months of the Advanced Diploma course. There will be 3 types of projects: external, internal and student-initiated projects. Students can choose any of these three types of projects subject to the approval of the Supervisor.

Entry Requirements

The following are the different categories under which applicants may be considered for admission into the Advanced Diploma in Software Technology course:

- (i) those holding the JSIST's Diploma in Programming and Systems Analysis OR its equivalent, and with at least two years of relevant information processing experience; or
- (ii) those holding the JSIST's Diploma in Systems Analysis OR its equivalent, and with at least two years of relevant information processing experience; or
- (iii) those who do not fall into the above categories but who have 5 years or more of relevant information processing experience. Applicants in this category must have at least two G.C.E. 'A' level passes.

(An applicant in any of the above categories may be required to attend an interview. In addition, an applicant in either category (ii) or (iii) may be required to sit for a written test in order to assess the applicant's suitability for the course.)

Course Fees*

Citizens and permanent residents of Singapore : S\$1200
Others : S\$1600

* Subject to change



JAPAN-SINGAPORE INSTITUTE
OF
SOFTWARE TECHNOLOGY



DIPLOMA IN PROGRAMMING AND SYSTEMS ANALYSIS

A Two-Year Full-Time Course

CURRENT COMPUTING FACILITIES AT JSIST

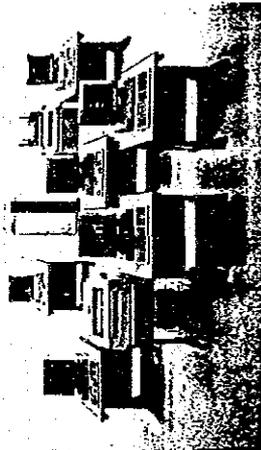
1. Mainframe Computers
 - (i) 1 NEC SYSTEM 630 (4 MIPS) with
 - 32 Megabytes main storage
 - 7 units of dual disk drives (Total 6,800 megabytes)
 - 2 line printers (each 1800 lines per minute)
 - 1 page printer (1250 lines per minute)
 - 4 magnetic tape drives
 - 1 Optical Character Reader
 - 60 Intelligent Terminals (APC III)
 - (ii) 1 NEC ACOS-450 Multiprocessor System (2 MIPS) with
 - 14 Megabytes main storage
 - 12 disk drives of 200 Megabytes disk storage each (Total 2400 Megabytes)
 - 2 line printers (each 1800 lines per minute)
 - 4 magnetic tape drives
 - 64 Visual Display Terminals
 - 4 Intelligent Terminals
2. Mini-Computers
 - (i) 1 NEC S100/80 mini-computer with
 - 256K Bytes main storage
 - 2 Visual Display Terminals
 - (ii) 1 NEC S100/85 mini-computer with
 - 1.2M Bytes main storage
 - 7 Visual Display Terminals
 - (iii) 3 NEC ASTRA 370VS With
 - 3M Bytes main storage
 - 48 Visual Display Terminals
3. Personal Computers
 - (i) 14 NEC APC III
 - (ii) 10 NEC APC
 - (iii) 2 Texas Instruments Business-Pro
 - (iv) 7 Philips P3200
 - (v) 1 Philips P3100
 - (vi) 2 Olivetti M21
 - (vii) 10 EPSON
 - (viii) 10 COMINGDORE
 - (ix) 10 FUJITSU FM-16
 - (x) 8 LAPTOS
 - (xi) 90 NEC APC IV

Entry Requirements
Applicants must be Singapore citizens or permanent residents and should possess:-

- (a) G.C.E. 'A' level passes in two subjects, one of which must be Mathematics or Principles of Accounting;
- (b) a pass in General Paper or English Language (EL1 or EL2).

Course Fees*
Citizens and permanent residents of Singapore :S\$ 9,000
Others :S\$1,200

Intake
There will be one intake a year in June. Each intake is limited to 120 students.



*Subject to change

Diploma in Programming and Systems Analysis (A Two-Year Full-Time Course)

Introduction

JSIST, established in December, 1980, is a technical cooperation project between the governments of Singapore and Japan to produce the much needed software professionals for the information processing industry. The first intake started in 1982 and the first batch graduated in 1984. Since then, many batches have graduated and are now gainfully employed. The course syllabus is based on the Japan MITI (Ministry of International Trade and Industry) Examinations but adapted to meet Singapore's needs. Since 1983, the Institute's Diploma has been validated by the National Computer Board and considered equivalent to the National Level 1 Standard. The Singapore Computer Society has also accepted our graduates with 3 years working experience for admission as Associate Members.

Certification

Upon successful completion of the course, students will be awarded the Singapore Polytechnic JSIST Diploma in Programming and Systems Analysis.

Study Mode

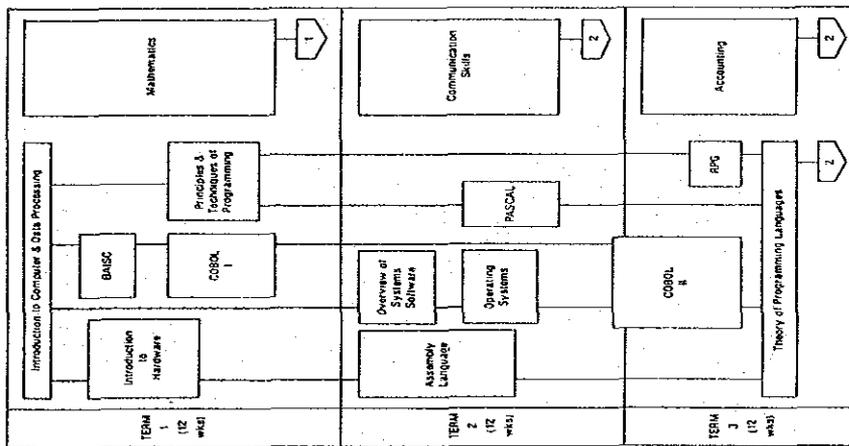
The course will be conducted on a full-time basis, for a period of 2 years. The training program consists of lectures, tutorials, machine-practice sessions and project work. At least 50% of the training time is allocated to machine-practice sessions. During the last 3 months of the second year, students will have to work on selected industrial projects in industry.

Aim of Course

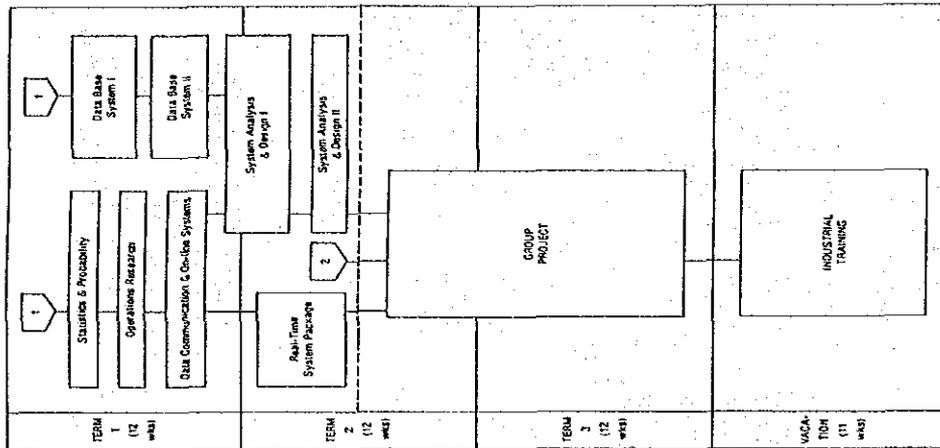
The aim of the course is to train people with G.C.E. 'A'-level qualifications to be analysts/programmers who will be able to assist systems analysts in the designing and implementation of application systems.

Course Outline
The following diagrams show the first and second year course structure.

FIRST YEAR COURSE STRUCTURE



SECOND YEAR COURSE STRUCTURE





ADVANCED DIPLOMA IN
SOFTWARE TECHNOLOGY COURSE

JAPAN-SINGAPORE INSTITUTE OF SOFTWARE TECHNOLOGY

INTRODUCTION

The restructuring of Singapore's economy, started in 1979, with the emphasis on new technology industries and higher productivity through automation, has made manpower development a critical aspect of the overall economic development strategy.

To fulfil the need to upgrade the skills of existing manpower as well as to train newcomers in specialised areas of technology, the Singapore Economic Development Board extended its training activities into broader scopes and higher levels of technology.

The project to establish the Japan-Singapore Institute of Software Technology (JSIST) was formally launched with the signing of the Record of Discussions by the Governments of Japan and Singapore on 18 December 1980. Under this agreement, the Government of Japan provided technical assistance to Singapore for the planning, establishment and operation of the Institute via a resident team of Japanese software experts for a period of five years. Donations of computer hardware and software amounting to S\$8 million were made to the Institute. 23 fellowships for training of local lecturers in Japan were also included. The Government of Singapore, in turn, was responsible for the provision of the Institute's premises, local lecturers, its operation costs, as well as recruitment of students.

The aim of the Institute is to prepare students for careers in computer-based information processing, either as application programmers or as systems analysts, both within the computer

With Compliments

ASIA/PACIFIC INSTITUTE OF SOFTWARE TECHNOLOGY

1 Raffles Square #12-11

World Trade Centre

Singapore 0409

REPUBLIC OF SINGAPORE

industry itself and in the commercial and public sectors. This objective is achieved by providing a variety of courses to meet the different levels of technical skills needed in the industry. The training is done via

a) The training of A-level students to be Analyst/Programmers through a two-year full time Diploma in Programming and Systems Analysis course. Total training hours amount to 4000 hours. These graduates will serve as the important interface between systems designers and programmer/coders in the design and implementation of computerised systems. Entry requirement is a minimum of 2 GCE A-level passes, of which one must be in Mathematics or Accounting and at least a pass in English Language. The course covers the scope of the Japan MITI examinations Type II subjects and also the needs of the Singapore industry.

b) The training of non-Computer Science degree graduates to be systems analysts. Flexibility is allowed in a 2-module nine months training.

i) A 3-month full time Certificate in Systems Analysis course prepares the student for work as computer systems analyst in an end-user environment. Entry requirement is a recognised university degree or equivalent qualification.

SINGAPORE POLYTECHNIC - JAPAN-SINGAPORE
INSTITUTE OF SOFTWARE TECHNOLOGY

- ii) A 6-month full time Diploma in Systems Analysis course which will upgrade the graduates from the certificate course after some relevant working experience or experienced systems analysts for work as systems designers/engineers capable of independent software package design and development in their own fields of specialisation.
- c) Short courses in computer appreciation for middle and senior management, to familiarise them with all aspects of information technology, its environment and applications.
- d) Other short courses, on an ad-hoc basis, customised to provide training in the latest information technology techniques and high-level software technology to practising information processing professionals.

The JSIST was established in 1980 under the EDB as an integral part of its manpower development programme to provide the fledgling computer services industry with practice-oriented computer professionals. In the following year, the National Computer Board (NCB) was set up as a single-focus organisation responsible for the promotion of computerisation and the overall development of Singapore's computer services industry in particular.

Over the years, good progress has been made in professional manpower development for the computer services industry. The implementation of the National Information Technology Plan calls for a consolidation of our manpower development programme.

By 1987, apart from the JSIST, the National University of Singapore (NUS) and the Ngee Ann Polytechnic (NP) each has a training centre related to computer studies, i.e. the Institute of Systems Science (ISS) and the Department of Information Science & Computer Science (DISCS) within the NUS, and the Centre for Computer Studies (CCS) within the NP.

All these institutions offer formal training courses in computer studies. JSIST was transferred from the Economic Development Board (EDB) to the Singapore Polytechnic (SP) with effect from 1 April 1987 so as to bring the institute in line with the organisational arrangement adopted by all the other national computer training institutions. The transfer also brought about a streamlined and focused approach in the co-ordination of manpower development for the information technology industry, which is undertaken by NCB.

JSIST functions as an autonomous institute within SP. It is administered by a Management Council which in turn is responsible to the SP Board of Governors.

Students joining the courses after 1 April 1987 are awarded joint Singapore Polytechnic-JSIST diplomas.

Plans are being drawn up to house the JSIST at the SP Campus at Dover Road by 1989.

JSIST PHASE II PROJECT

The first phase of cooperation between the Governments of Japan and Singapore for the JSIST project ended on the 17 December 1985 and the project was entirely handed over to the Government of Singapore for continuation. The cooperation and technology transfer was so successful that both governments agreed on a second phase of cooperation. The Record of Discussions for the implementation of the JSIST Phase II project was signed on the 13 January 1986. The period of cooperation will last for another five years. The Phase II project will enhance the skills of existing computer professionals particularly the JSIST graduates from the Phase I training courses. This will be done through an Advanced Diploma in Software Technology which will cover the scope of the Japan MITI examinations Type I subjects and also the needs of the Singapore industry. The Government of Japan has seconded 12 long-term experts in software technology, as well as short-term experts. A total of 14 fellowships is provided for local lecturers to undergo training in the Okinawa International Centre as well as at Tokyo. The Government of Japan has donated another mainframe computer (NEC System 630) with appropriate peripherals and the total contribution is about 400 million yen.

ADVANCED DIPLOMA IN SOFTWARE TECHNOLOGY

AIM OF COURSE

The aim of this course is to upgrade the Analyst/Programmers to play a leading part in the development of systems programs and large-scale application programs in the field of computer software technology by providing the practical and theoretical training on the advanced programming and systems analysis techniques.

CERTIFICATION

Upon the successful completion of the course, the student will be awarded the Singapore Polytechnic - JSIST Advanced Diploma in Software Technology.

STUDY MODE

The Advanced Diploma in Software Technology course will be conducted on a full-time basis, for a period of one calendar year. During this one year, the student will spend the first 9 months undergoing institutional training and the last 3 months working on selected projects with outside companies. In subsequent years, a part-time course will be conducted if there is sufficient demand for it.

ENTRY REQUIREMENTS

The following are the different categories under which prospective applicants may be considered for admission into the Advanced Diploma in Software Technology course :

- (i) those holding the JSIST's Diploma in Programming and Systems Analysis OR its equivalent and together with at least two years of relevant data processing experience; or
- (ii) those holding the JSIST's Diploma in Systems Analysis OR its equivalent and together with at least two years of relevant data processing experience; or
- (iii) those do not fall into the above categories but who have five years or more of relevant data processing experience. Applicants in this category must have at least two G.C.E. 'A' level passes.

(Applicant in any of the above categories may be required to attend an interview. In addition, an applicant in either categories (ii) or (iii) may be required to sit for a written test in order to assess the applicant's suitability for the course).

COURSE FEES

For citizens and permanent residents of Singapore : S\$1200

For other persons : S\$1800

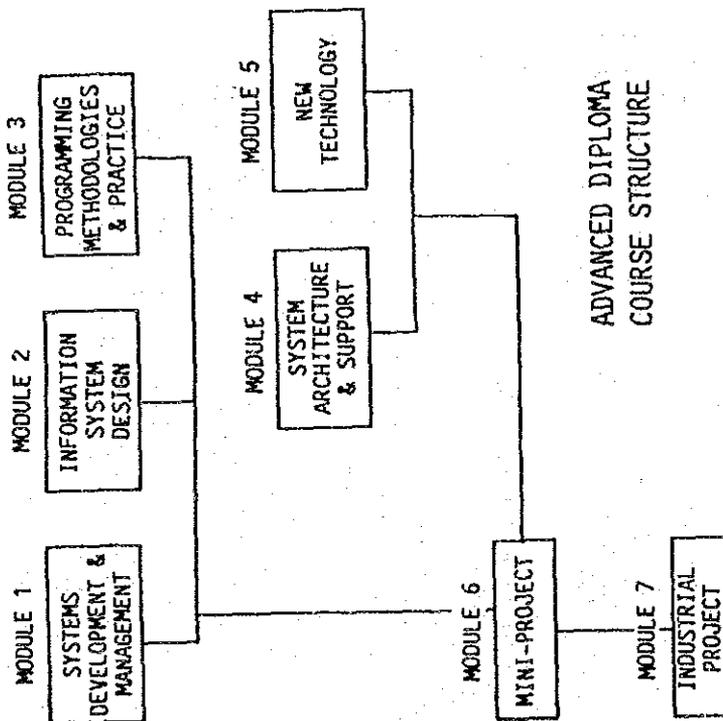
OBJECTIVES

The following are the objectives that the student should be able to achieve upon the successful completion of the course :

1. to plan, develop, implement and manage small to large-scale application systems.
2. to select and apply the appropriate systems design methodologies in order to build up on-line and database information systems.
3. to use effective program design and methodologies and programming techniques in the implementation of reliable and efficient software systems.
4. to be equipped with the knowledge of computer system architecture and system software which is applicable in a system-support environment.

5. to be aware of the evolutions of the new computer-related technologies and techniques and also to examine the current trends of technologies and their impact on our society.
6. to cultivate the ability to identify problem areas, analyse systems, recommend solutions and implement them especially from a systems point of view.
7. to demonstrate resourcefulness, creativity, group cooperation, personal independence and the ability to provide solutions especially in handling software projects for outside companies.

The following diagram shows the course structure :



SUBJECTS

The following are the subjects to be taught under the respective modules :

Module 1 : Systems Development and Management

1. System Development Techniques
2. Project Management
3. Software Quality Control
4. Computer Security & EDP Auditing

Module 2 : Information System Design

1. Specification Methods
2. System Design Methodologies
3. Database Management
4. On-line Systems Design

Module 3 : Programming Methodologies and Practice

1. Program Design and Documentation
2. Programming Techniques and Practice

Module 4 : System Architecture & Support

1. Computer Architecture
2. Systems Programming
3. Network Architecture

- 1.7 Performance Design
- 1.8 Performance Evaluation
- 1.9 Man - Machine interface
- 1.10 Case Study

2. Project Management (SDM2) :

- 2.1 Overview of Project Planning and Control
- 2.2 Organizing the Project
- 2.3 Software Subcontracting Decision
- 2.4 Project Planning
- 2.5 Planning Techniques
- 2.6 Project Control
- 2.7 Software Configuration Management

3. Software Quality Control (SDM3) :

- 3.1 Introduction - Necessity of Quality Control
 - Quality Assurance Program
 - Quality Control Team
- 3.2 Quality Evaluation and Control
- 3.3 Quality Improvement Techniques
 - Introduction
 - Effective Design Review
 - Total Quality Control

4. Computer Security and EDP Auditing (SDM4)

- 4.1 Concept of Computer and Data Security
- 4.2 Necessity and trends of Computer Security
- 4.3 Computer Law
- 4.4 Computer Crime
- 4.5 Disaster Countermeasures

Module 5 : New Technology

- 1. Logic Programming
- 2. Artificial Intelligence

Module 6 : Mini-Project

Developing a miniaturised large-scale Administrative Information System using some accepted methodologies and also adopting the database approach.

Module 7 : Industrial Project

- 1. External Project) Students can
- 2. Internal Project) choose any
- 3. Student-Initiated Project) one of the projects

TOPICS COVERED IN EACH SUBJECT

MODULE 1 : SYSTEMS DEVELOPMENT AND MANAGEMENT (SDM1)

1. Systems Development Techniques (SDM1) :

- 1.1 Information System - Trends in Singapore
- 1.2 Characteristics of Online Systems
- 1.3 System Configuration
- 1.4 Language Selection
- 1.5 File Organization
- 1.6 Specification Management

- 4.6 Failure Countermeasure
- 4.7 EDP Auditing

MODULE 2: INFORMATION SYSTEMS DESIGN (ISD)

5. Specification Methods (ISD1)

- 5.1 Role of Specification Methods
- 5.2 Types of Diagramming Methods
 - Decomposition Diagrams
 - Dependency Diagrams
 - Data Flow Diagrams
 - Structure Charts
 - Michael Jackson Diagrams
 - Action Diagrams
 - Decision Trees and Decision Tables
 - Data Structure Diagrams
 - Entity-Relationship Diagrams
 - Advantages and Disadvantages of each method

6. System Design Methodologies (ISD2)

- 6.1 Introduction - Definition of methodology
 - Need for a Methodology
 - Well-designed information system requirements
- 6.2 Characteristics of methodologies
- 6.3 Comparison criteria

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- 6.4 Particular methodologies
 - Information Engineering
 - Jackson System Development
 - LBMS - SDM (Learmonth Burchett Management System-System Development Methodology)
 - Information Systems Planning and Structured Analysis and Logical Design

6.5 Machine Dependent Methodology : STEPS/C (Standardized Technology and Engineering for Programming Support/Common

7. Database Management (ISD3)

- 7.1 Introduction - Managing data in organizations
- 7.2 Overview of Database Management Systems
 - motivation, objectives, and evolution of the Database Approach
 - conceptual DBMS model
 - logical data structures
 - user interface, language and DBMS operation
- 7.3 Database Management System Functions
 - Database design and definition
 - Database design case study
 - Database retrieval: flat files
 - Database creation and update
 - Data independence, data conversion and database revision
 - Database integrity: backup and recovery
 - Database integrity : Quality

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- control and concurrent update
- Database integrity : Access control and encryption
- 7.4 Database Administration
 - Database Administration, Organization, functions and tools
 - DBMS selection and Acquisition
 - Trends to the future in Database Management
- 7.5 Database Practice
 - Relational Information Query System (RIQS)
 - Structure of RIQS
 - RIQS Database Generation
 - Using the RIQS Database
 - Using the Data Dictionary/Dictionary/system

8. Online Systems Design (ISD4)

- 8.1 Introduction - Background to online systems
 - Online versus "Real time" Systems
 - Meaning of DB/DC and distributed systems
- 8.2 Communications Processing Hardware
- 8.3 Data Communication Software
- 8.4 Communication Network Design
- 8.5 Reliability Design
- 8.6 Estimation
- 8.7 Case Study

MODULE 3 : PROGRAMMING METHODOLOGIES AND PRACTICE (PMP)

- 9. Program Design and Documentation (PMP1)
 - 9.1 Program Structure and Module Design
 - 9.2 Design Representation and Documentation
 - 9.3 Considerations in Designing Programs for Specific Processing Systems
 - Program Design for Online Processing System
 - Program Design for Database Systems
 - Program Design for Simulation Systems
 - Program Design for Graphic Systems
- 10. Programming Techniques and Practice (PMP2)
 - 10.1 Algorithm and Data Structure
 - 10.2 Computations and accuracy
 - 10.3 Software Reliability
 - 10.4 Program Testing and Debugging
 - 10.5 Program Optimization
 - 10.6 The Elements of Programming System
 - 10.7 User and Program Interaction
 - 10.8 Programming Productivity

MODULE 4 : SYSTEMS ARCHITECTURE AND SUPPORT (SAS1)

- 11. Computer Architecture (SAS1)
 - 11.1 Introduction - Definitions of computer architecture
 - Historical survey
 - 11.2 Basic hardware configuration (NEC S630)
 - Parallel computer systems
 - Reduced Instruction Set Computer (RISC)
- 12. Systems Programming (SAS2)
 - 12.1 The UNIX System
 - 12.2 The ACOS-4/MVP XE Operating System
 - 12.3 ACOS-4/MVP XE System operations
 - Installation
 - Customization
 - System Performance
- 13. Network Architecture (SAS3)
 - 13.1 Introduction - background and definitions
 - 13.2 Computer Network Standards
 - 13.3 Proprietary Network Architectures
 - 13.4 The Integrated Environment

MODULE 5 : NEW TECHNOLOGY (NTG)

- 14. Logic Programming (NTG1)
 - 14.1 Predicate Calculus
 - 14.2 Logic Programming - History of Logic Programming
 - Prolog: Elements and Data Structure
 - Relation of Prolog to Logic
 - Application of Prolog
 - Various Versions of Prolog
- 15. Artificial Intelligence (NTG2)
 - 15.1 Knowledge Engineering - Introduction
 - Frame System
 - Expert System
 - Development Applications in AI
 - 15.2 Character Recognition - Process Flow
 - Recognition Method

15.3 Image Understanding - Image and Image Processing

- 15.4 Natural Language Processing
- Natural Language Machine Translation
 - Voice Characteristics
 - Voice Analysis

MODULE 6 : MINIPROJECT (MIP)

Aim : 1. To enable the student to build up an information system based on selected methodologies and the database approach

2. To enable the student to consolidate all that he has been taught in lectures on the various subjects

- Objectives :
1. Apply project management skills to manage a project
 2. plan and design an information system using an appropriate system development methodology
 3. develop a computerised information system using a DBMS and some software productivity tools

4. develop some programs in order to interface between the operating system and the application software

OUTLINE OF MINI-PROJECT

1. The mini-project shall be a scaled-down version of an information system. The information system shall be an administrative information system of a typical training organization in Singapore.
2. Some practical methodologies will be used in the initiation, planning, design and development of such an administrative information system. The methodologies that will be used are the ISP (Information Systems Planning) and the SALD (Structured Analysis and Logical Design) methodologies (developed by the S & C and the NCB). In addition, the machine-dependent methodology of STEPS/C (Standardized Technology and Engineering for Programming Support/Common) from NEC Corporation will be used during the physical design and development of the administrative information system. The following diagram illustrates the approach that is to be taken in the mini-project:

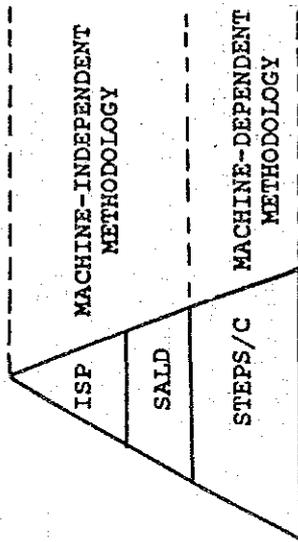
- (3) write technical reports, make presentations and communicate effectively with computer users, and
- (4) apply theoretical concepts to develop practical methods of solution.

CATEGORIES OF PROJECT

The projects that are to be undertaken by the students must be related to the subjects that are taught in the Advanced Diploma course. In addition, there will be very close supervision by the lecturers. However, it needs to be emphasized that this Industrial Project should take on a different format from that of the Analyst/Programmer's Diploma course. Specifically, this means that we need to be selective in the projects to be suggested by outside companies.

In view of the need to be selective in accepting projects, it is proposed that there should be 3 categories of projects that the Advanced Diploma student can work on. These 3 categories are:

- (i) External Project
Projects that are under this category are those projects initiated and offered by outside companies.
- (ii) Internal Project
Projects under this category are those that are initiated and proposed by internal staff members of JSIST. The



MODULE 7 : INDUSTRIAL PROJECT (INP)

AIM : To enable the student to cultivate their ability to work independently on practical projects that are of relevance to the information processing industry in Singapore.

- OBJECTIVE(S) :** Upon the successful completion of this module, students should be able to :
- (1) review literature on specific areas in software,
 - (2) formulate clear problem statements,

basis of such internal projects can be slightly academic but they should be of use to the community at large.

- (iii) Projects under this category are those that are initiated and proposed by the students themselves. It is envisaged that there could be many projects under this category. However, all projects under this category must be sponsored by companies. By this it is meant that the project, if successfully completed, can be developed and even implemented in the sponsoring company.

ASSESSMENTS

Every student is to prepare a report of the project which he or she does during the Industrial Project period. In addition, every student will have to attend a viva. This is a verbal presentation in which the student will be expected to debate on his or her project.

The project report will be assessed by a project supervisor who would be assigned to him/her at the beginning of the Industrial Project period. Another member of the staff will act a moderator for this submission.

There will be a panel of assessors during the viva. The assessors will include the project supervisor, the Head of the Advanced Diploma course and a Japanese Expert.



**POST-GRADUATE
SYSTEMS ANALYSIS COURSES**
— CERTIFICATE IN SYSTEMS ANALYSIS
— DIPLOMA IN SYSTEMS ANALYSIS

JAPAN-SINGAPORE INSTITUTE OF SOFTWARE TECHNOLOGY

INTRODUCTION

The restructuring of Singapore's economy, started in 1979, with the emphasis on new technology industries and higher productivity through automation, has made manpower development a critical aspect of the overall economic development strategy.

To fulfil the need to upgrade the skills of existing manpower as well as to train newcomers in specialised areas of technology, the Singapore Economic Development Board extended its training activities into broader scopes and higher levels of technology.

The project to establish the Japan-Singapore Institute of Software Technology (JSIST) was formally launched with the signing of the Record of Discussions by the Governments of Japan and Singapore on 18 December 1980. Under this agreement, the Government of Japan provided technical assistance to Singapore for the planning, establishment and operation of the Institute via a resident team of Japanese software experts for a period of five years. Donations of computer hardware and software amounting to S\$8 million were made to the Institute. 23 fellowships for training of local lecturers in Japan were also included. The Government of Singapore, in turn, was responsible for the provision of the Institute's premises, local lecturers, its operation costs, as well as recruitment of students.

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With Compliments
JAPAN-SINGAPORE INSTITUTE OF SOFTWARE TECHNOLOGY
1 Maritime Square # 12-11
World Trade Centre
Singapore 0409
REPUBLIC OF SINGAPORE

The aim of the Institute is to prepare students for careers in computer-based information processing, either as application programmers or as systems analysts, both within the computer industry itself and in the commercial and public sectors. This objective is achieved by providing a variety of courses to meet the different levels of technical skills needed in the industry. The training is done via

a) The training of A-level students to be Analyst/Programmers through a two-year full time Diploma in Programming and Systems Analysis course. Total training hours amount to 4000 hours. These graduates will serve as the important interface between systems designers and programmer/coders in the design and implementation of computerised systems. Entry requirement is a minimum of 2 GCE A-level passes, of which one must be in Mathematics or Accounting and at least a pass in English Language. The course covers the scope of the Japan MITI examinations Type II subjects and also the needs of the Singapore industry.

b) The training of non-Computer Science degree graduates to be Systems Analysts. Flexibility is allowed in a 2-module nine months training:

i) A 3-month full time Certificate in Systems Analysis course prepare the student for work as computer systems analyst in an end-user environment. Entry

requirement is a recognised university degree or equivalent qualification.

ii) A 6-month full time Diploma in Systems Analysis course which will upgrade the graduates from the Certificate course after some relevant working experience or practising systems analysts for work as systems designers/engineers capable of independent software design and development.

c) Short courses in computer appreciation for middle and senior management, to familiarise them with all aspects of information technology, its environment and applications.

d) Other short courses, on an ad-hoc basis, customised to provide training in the latest information technology techniques and high-level software technology to practising information processing professionals.

The JSIST was established in 1980 under the EDB as an integral part of its manpower development programme to provide the fledgeling computer services industry with practice-oriented computer professionals. In the following year, the National Computer Board (NCB) was set up as a single-focus organisation responsible for the promotion of computerisation and the overall development of Singapore's computer services industry in particular.

Over the years, good progress has been made

in professional manpower development for the computer services industry. The implementation of the National Information Technology Plan calls for a consolidation of our manpower development programme.

By 1987, apart from the JSIST, the National University of Singapore (NUS) and the Ngee Ann Polytechnic (NP) each has a training centre related to computer studies, i.e. the Institute of Systems Science (ISS) and the Department of Information Science & Computer Science (DISCS) within the NUS, and the Centre for Computer Studies (CCS) within the NP.

All these institutions offer formal training courses in computer studies. JSIST was transferred from the Economic Development Board (EDB) to the Singapore Polytechnic (SP) with effect from 1 April 1987 so as to bring the Institute in line with the organisational arrangement adopted by all the other national computer training institutions. The transfer also brought about a streamlined and focussed approach in the co-ordination of manpower development for the information technology industry, which is undertaken by NCB.

JSIST functions as an autonomous Institute within SP. It is administered by a Management Council which in turn is responsible to the SP Board of Governors.

Students joining the courses after 1 April 1987, upon graduation, will be awarded joint Singapore Polytechnic-JSIST certification.

Plans are being drawn up to house the JSIST at the SP Campus at Dover Road by 1989.

CONSULTANCY SERVICES

By 1986, JSIST lecturers were ready to offer consultancy services to industry. These consultancy services are undertaken to provide technology transfer to the local companies. An appropriate JSIST local lecturer will be assigned on a full-time or part-time basis, depending on the scope and urgency of the project, to the client organisation. However, the client organisation must have a suitable counterpart to work with the JSIST lecturer on the design and implementation of the computer system. At the end of the consultancy, the client organisation will be able to take over from the consultant and do maintenance of the software and implement further enhancement to the system when necessary. By mid-1986 the Institute has also set up an Expert Systems development laboratory to develop expert systems jointly with industry. The Institute provides the knowledge engineering while the partner from industry provides the domain expertise.

JSIST PHASE II PROJECT

The first phase of cooperation between the Governments of Japan and Singapore for the JSIST project ended on 17 December 1986 and the project was entirely handed over to

the Government of Singapore for continuation. The cooperation and technology transfer was so successful that both governments agreed on a second phase of cooperation. The Record of Discussions for the implementation of the JSIST Phase II project was signed on 13 January 1986. The period of cooperation will last for another five years. The Phase II project will enhance the skills of existing computer professionals particularly the JSIST graduates from the Phase I training courses. This will be done through an Advanced Diploma in Software Technology which will cover the scope of the Japan MITI examinations Type I subjects and also the needs of the Singapore industry. The Government of Japan has seconded 12 long-term experts in software technology, as well as short-term experts. A total of 14 fellowships is provided for local lecturers to undergo training in the Okinawa International Centre as well as at Tokyo. The Government of Japan has donated another main frame computer (NEC System 630) with appropriate peripherals and the total contribution is about 400 million yen.

POST-GRADUATE COURSES IN SYSTEMS ANALYSIS

The Institute offers a 2-module 9 months post-graduate course in systems analysis, the first module leading to the award of a Certificate in Systems Analysis while the latter leads to the award of a Diploma in Systems Analysis.

The Certificate in Systems Analysis course aims to train and equip end-user analysts, that is, graduates of this course will be expected to return to their fields of specialisation, and in their own capacities, to assist the EPP staff in the development and implementation of effective information systems. This course covers topics which are fundamental to information systems processing, programming know-how, topics which complement analysis work e.g. business knowledge and communication skills, tools and techniques used in analysis and design work, current technologies which are applicable in an office environment, the impact of computers on society as well as other specialised topics. For consolidation, students will participate, on a group basis, in a case study in the development of an information system.

Graduates from the Certificate course in Systems Analysis, wishing to upgrade themselves, can enrol for the Diploma course in Systems Analysis where they will be trained to work as Systems Analysts in a systems development environment. This course covers 4 topics and is practically orientated. Besides coursework, the students will be involved in group projects. The students will also participate in an industrial attachment programme during the last 3 months of the course where they will be attached to companies where they will be involved in systems development work for those companies.

Total : 500 periods (1 period = 45 minutes)

SYLLABUS

INFORMATION SYSTEMS CONCEPTS

Basic components of a computer, system software, translators, linkers, loaders, application software, symbolic languages, procedure-oriented languages, programming steps, problem definition, coding, compilation, execution, packages, duplex systems, dual systems, tandem systems, main memory, auxiliary channels, I/O devices, terminals, batch system, online system, communication lines, transmission control, network, time-sharing system, remote batch system.

FILE PROCESSING FUNDAMENTALS

Basic concepts of files, cylinder, track, variable block, fixed block, file organization - sequential, indexed sequential, direct, VSAM, random, selection criteria.

COBOL PROGRAMMING

Character set, reserved words, literals, coding format, COBOL divisions, configuration section, input/output section, file section, file description, word description, working-storage section, COBOL verbs, table handling, file-handling, inter-program communication, report writer, COBOL library.

BUSINESS KNOWLEDGE

Business inter-relationships, sole proprietorships, partnership, limited companies, functional applications in manufacturing, retailing and servicing industries, production planning and control, purchasing and stock/inventory control, marketing, market research, human resource management, cost management, payroll, actual business concerns in services, manufacturing and retailing industries.

COMMUNICATION SKILLS

Necessity of communication, communication process, lines of communication, human aspects in systems investigation, fact finding techniques, report writing, presentation techniques, telephone conversations, interviewing techniques, meetings, presentations, reports.

SYSTEMS ANALYSIS AND DESIGN

Definition, system development environment, user-analyst relationship, feasibility study, systems analysis, systems design, coding, debugging, integration test, acceptance test, maintenance evaluation, analysis and design tools and techniques e.g. dataflow diagrams, pseudo-code, data dictionary, HIPO, decision tables, information system methodologies e.g. SASD, comparison of methodologies, structured methodologies e.g. Yourdon ap-

proach, De Marco, choice of methodology, project management, planning, control, documentation.

DATABASE SYSTEMS

Functional components, characteristics of DBMS, DBMS evaluation, database models, hierarchical, network, relational, user interfaces, schema DDL, sub-schema DDL, DML, end-user languages, utilities, database reorganization, restructuring, recovery, database administration, management issues.

FUNDAMENTALS OF ONLINE SYSTEMS

Definition, characteristics, configuration, hardware requirements, response time, random arrival of messages, random access files, reliability and control features, applications in banking and finance, manufacturing, transport, trading.

SOCIAL IMPLICATIONS

Computers and society, needs for computer system controls and security, computer fraud, standard EDP system controls, copyright law.

OFFICE TECHNOLOGY

Office technology, microcomputers and software, architecture, common microcom-

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puter operating systems, microcomputer software, local area networks, LAN technology, transmission media, topology, access methods, advantages and restrictions, LAN applications, videotext, electronic mail, teleconferencing, future technology.

DIPLOMA IN SYSTEMS ANALYSIS COURSE

AIM

To train and equip EDP professionals/graduates, or its equivalent, preferably with some working experience, to function as Systems Analysts in systems development environment.

OBJECTIVES

By the end of this course, the students will be able to :

1. Understand the basic concepts and functions of operating systems.
2. Apply a Systems Analysis and Design methodology in systems development.
3. Have an analytical ability and practical experience an efficient online system.
4. Design and implement a relational type

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database system.

DURATION

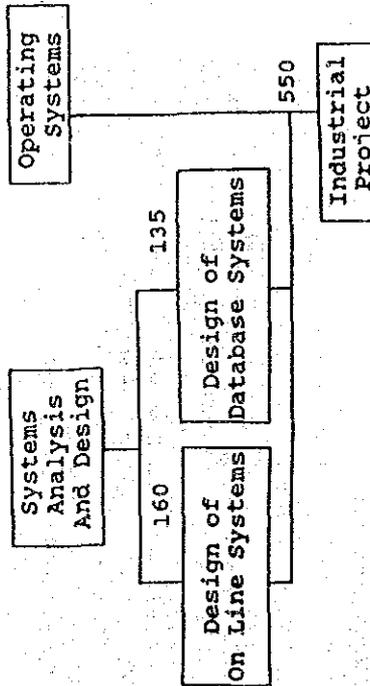
- 6 months full-time - consisting of 3 months of coursework followed by 3-month industrial project.

PRE-REQUISITES

- 1. University graduate or equivalent.
- 2. Must pass the selection test administered by JSIST or has passed the Certificate in Systems Analysis course.
- 3. Preferably with some working experience in business field.
- 4. Relevant data-processing experience will be an advantage.

COURSE STRUCTURE

(Numbers indicate teaching periods of 45 minutes each) 65



Total : 510 + 550 = 1060 periods (1 period = 45 minutes)

SYLLABUS

OPERATING SYSTEMS

OS architecture, job-by-job, batch, multiprogramming, online, timesharing, multiprocessing, job, job steps, job control language, job scheduler, initiator, terminator, job class, priority, multiplicity, spooling, process scheduling, control, interrupt processing, synchronisation, deadlock, race condition, static, dynamic and relocatable partitioning, paged memory, segmentation, paged segmentation, virtual memory, file management, organisation, cataloging, file control, block-chaining, index-block chaining, file mapping, I/O traffic controller, I/O scheduler, I/O device handler, case study.

DESIGN OF ONLINE SYSTEMS

Data communications, simplex, duplex, transmission modes, Bardot code, ASCII code, EBCDIC code, parallel and serial transmission, bit and character synchronization, asynchronous and synchronous transmission, communication lines, modems, terminals, network interface standards, network

configuration, multiplexors, concentrators, error control, forward feedback, Shannon's theorem, error detection, parity bit, frame check sequence, cyclic redundancy check, network protocols, communication carrier facilities, online systems and queues, statistics, queuing models, Kendall's symbols, system performance calculation, network analysis, multidrop, system evaluation, file design, circuit configuration design, calculation of number of terminals, RASIS technology, evaluation of reliability.

DESIGN OF DATABASE SYSTEMS

DBMS architecture, database models, hierarchical, network, relational, theory of normalization, conceptual modelling, ERM, physical design, performance analysis, pointers, chains, rings, trees, inverted files, DDL, DML, database administration, data dictionary systems, data base security and integrity, concurrency control, integrity constraints, locking protocol, granularity, recovery techniques, types of failures, recovery log, image copies, checkpoints, backward and forward recovery, compensation, salvation.

SYSTEMS ANALYSIS AND DESIGN

Feasibility study, problem definition, methodologies, tools and techniques, data flow diagram, structured english, decision table, system chart, code design, check digit, output design, input design, file design, program design, testing & debugging, unit test, integration test, system test, acceptance test, implementation, walkthrough, documentation,

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project management, system operation, system maintenance, system evaluation, security and privacy.

COMPANIES THAT HAVE PARTICIPATED IN INDUSTRIAL ATTACHMENT PROGRAM

1. 3M Singapore Pte Ltd
2. ATS Computer Centre Ptd Ltd
3. Bank of America, NT & SA
4. Banque Nationale De Paris
5. BBC Brown Boveri (SEA) Pte Ltd
6. British Petroleum Singapore Pte Ltd
7. Central Provident Fund Board
8. Ciba-Geigy S.E.Asia Pte Ltd
9. Consoftec Systems & Consultancy Pte Ltd
10. Economic Development Board
11. Export Credit Insurance Corporation of Singapore Ltd
12. Forbes Infonet Pte Ltd
13. Hewlett-Packard Singapore Pte Ltd
14. Housing & Development Board
15. Jurong Town Corporation
16. Keppel Corporation Ltd
17. Mandarin Singapore
18. Metal Box Pte Ltd
19. Ministry of Defence, Systems & Computers Organization
20. Ministry of Finance, Management Services Department
21. National Productivity Board
22. NEC Singapore Pte Ltd
23. Nemic-Lambda (S) Pte Ltd
24. Nippon Computer Systems & Services Pte Ltd
25. Overseas Union Bank Ltd
26. Reda Pump Co (S) Pte Ltd
27. RIS Computers Pte Ltd

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- 28. SCS Semiconductors (Pte) Ltd
- 29. Siflex Industries Pte Ltd
- 30. Singapore Bus Services (1979) Ltd
- 31. Singapore Institute of Management
- 32. Singapore Institute of Personnel Management
- 33. Standard Chartered Bank
- 34. Telecommunication Authority of Singapore
- 35. Total Information Systems Pte Ltd
- 36. Trade Development Board
- 37. Westin Stamford & Westin Plaza Hotel
- 38. Yamaha Music (Asia) Pte Ltd

COMPUTING FACILITIES IN JSIST

MAINFRAME COMPUTERS

- <1> 1 NEC SYSTEM 630 (4 mips) with
 - 32 Mb main storage
 - 7 units of dual disk drives (6,804 Mb)
 - 2 line printers (1800 lpm)
 - 1 page printer (1250 lpm)
 - 4 magnetic tape drives
 - 1 optical card reader
 - 60 intelligent terminals (APC III)
- <2> 1 NEC SYSTEM 450 (2 mips) with
 - 15 Mb main storage
 - 12 disk drives (200 Mb each)
 - 2 line printers (1800 lpm)
 - 4 magnetic tape drives
 - 64 terminals
 - 4 intelligent terminals

MINICOMPUTERS

- <1> 1 NEC S100/80 with
 - 256 Kb main storage
 - 2 visual display terminals
- <2> 1 NEC S100/85 with
 - 1.2 Mb main storage
 - 7 visual display terminals
- <3> 3 NEC ASTRA 370VS with
 - 3 Mb main storage
 - 48 visual display terminals

PERSONAL COMPUTERS

- <1> 14 NEC APC III
- <2> 10 NEC APC
- <3> 2 Texas Instrument Business Pro
- <4> 7 Philips P3200
- <5> 1 Philips P3100
- <6> 2 Olivetti M21
- <7> 10 Epson
- <8> 10 Commodore
- <9> 10 Fujitsu FM-16
- <10> 8 laptops
- <11> 90 APC IV



**DIPLOMA IN PROGRAMMING
& SYSTEMS ANALYSIS COURSE**

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SINGAPORE POLYTECHNIC - JAPAN-SINGAPORE INSTITUTE OF SOFTWARE TECHNOLOGY

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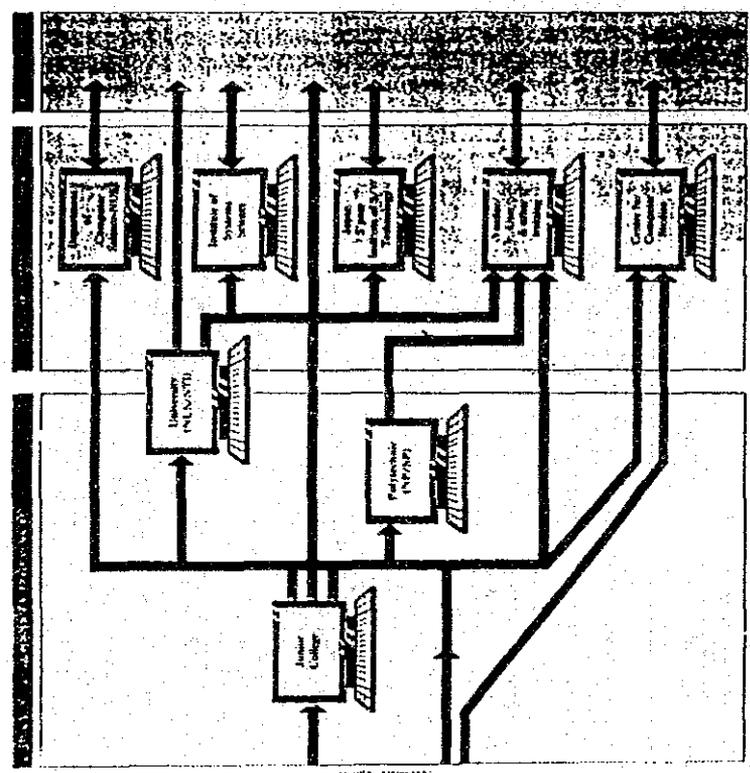
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THE ROUTE TO INFORMATION PROCESSING EDUCATION IN SINGAPORE

ORGANIZATIONS WHICH RECOGNISE THE JSIST DIPLOMA IN PROGRAMMING AND SYSTEMS ANALYSIS

S/N	YEAR OF RECOGNITION	PROFESSIONAL BODIES RECOGNISING JSIST A/P DIPLOMA	DETAILS
1	1983	Singapore National Computer Board (NCB)	JSIST A/P Diploma is accredited by NCB at National Level One (NCB has pegged the British Computer Society Part I at this level)
2	1983	Singapore Computer Society (SCS)	JSIST A/P Diploma graduates with at least two years of working experience in the computer industry are eligible to become Associate Members of SCS



FURTHER DEVELOPMENT FOR J61ST
DIPLOMA IN PROGRAMMING AND SYSTEMS ANALYSIS GRADUATES

YEAR OF RECOGNITION OVERSEAS UNIVERSITY COURSE TITLE DURATION

S/N	YEAR OF RECOGNITION	OVERSEAS UNIVERSITY	COURSE TITLE	DURATION
1	1984	City University Northampton Sq. London EC1V 0HB UK	Undergraduate Diploma in Business Data Processing	12 months full-time
2	1984	The University of Sussex Brighton BN1 9QN UK	followed by MSc in Business Systems Analysis and Design	12 months full-time
3	1985	The London Sch. of Economics and Political Science University of London Houghton Street London WC2A 2AE UK	MSc in Analysis, Design & Management of Information Systems	12 months full-time
4	1986	University of Essex Dept of Computer Science Wivenhoe Park Colchester CO4 3SQ England	MSc in Computer Studies or MSc in IKBS	12 months full-time
5	1986	University of Glasgow G12 8QQ Scotland	MSc in Information technology Master of Applied Science Course in Computing Science (MASC)	12 months full-time 12 months full-time
6	1986	University of Stirling FK9 4LA Scotland	MSc in Information technology OR MSc in Software Engineering	12 months full-time 18 months full-time
7	1987	The University College of Wales Old College King Street Aberystwyth Dyfed SY23 2AX	MSc in Computer Science	12 months full-time

PLACEMENT OF GRADUATES FROM THE DIPLOMA IN PROGRAMMING AND SYSTEMS ANALYSIS COURSE

Our graduates have been employed by the following companies:-

- 1 American Express International, Inc
- 2 AMF Manufacturing Singapore Pte Ltd
- 3 APEX Systems Pte Ltd
- 4 Asia Commercial Bank Ltd
- 5 Asian Computer Services Pte Ltd
- 6 ATS Computer Centre Pte Ltd
- 7 Bank of China
- 8 BBC Brown Boveri (S) Pte Ltd
- 9 BIS Banking Systems Pte Ltd
- 10 Boustead Marketing & Management Services
- 11 Business Automation Consultants
- 12 Business Computers (Pte) Ltd
- 13 Caldwell MacGregor (S) Pte Ltd
- 14 Carrier Singapore (Pte) Ltd
- 15 CDC-Construction & Dev Pte Ltd
- 16 Chartered Electronics Industries Pte Ltd
- 17 Chin & Be General Contractors
- 18 Citibank N.A. COS Systems Group
- 19 Citicorp International (S) Ltd
- 20 Cold Storage S'pore (1983)
- 21 Comsat Services Pte Ltd
- 22 Computer Systems Advisers Pte Ltd
- 23 Data Interlink Pte Ltd
- 24 DBS Bank
- 25 Decision Support Systems Pte Ltd
- 26 Digital Equipment Int'l Ltd
- 27 Ernst & Whinney 10 Collyer Quay
- 28 Far East Computer Pte Ltd
- 29 Festo GMBH and Company
- 30 Global Airfreight Int'l Pte Ltd
- 31 Golden Cycle Store Pte Ltd
- 32 Government of Singapore Investment Corp Pte Ltd
- 33 Hitachi Electronics Devices (Singapore)
- 34 HongKong and Shanghai Banking Corporation
- 35 Indeco Engineers Pte Ltd
- 36 Informatics Software (S) Pte Ltd
- 37 Infotech Consultants Pte Ltd
- 38 Insurance Corporation of Singapore Ltd
- 39 IPACS Computer Services (S) Pte Ltd
- 40 Jurong Environmental Eng Pte Ltd
- 41 Jurong Town Corporation
- 42 Kaidi Co Pte Ltd
- 43 Kenda (Singapore) Pte Ltd
- 44 Keppel Corporation Ltd
- 45 Keppel Shipyard Ltd
- 46 Leihland Makino Asia Pte Ltd
- 47 Lingo Computer School
- 48 Mandarin Singapore
- 49 Manufacturers Hanover Trust Company
- 50 Mitsubishi Denshi (S) Pte Ltd
- 51 Metal Box Singapore Limited
- 52 Microlink Systems Pte Ltd
- 53 MIS Software Consultant
- 54 Mobil Oil Singapore Pte Ltd
- 55 National Computer Board
- 56 National Iron & Steel Mills Ltd
- 57 National Semiconductor (Pte) Ltd
- 58 NEC Singapore Pte Ltd
- 59 Neptune Orient Lines Ltd
- 60 Nexus Technology (S) Pte Ltd
- 61 Nikko Electronics Toy Pte Ltd
- 62 Nippon Computer System & Services Pte Ltd
- 63 Norse Management Co (Pte) Ltd
- 64 NTUC Comfort
- 65 Oberoi Imperial Hotel
- 66 Okamoto (Singapore) Pte Ltd
- 67 Overseas Union Management Services Pte Ltd
- 68 Peat, Marwick, Mitchell & Co
- 69 Pepperi + Fuchs (Singapore) Pte Ltd
- 70 Philips Singapore Pte Ltd
- 71 POSB Computer Services Pte Ltd
- 72 Powermatic Data Systems
- 73 Price Waterhouse
- 74 Prudential Assurance Co Ltd
- 75 Real Time Systems Pte Ltd
- 76 Reda Pump Co (S'pore) Pte Ltd
- 77 Reda Pump Company (S) Pte Ltd
- 78 S'pore Aerospace Maintenance Company
- 79 S'pore Electronic & Engineering Ltd
- 80 S&L Leasing (Pte) Ltd
- 81 Sanyo Airconditioners Mfr S'pore Pte Ltd
- 82 SGS Singapore (Pte) Ltd
- 83 SHELL Eastern Petroleum Pte Ltd
- 84 Sheraton Towers S'pore Hotel
- 85 Sim Lim Technology Pte Ltd
- 86 Sin Tien Seng Pte Ltd
- 87 Singapore Airlines Ltd
- 88 Singapore Computer Systems Pte Ltd
- 89 Skills Development Fund
- 90 Standard Chartered Bank
- 91 Tai Pan Amada Hotel
- 92 Taiko Electronics (S) Pte Ltd
- 93 Tien Wah Press (Pte) Ltd
- 94 Times Publishing Berhad
- 95 Tomy (S) Pte Ltd
- 96 Topcon S'pore Pte Ltd
- 97 ULC Systems (Far East) Pte Ltd
- 98 Unicom Data Bank Pte Ltd
- 99 Vocational & Industrial Training Board
- 100 National Computer Systems Pte Ltd
- 101 Aashu Electronics (S) Pte Ltd
- 102 Mas Rapid Transit (S'pore) Pte Ltd
- 103 Samero Company Pte Ltd
- 104 Singapore Datto Engineering Pte Ltd
- 105 Cameron Ironworks (S) Pte Ltd

DIPLOMA IN PROGRAMMING AND SYSTEMS ANALYSIS COURSE

AIM :

To provide the necessary training and technical knowledge in the various aspects of computer applications software so as to form a core of skilled Analyst/Programmers for the software industry.

OBJECTIVE :

By the end of the 2-year Diploma course, the trainees will be able to :

- (1) Design and code structured programs in at least 3 high-level languages.
- (2) Identify the components in various computer system configurations.
- (3) Utilize Codasyl and Relational types of database systems.
- (4) Assist in the development of on-line system.
- (5) Communicate effectively on matters relating to data processing.
- (6) Assist the Systems Analyst in
 - (i) Carrying out feasibility studies.
 - (ii) Writing specifications for general and detailed application systems design.

(iii) Implementing application systems.

DURATION : 2 years

PRE-REQUISITES :

- (1) GCE 'A' level passes in two subjects, one of which must be a Mathematics or Principles of Accounting
- (2) A Pass in General Paper or English Language (EL1 or EL2)

COURSE STRATEGY

The central theme of the course is computer-based data processing with its main areas of study concentrated in programming, computer systems and systems analysis and design. Communication skills in interviewing, verbal presentations and report writing are important aspects of the work of computer personnel. It is also important for the graduates from the course to understand the working environment and to interface properly with it. Related training in communication skills and accounting is therefore provided in the curriculum. To assist the student to attain a better understanding of his studies in the core areas, supportive training in Mathematics and Operational Research techniques are included.

To ensure that students will develop with sufficient practical skills relevant to their future employment there is a significant emphasis on practical work. 50% of the core subject time is spent on practical work. A major group project is undertaken during the course to give students some experience in the complex task of designing and implementing computer-based information systems. The team spirit developed during the group project preparation is also an important phase in the general education. At the end of second year, students are required to conduct independently a study on a particular topic in an actual working environment in the industry, commerce or public sector. In each project the students must be able to show through their work and report presentation, his or her initiative, critical faculty, ability to be creative and to use what he or she has learned during the course to solve problems.

There will be one intake a year in June. In each intake the total enrolment will be 120.

Each intake will be managed by a course coordinator. The course coordinator is responsible for the smooth running of the day-to-day operation of each intake. The course coordinator will arrange for projects for the students in the second year of the Diploma Course.

In order to provide proper guidance to the students, course tutors will be appointed to supervise groups of students in each course. Students in the Institute will be assigned a tutor and will be encouraged to seek the tutor's advice on any problems, personal as

well as academic, that may occur during their stay in the Institute. The role of the course tutor will be :-

- a) To advise students on their studies throughout their entire training program;
- b) To assist the subject lecturer by giving tutorials for his or her group of students;
- c) To assist in getting jobs for graduates and write testimonials for them when necessary;
- d) To advise the course coordinator and subject lecturers on actions which need to be taken to assist a student to achieve a higher level of attainment;
- e) To assist in getting feedback from their students on the usefulness and relevance of the training to their work after graduation.

SYLLABUS

FIRST YEAR SUBJECTS

- 1.1 INTRODUCTION TO COMPUTER AND DATA PROCESSING - 35 periods
Information & data processing. Characteristics of computer. Hardware.

Software. Information processing systems. Computer applications. Impact on society.

- 1.2 INTRODUCTION TO HARDWARE - 100 periods
Computer components. Logic convention. Logic circuit. Data representation. Arithmetic logic operations. Control unit. Main memory. Auxiliary memory. Input/output devices.

- 1.3 BASIC - 35 periods
Input processing. Output formatting. Control structures. Array. Functions. Subroutines. String manipulations. Error handling. File processing. Graphic processing.

- 1.4 COBOL I - 130 periods
Coding format. Identification, environment, data and procedural divisions. Table handling. Basic file processing. Sorting.

- 1.5 PRINCIPLES AND TECHNIQUES OF PROGRAMMING - 60 periods
Program structures: data definition, control structures, subprograms. Programming techniques: implementation order, style, structured programming, structured program design tools.

Testing & debugging.

1.6 MATHEMATICS - 80 periods

Indices & logarithms. Linear algebraic equations. Matrices & determinants. Progressions. Differentials. Integrals. Approximation & error. Least squares method. Set theory.

1.7 OVERVIEW OF SYSTEMS SOFTWARE - 30 periods

Necessity & components of system software. Language processors: compiler, interpreter, precompiler, assembler, linker & loader. Necessity, structure & types of operating systems. Types of general utilities. Case studies.

1.8 OPERATING SYSTEMS - 90 periods

Components. Functions. Characteristics. Job management. Task management. Memory management. Information management. Device management.

1.9 PASCAL - 140 periods

Program components. Control structures. Data types. Procedures. Functions. Static data structures & their implementation: array, record, file. Dynamic data structures & their implementation: singly and doubly linked-lists.

1.10 ASSEMBLY LANGUAGE - 75 periods

Instruction set. Instruction execution sequence. 8086 microprocessor. Instruction classes. Addressing techniques. Features of assemblers & debuggers. Basic programming. Program control structures. Array handling.

1.11 COMMUNICATION SKILLS - 80 periods

Language in business. Communication & business. Oral communication. Written communication.

1.12 COBOL II - 230 periods

VSAS file organisation. Subprogram. Library facility. Report Writer. Program debugging. Efficient programming. Project development.

1.13 RPG - 60 period

Control & file specifications. Input & output specifications. Report generation, Record identifying indicators. Comparison operation & resulting indicators. Field indicators. File processing. Table &

array handling.

1.14 THEORY OF PROGRAMMING LANGUAGE -
50 periods

Syntax & translation. Semantics.
Binding. Data types. Control
structures. Data control, Storage
management. Operating and programming
environments.

1.15 ACCOUNTING - 85 periods

Accounting concepts. Financial
statements. Analyzing & classifying
transactions. Recording transactions.
Repetitive transactions. Adjusting &
closing procedures. Inventory. Cash &
its control. Payroll. Fixed assets.
Revenue, expenses & net income.
Liabilities & equity. Inflation
accounting. Management accounting.
Budgeting. Capital budgeting.
Financial statement analysis.

SECOND YEAR SUBJECTS

2.1 STATISTICS AND PROBABILITY - 35 periods

Probability theory. Sampling.
Estimation. Hypothesis testing.
Graphical analysis.

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2.2 OPERATIONS RESEARCH - 90 periods

Definition & procedure of OR. Linear
programming. Transportation. Network
analysis. Simulation. Decision theory.
Inventory control. Queuing theory.

2.3 DATA COMMUNICATIONS AND ON-LINE SYSTEMS
- 60 periods

Communication network components.
Error detection & correction. Network
protocol & line control procedures.
Communication carrier facilities.
System planning consideration. On-line
system characteristics. Spectrum of
real-time system. Difficulties of
real-time programming. Supervisory
system. Utilization of main memory.
Queues. Random access files. Program-
ming for communication lines. Linkage
between programs.

2.4 DATABASE SYSTEMS I - 120 periods

Overview of hierarchical, network &
relational model. Physical database
organization. Database languages.
Introduction to Codasyl DBMS. Database
implementation.

2.5 DATABASE SYSTEMS II - 100 periods

Relational algebra. Relational calcu-
lus. Introduction to relational DBMS.
Normalization. Database security &
integrity. Database implementation.

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2.6 SYSTEMS ANALYSIS AND DESIGN I -
110 periods

System development life cycle. Data gathering. Structured analysis. Feasibility study. Systems requirement definitions. Output/input/code/file design. Selection of computer configuration. Procedure development. Structured design.

2.7 SYSTEMS ANALYSIS AND DESIGN II -
45 periods

Data security methods. Data processing control. Privacy & computer. Data security auditing methods. System evaluation. Monitoring methods. Analytical methods. Measurement of system performance. Hardware/software maintenance. Maintenance organization.

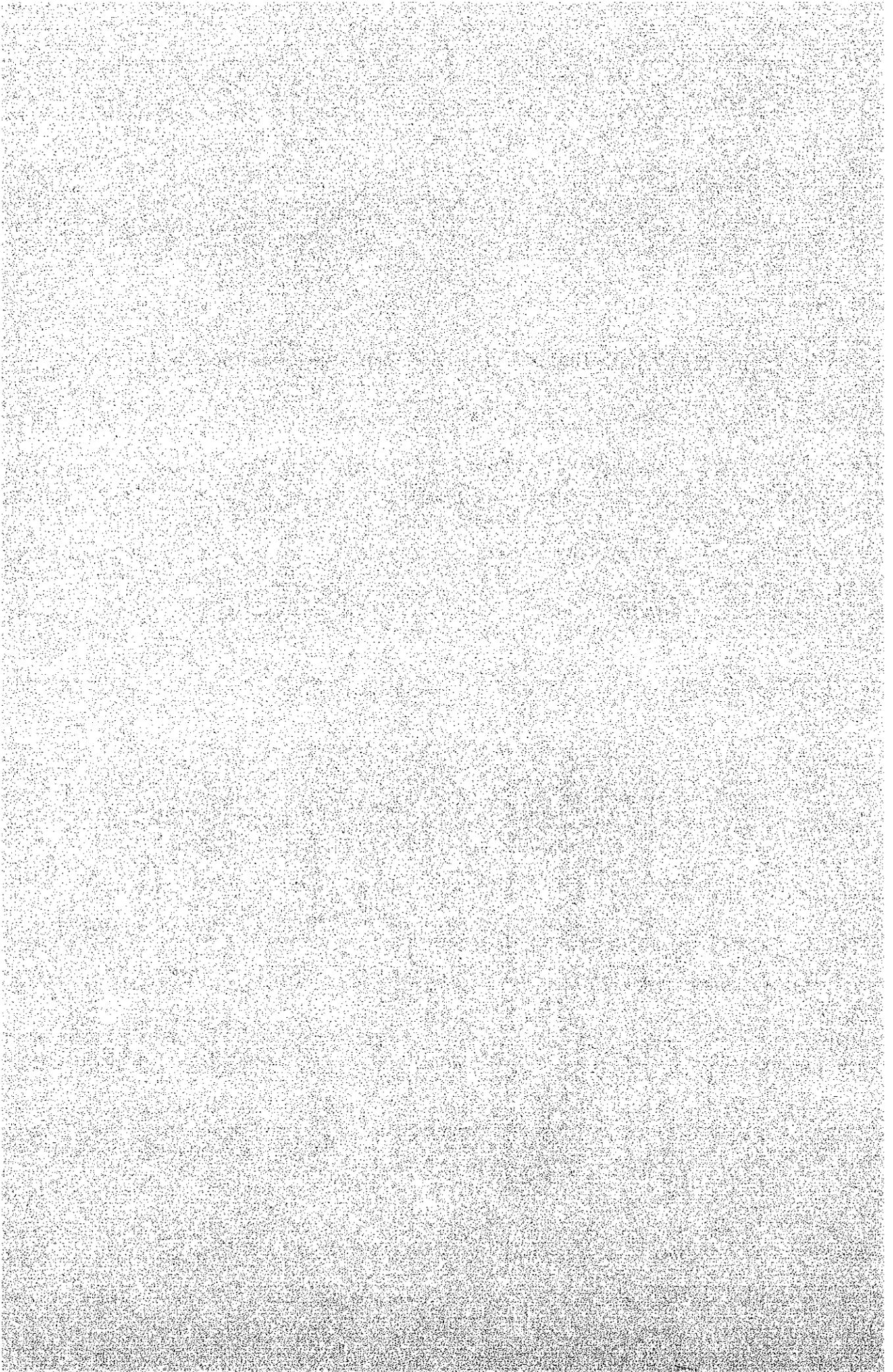
2.8 REAL-TIME SYSTEM PACKAGE - 80 periods

Features of the package - Versatile Information System (VIS). Transaction & transaction processing program (TPP). Types of message processing. Structure of VIS. Message editing & Processing. Position of TPP. Structure of TPP. System utilities. Development of TPP.

2.9 GROUP PROJECT - 17 weeks

2.10 INDUSTRIAL TRAINING - 11 weeks

7-5 NEC JSISTコンピュータ・ラボラトリーパンフレット



NEC - JISIST

Computer Laboratory Computer Laboratory Computer Laboratory



GRAPHIC FACT

NEC
MAKING YOUR OFFICE WORK FOR YOU
NEC Singapore Pte Ltd
No. 138 Robinson Road #11-01 Hong Leong Centre Singapore 0106

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1. INTRODUCTION

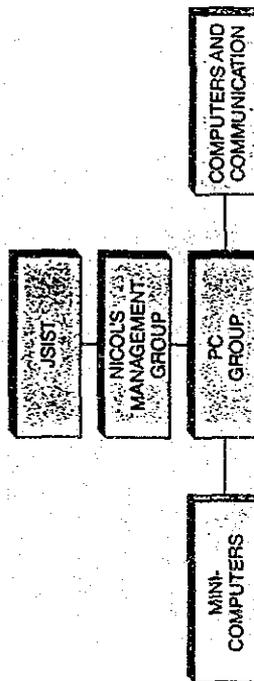
The NEC-JSIST Computer Laboratory, or NICOL in short, was established on the 27 April 1987 when the Plan of Operation for its set-up was signed between the officials from NEC Singapore (Pte) Ltd, NEC Corporation, the Japan-Singapore Institute of Software Technology and Singapore Polytechnic. The purpose of this Computer Laboratory is to maintain direct co-operation not only with NEC but also with other companies and organizations. Such co-operation may take the form of joint projects, software engineering tools and training courses. Under this Computer Laboratory, companies and organizations which want to participate in joint projects with NICOL can make use of the full range of computers installed in JSIST.

2. OBJECTIVES

Based on the above stated purpose of NICOL, our objectives are:

- (1) To promote the use of actual application case studies for JSIST students;
- (2) To promote software development work;
- (3) To act as a testbed for software applications;
- (4) To support consultancy work; and
- (5) To provide training to computer users.

3. ORGANIZATION STRUCTURE



As to the operation of NICOL, it is handled entirely by JSIST. However, representatives from NEC Singapore Pte Ltd do sit in the management group as observers. In addition, there is a manager who will ensure that all the planned activities are carried out.

4. CURRENT COMPUTING FACILITIES IN JSIST

The following is a list of all the computing equipment available for use in the NEC-JSIST Computer Laboratory:

1. Mainframe Computers

- (i) 1 NEC SYSTEM 630 (4 MIPS) with
 - 32 Megabytes main storage
 - 7 units of dual disk drives (Total 6804 Megabytes)
 - 2 line printers (each 1800 lines per minute)
 - 1 page printer (1250 lines per minute)
 - 4 magnetic tape drives
 - 1 Optical Character Reader
 - 60 Intelligent Terminals (NEC APC.III)
- (ii) 1 NEC SYSTEM 450 Multiprocessor System (2 MIPS) with
 - 14 Megabytes main storage
 - 12 units of disk drives each of 200 Megabytes capacity (Total 2400 Megabytes)
 - 2 line printers (each 1800 lines per minute)
 - 4 Magnetic tape drives
 - 64 Visual Display Terminals
 - 4 Intelligent Terminals

2. Mini-Computer Systems

- (i) 3 ASTRA 370VS Mini-computer systems with
 - 7 Megabytes main storage for each unit (Total 21 Megabytes)
 - 1 Megabyte floppy disk drive unit for each unit
 - 48 Visual Display Terminals
 - 3 High-speed serial printers (200 characters per second)
- (ii) NEC SYSTEM 100/85 Mini-computer with
 - 768 Kilobytes main storage
 - 1 Megabyte floppy disk drive
 - 7 Visual Display Terminals
 - Line printer (300 lines per minute)
 - Kanji line printer (100 lines per minute)
- (iii) NEC SYSTEM 100/80 Mini-computer with
 - 256 Kilobytes main storage
 - 1 Megabyte floppy disk drive
 - 2 Visual Display Terminals
 - 1 Serial printer (125 characters per second)

6. SCHEDULE OF TRAINING COURSES FOR 1988

S.NO.	COURSE TITLE	COST	DURATION	DATES
1	INTRODUCTION TO MINICOMPUTER OS	\$300	2 DAYS	29 FEBRUARY 1 MARCH
2	PARAMETRIC PROGRAMMING	\$500	3 DAYS	9 MARCH 10 MARCH 11 MARCH
3	RELATIONAL DATA BASE (RDB)	\$500	3 DAYS	23 MARCH 24 MARCH 25 MARCH
4	INTRODUCTION TO PROLOG	\$300	3 DAYS	11 APRIL 12 APRIL 13 APRIL
5	UNDERSTANDING LANS	\$300	3 DAYS	26 APRIL 27 APRIL 28 APRIL
6	INTRODUCTION TO MINICOMPUTER OS	\$300	2 DAYS	26 MAY 27 MAY
7	PARAMETRIC PROGRAMMING	\$500	3 DAYS	22 JUNE 23 JUNE 24 JUNE
8	INTRODUCTION TO EXPERT SYSTEMS	\$850	5 DAYS	4 JULY 5 JULY 6 JULY 7 JULY 8 JULY
9	RELATIONAL DATA BASE (RDB)	\$500	3 DAYS	23 AUGUST 24 AUGUST 25 AUGUST
10	UNIX FOR BEGINNERS	\$300	3 DAYS	21 SEPTEMBER 22 SEPTEMBER 23 SEPTEMBER
11	UNDERSTANDING LANS	\$300	3 DAYS	26 OCTOBER 27 OCTOBER 28 OCTOBER
12	DATA COMMUNICATIONS	\$700	4 DAYS	22 NOVEMBER 23 NOVEMBER 24 NOVEMBER 25 NOVEMBER

3. Personal Computers

- (a) 14 NEC APC III microcomputers
- (b) 10 NEC APC microcomputers
- (c) 27 IBM PC and IBM PCXT compatibles (Commodore, Epson, NEC, Olivetti, Smart, Philips)
- (d) 61 IBM PC/AT compatibles (Philips, NEC, Sheny, DTC, Texas Instruments)
- (e) 12 Laptops (Olivetti, Toshiba, Zenith, Solec, Spark)
- (f) 21 Others (NEC 9801, NEC 8801, NEC 8201, Amiga and Fujitsu)

4. Local Area Network

- (a) Hardware configuration:
 - Proteon's ProNET F10 card
 - 4 NEC Powermate-2 servers, each with
 - 640 KB + 1 MB main storage
 - 1.2 MB floppy disk drive
 - 66 MB hard disk drive
 - NEC P9XL printer
 - 5 wire centres (1 standard wire centre + 4 satellite wire centres)
 - 40 NEC APC IV workstations
- (b) Software:
 - Novell's Advanced Netware 286 Version 2.0
 - Novell's SFT (System Fault Tolerance) Netware 286 Level 1

As for software, we have a whole range of software applicable on the NEC mainframe computers, NEC mini-computers and commonly used microcomputer software.

5. TRAINING COURSES

One of the objectives of the NEC-JSIST Computer Laboratory is to provide training courses for computer users. As such, a schedule of training courses has been prepared for 1988. These courses cover the ASTRA mini-computers, the Local Area Network and the NEC APC IV microcomputers (which are all IBM PC/AT compatibles). However, special arrangements can be made to meet any request from companies or organizations which want to have specially tailored courses for their staff.

The course enrolment form is attached in this brochure. Individuals or companies interested in participating in our training courses are welcomed to send their enrolment forms to the NEC-JSIST Computer Laboratory.

13	INTRODUCTION TO EXPERT SYSTEMS	\$850	5 DAYS	5 DECEMBER 6 DECEMBER 7 DECEMBER 8 DECEMBER 9 DECEMBER
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The above schedule and other course details are subject to changes. The management of the NEC-JSIST COMPUTER LABORATORY reserves the right to amend the above schedule and other course details. The costs given above are inclusive of all training materials, computer time, light refreshments and lunch.

7. DETAILS OF TRAINING COURSES

COURSE NAME: Introduction to MINICOMPUTER OS

AIM: To familiarise ASTRA computer users on the hardware and software features of ASTRA computers.

OBJECTIVES:

- 1) To state some important hardware characteristics of ASTRA computers
- 2) To list the main features of ASTRA computers
- 3) To use the important system utilities for building application systems

CONTENTS:

- 1) Hardware components
- 2) Main ASTRA/OS functions
- 3) System Management
 - a) Job Management
 - b) Executive
 - c) System Control
- 4) Data Management
- 5) System Utilities:
 - #TEDIT, #ALLOC, #MAP, COBOL, #LINK, #SFGEN, #FLCNY, #FILEM, #OCFM, #MENU, #VOLPR, #LBM, #BEDIT, #ABC

DURATION: 2 Days (9:00 am — 5:00 pm)

DATES: 29 FEBRUARY 1988 26 MAY 1988
1 MARCH 1988 27 MAY 1988

COST: \$300/=

PREREQUISITES: Basic EDP knowledge

COURSE NAME: RDB (Relational Data Base)

AIM: To use the ASTRA Relational Data Base Management System to develop application system

OBJECTIVES:

- 1) To list down some features of a relational database
- 2) To create basic tables and virtual tables
- 3) To use the extended COBOL facilities
- 4) To use the RDB/EUF for query purposes

CONTENTS:

- 1) Relational database
- 2) Relational algebra
- 3) RDB Structure and relational tables
- 4) Table Definition Facility
- 5) RDB support facilities
- 6) Volume catalogue
- 7) #ABC utility
- 8) Virtual Tables
- 9) RDB access facilities
- 10) RDB access paths
- 11) RDB management functions
- 12) Extended COBOL facilities
- 13) RDB merits and demerits

PRACTICAL:

- 1) Physical file allocation
- 2) Basic table creation
- 4) SMART data entry programs to load data
- 5) Using COBOL to access RDB tables
- 6) RDB/EUF exercises

DURATION: 3 Days (9:00 am — 5:00 pm)

DATES: 23 MARCH 1988 23 AUGUST 1988
24 MARCH 1988 24 AUGUST 1988
25 MARCH 1988 25 AUGUST 1988

COST: \$500/ =

PREREQUISITES: Prior knowledge of ASTRA/OS

COURSE NAME: Parametric Programming

AIM: To familiarise ASTRA computer users on the use of the SMART programming language

OBJECTIVES:

- 1) To understand the terms used in SMART programming language
- 2) To state some capabilities of SMART in developing application programs
- 3) To use the SMART programming language in coding programs

CONTENTS:

- 1) Introduction to SMART
- 2) SMART Program Development Cycle
- 3) Terminology used in SMART
- 4) SMART functions
- 5) Reserved words used in SMART
- 6) Practical work:
 - a) Data Dictionary creation
 - b) Data Entry program
 - c) 1-File Update program
 - d) 2-File Update program
 - e) File Extraction program
 - f) Report Generation program

DURATION: 3 Days (9:00 am — 5:00 pm)

DATES: 9 MARCH 1988 22 JUNE 1988
10 MARCH 1988 23 JUNE 1988
11 MARCH 1988 24 JUNE 1988

COST: \$550/ =

PREREQUISITES: Knowledge of a programming language

COURSE NAME: Understanding LANs

AIM: To introduce the basics of LANs and LAN-related issues

OBJECTIVES:

- 1) To gain a better understanding of Local Area Networks
- 2) To use the NOVELL Advanced Netware 286 software

CONTENTS:

- 1) Introduction to LAN
- 2) How a LAN works — basic topologies, transmission media and access methods
- 3) LAN applications
- 4) The NOVELL Advanced Netware 286 software
- 5) How to select a Local Area Network

DURATION:

3 Days (9:00 am — 5:00 pm)

DATES:

26 APRIL 1988 26 OCTOBER 1988
27 APRIL 1988 27 OCTOBER 1988
28 APRIL 1988 28 OCTOBER 1988

COST:

\$300/=

PREREQUISITES: Basic MS-DOS or PC-DOS knowledge

COURSE NAME: Introduction to Expert System

AIM:

To introduce expert systems technology to professionals who want to know what expert systems are, why they are useful and their potential and the expert systems building process

OBJECTIVES:

- 1) To provide an understanding of what expert systems are
- 2) To introduce to participants the various types of knowledge representation
- 3) To identify the characteristics of problems which can be handled by expert system technology
- 4) To understand the different stages of building expert systems
- 5) To compare the different expert system shells available in the market

CONTENTS:

- 1) What are expert systems?
 - 1.1 Overview of related research in artificial intelligence
 - 1.2 Artificial intelligence and expert systems
 - 1.3 Why are expert systems useful?
 - 1.4 What have expert systems been used for?
- 2) What are expert systems?
 - 2.1 Features of an expert system
 - 2.2 How are expert systems organised?
 - 2.3 How do expert systems differ from conventional programs?
- 3) Different knowledge representation techniques:
 - 3.1 Rule-based methods
 - 3.2 Frame-based methods
 - 3.3 Logic-based methods
- 4) Inference mechanisms:
 - 4.1 Forward chaining
 - 4.2 Backward chaining
- 5) Building an expert system:
 - 5.1 When is building an expert system possible, justified or appropriate?
 - 5.2 Stages of an expert system development
 - 5.3 Role of domain experts, knowledge engineers and top management
 - 5.4 Example of the expert system building process

- 6) Expert system development tools:
 - 6.1 Expert system languages
 - 6.2 Expert system shells
 - 6.3 Selection of the appropriate expert system development tools
- 7) Introduction to PC Plus — a rule-based expert system shell
 - 7.1 Consultation with PC Plus using a prototype knowledge base
 - 7.1.1 Why, how and Help features
 - 7.2 Structuring knowledge
 - 7.2.1 Frames, Parameters and Rules
 - 7.3 Developing a knowledge base
 - 7.3.1 Defining goals, frames, parameters and rules
 - 7.3.2 Forward chaining and backward chaining
 - 7.3.3 Creating and connecting subframes
 - 7.4 A Case Study

DURATION:

5 Days
(Morning session: 9:00 am — 12:00 pm)
(Afternoon session: 1:30 pm — 4:30 pm)

DATES:

4 JULY 1988 5 DECEMBER 1988
 5 JULY 1988 6 DECEMBER 1988
 6 JULY 1988 7 DECEMBER 1988
 7 JULY 1988 8 DECEMBER 1988
 8 JULY 1988 9 DECEMBER 1988

COST:

\$850/ =

PREREQUISITES: Computer professionals, engineers, managers and anyone interested in learning about expert system. However, it is preferable that participants should have some experience in using personal computers.

COURSE NAME: UNIX for Beginners

AIM:

To provide an introduction to the UNIX operating system, with "hands-on" exercises throughout the course.

OBJECTIVES:

- 1) To understand and utilise key facilities, services and utilities of the UNIX operating system
- 2) To use UNIX shells and shellscripts
- 3) To perform systems administration tasks

CONTENTS:

- 1) Introduction and overview of UNIX
- 2) Using the UNIX File System
- 3) UNIX VI Editor and Documentation aids
- 4) The UNIX Shell
- 5) UNIX System Administration
- 6) Future developments

DURATION:

3 Days (9:00 am — 5:00 pm)

DATES:

21 SEPTEMBER 1988
 22 SEPTEMBER 1988
 23 SEPTEMBER 1988

COST:

\$300/ =

PREREQUISITES: None

COURSE NAME: Data Communications

AIM: To enable users to plan or use data communications systems for the ASTRA RANGE OF COMPUTERS

- OBJECTIVES:**
- 1) To describe the components of a data communication system
 - 2) Parts of a data communication system
 - 3) Communication Networks
 - 4) Synchronisation and Transmission Control
 - 5) Distributed processing utilities in a small business computer
 - 6) Communication Facility in COBOL:
 - a) Data Division:
 - Communication Section
 - Communication Descriptive Entry
 - b) Procedure Division:
 - Disable
 - Enable
 - Receive
 - Send

DURATION: 4 Days (9.00 am — 5.00 pm)

DATES:
22 NOVEMBER 1988
23 NOVEMBER 1988
24 NOVEMBER 1988
25 NOVEMBER 1988

COST: \$700/ =

PREREQUISITES: Basic EDP knowledge

COURSE NAME: Introduction to PROLOG

AIM: This course presents the basic concepts of Prolog programming; it also introduces the features of Prolog that cannot be found in conventional programming languages. A brief survey of Prolog implementations and several applications of the language will be given at the end of the course.

- OBJECTIVES:**
- 1) To understand the nature of a Prolog program
 - 2) To code simple programs using Micro-Prolog
- CONTENTS:**
- 1) What is a Prolog program: rules, facts and queries
 - 2) Data structures: list
 - 3) How does a Prolog program execute: variable binding, resolution, backtracking, cut, recursion
 - 4) Logic programming using Micro-Prolog: syntax, built-in predicates and examples
 - 5) Application: searching, list processing, expert systems
 - 6) Implementation: DEC-10 Prolog, Turbo-Prolog
 - 7) Advanced topics: Horn clauses and Prolog, storage management in Prolog systems
 - 8) Practical work: solving simple problems using Micro-Prolog

DURATION: 3 Days (9.00 am — 5.00 pm)

DATES:
11 APRIL 1988
12 APRIL 1988
13 APRIL 1988

COST: \$300/ =

PREREQUISITES: No special entry requirement is needed. However, a good mathematical foundation and some experience in computer programming will be helpful.

**NEC-JSIST COMPUTER LABORATORY
JOINT PROJECT PROPOSAL FORM**

REF. NO. _____

SECTION ONE

COMPANY'S INFORMATION

NAME: _____

ADDRESS: _____

TEL. NO.: _____

NATURE OF BUSINESS: _____

HARDWARE INSTALLATION(S): _____

(PLEASE STATE MODEL AND DATE INSTALLED) _____

PROJECT INFORMATION

TITLE: _____

DESCRIPTION: _____

REQUIREMENTS: _____

HARDWARE EQUIPMENT TO BE USED: _____

SOFTWARE TO BE USED: _____

DURATION: FROM _____ TO _____

8. DEVELOPING JOINT PROJECTS WITH COMPANIES

Companies which intend to develop software projects but lack the resources (such as manpower, hardware, software or the expertise) can approach us to develop joint projects. In such joint projects, the proposing company will need to assign a Project Leader to liaise with our staff. The Project Leader will then have to convey all the requirements to a NICOL member who will organise the software project. As we have many well-trained students, we believe that they will be able to develop quality software for the proposing company. Our fees for such consultation and development are minimal and they are meant more to cover the incremental costs incurred rather than treated as profits. If your company is interested in developing joint projects with us, you need to submit the project proposal to us in the Project Proposal Form. Additional Proposal Forms can be requested from NICOL. We are always ready to assist your organization in developing software projects.

Our address is:

NEC-JSIST COMPUTER LABORATORY
c/o Japan-Singapore Institute of Software Technology
1 Maritime Square #12-11
World Trade Centre
Singapore 0409
Tel. No.: 2730777
Fax. No.: 2731183

NEC-JSIST COMPUTER LABORATORY
COURSE ENROLMENT FORM

PROJECT LEADER

NAME: _____

DESIGNATION: _____

SIGNATURE: _____

SECTION TWO

(To be completed by JSIST staff)

NAME OF STUDENT(S): _____

NAME OF LECTURER(S): _____

GENERAL REMARKS: _____

SECTION THREE

PROJECT COMPLETED AND HANDED OVER ON: _____

BILL SENT ON: _____ BILL NO: _____

PAYMENT RECEIVED (AMOUNT): _____

RECEIPT SENT TO: _____

PROJECT CATALOGUE NO: _____

COURSE NAME: _____

COURSE DATE(S): _____

APPLICANT'S NAME: _____

APPLICANT'S ADDRESS: _____

APPLICANT'S TEL NO: _____

COMPANY'S NAME: _____

COMPANY'S ADDRESS: _____

COMPANY'S TEL NO: _____

(PLEASE NOTE THAT THE CLOSING DATE IS 4 DAYS BEFORE THE COMMENCEMENT OF
ANY PARTICULAR COURSE.)

CHEQUE FOR _____ IS ENCLOSED. PLEASE MAKE YOUR CROSSED

CHEQUE PAYABLE TO:

JAPAN-SINGAPORE INSTITUTE OF SOFTWARE TECHNOLOGY
1 MARITIME SQUARE #12-11
WORLD TRADE CENTRE
SINGAPORE 0409

REMARKS (to be filled in by NEC-JSIST COMPUTER LABORATORY staff)

7-6 トップマネジメントセミナーパンフレット
(58, 59, 60年度)



JSIST

SEMINAR

ON

FUTURE INFORMATION TECHNOLOGY IN JAPAN

10-11 NOVEMBER 1989

MANDARIN HOTEL

MANDARIN PALACE

SINGAPORE

Organised by
JAPAN-SINGAPORE INSTITUTE OF SOFTWARE TECHNOLOGY
(A training unit of the Singapore Economic
Development Board)

As computerisation advances, information technology with computers as its core will play a major role in the socio-economic front in the years ahead, and become an indispensable tool in modern society. To achieve this, more advanced and higher-level functions and performance will be required of information technology. This includes easy-to-use intelligent computers, higher software productivity and application of information technology to these areas in which existing information technology has not been applied, such as for telecommunication purposes within Information Network Systems. In Japan, work has already been going on in these directions and much publicity has been given to their fifth generation computer system project.

The Seminar on "Future Information Technology in Japan" brings together, for the first time, three prominent experts to address the professionals in the information technology industry in Singapore on the areas of the fifth generation computer project, information network systems and software productivity.

Papers and Speakers

Overview and Introduction to the Fifth Generation
Professor Tatsuo Moto-Oka
University of Tokyo

Future Prospects for On-Line Systems
Mr Tohru Uehara
Deputy Director General
Data Communication Bureau
Nippon Telegraph and Telephone Public Corporation

Improving Software Productivity & Quality Through Software Management
Dr Yukio Mizuno
Vice-President and Director, NEC Corporation

EXTRACTS

OVERVIEW AND INTRODUCTION TO THE FIFTH GENERATION

Computers are not only used for business computations and process control in factories, they have penetrated our daily lives and are becoming the central nervous system of our society. The 21st Century looms closely in front of us and one of the key factors of this century will be computer technology. Also during this time the social environments surrounding computers will undergo major changes. In other words, we are at the dawning of an era in which the first major changes in social structure since the industrial revolution will take place. Typical of these changes are non-standardisation and decentralisation, exemplified by the diversification of production, of energy sources, of axiological philosophy, and of information media.

Computers are expected to play a very significant role in making such gradually developing, and we anticipate that the commencement of this project will stimulate rapid progress toward computer systems suited to the new era.

The Fifth Generation computers are defined as the computers which will be used predominantly in the 1990s. Supercomputers will be used in scientific and engineering calculations and simulations. Database machines and present mainframe computers will be networked in order to organise worldwide information systems. Many microcomputers will be used as system elements in various social systems. However, many computer industries are already earnestly developing these computers for future use.

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FOR WHOM

Data processing managers, senior computer professionals and senior management associated with the computer industry.

FEE

S\$150 per participant
(Inclusive of seminar materials, refreshment and lunch)

REGISTRATION

Fill in the application form and send it with a crossed cheque payable in Singapore dollars to the "Japan-Singapore Institute of Software Technology", by the 4 November 1983.

ENQUIRY

JAPAN-SINGAPORE INSTITUTE OF SOFTWARE
TECHNOLOGY
1 MARITIME SQUARE #12-11
WORLD TRADE CENTRE
SINGAPORE 0409
TEL: 2730777

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Non-numeric data processing, including symbol processing and applied artificial intelligence, will play more important roles than at present in the future information processing field. Non-numeric data such as sentences, speeches, graphs, and images will be used in tremendous volume compared to numerical data. Computers are expected to deal with non-numeric data mainly in future applications. However, present computers have much less capability in non-numeric data processing than in numeric data processing.

The objective of this project is to realise new computer systems to meet the anticipated requirements of the 1990s. Roles that FCCSs* are expected to play include the following:

1. To enhance productivity in low-productivity areas among non-standardised operations in the tertiary industries.
2. To overcome constraints on resources and energy conversion efficiencies.
3. To realise medical, educational, and other support systems for solving ever more complex, multifaceted, social problems including, but not limited to, transition to an elderly society.
4. To contribute to international society and to help internationalisation of Japanese society through international cooperation, machine translation, and in other ways.

* Fifth Generation Computer System

FCCSs will have to overcome, the technical restrictions imposed on conventional computers, and knowledge information processing systems (KIPs) will be investigated in the Japanese national project. They will be based on innovative theories and technologies, and hence be capable of accommodating such functions, as intelligent conversation functions and inference functions employing knowledge bases that will be required in the 1990s. Henceforth FCCSs are defined in a narrow sense as the systems which are investigated in the Japanese national project.

The functions of FCCSs may be roughly classified as follows:

1. Problem-solving and inference
2. Knowledge-base management
3. Intelligent interface

There is no precedent for this innovative and large-scale research and development anywhere in the world. We will therefore be obliged to move toward the target systems through a lengthy process of trial and error, producing many original ideas along the way.

The Japanese national project of FCCS started in April 1982 and is expected to run for 10 years. The first step is the preliminary three-year stage in which the project is dealt with by the Institute of New Generation Computer Technology (ICOT).

FUTURE PROSPECTS FOR ON-LINE SYSTEM

1. History of Data Communication
A high quality and economical digital network has come to be indispensable for the further development of data communication services. Accordingly, the existing telephone network has recently been digitized, and data transmission speed for leased circuits have been made faster.
2. Future Prospects Regarding the Communication Network
The ISDN (Integrated Serviced, Digital Network) has been started as a new national infrastructure project. The INS will make it possible to establish a new rate structure in which charges are based only on the amount of information transmitted. Distance will no longer be a factor in charging. A highly advanced information society will be realized wherein users will create various new ways of using their computers and various types of terminals for telecommunication purposes within the INS network.
3. Future Prospects Regarding the Data Communication
Construction of a VAN (value added network) is necessary for full utilization of highly sophisticated and diversified data communication facilities. A nationwide integrated on-line network based on VANs must be developed to supplement the integrated information systems to be established within each enterprise.

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IMPROVING SOFTWARE PRODUCTIVITY & QUALITY THROUGH SOFTWARE MANAGEMENT

1. Introduction
We are entering into the third software generation which is said to be the days of software products. For software products that are developed for marketing purposes, it is important to find the most cost-effective development of high-quality softwares while fulfilling the users' needs at the same time.
2. Concept of Software Management Engineering
Software Management Engineering is a science used to achieve the low-cost development of high-quality softwares by a target date. It is also used to carry out the best possible maintenance through the planning, managing and maintaining of a development organization. For this purpose, we are required to gather and analyze various data as well as develop the methodology and tools in the hope of transforming the conventional management (based on the human experience and perception) into a management that is based on accurate data and scientific theories.

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3. Software Development Environments and Software Works
Software development is a labour-intensive production activity mostly dependent on intellectual works. However, there is a problem of software management. How can we improve the working environment in which we can bring the quality and efficiency of such intellectual works to the best? How can we improve the facility environment in which we can transform the present labour-intensive production activity into a facility-intensive one?

To answer such questions, we need to change our concept of traditional software work — that is, designing and programming with pencil and paper at the office desk plus testing and debugging at the machine in the noisy machine room. As in any modern production industries, the modern software production has to be performed in the composite software plant where it is specially designed and furnished.

4. Cost Model & Digitization

Good management depends on good planning whilst good planning depends on precise estimations. The latter cannot be achieved without correct data and models. The cost model is a technique by which we can estimate the software development cost from the accumulated data of previous developments. This can be done by using various factors such as "scale of software", its required manhours and so forth.

5. Standardization of Software System

The history of engineering development reflects more on the history of engineering standardizations. Although there are many results achieved in software engineering, what must be done (to make effective use of such results) is to standardize them and to allow users to adopt them. Software Productivity can be most effectively improved by the standardization of programs. In addition we need to standardize the design methodology and documentations at the same time. We may call this the systematic standardization.

6. Proposal for Software Quality Management

It is not only the job of personnels in charge of software quality control who have to cope with the improvement of software quality, all the staff engaged with the requirement analysis, design, manufacture and testing at each stage of the life cycle are involved as well. Each one is requested to make his best effort to remove and prevent and quality defects. Thus we set up quality control (QC) groups in all our production lines. At the QC group meeting, participants will exchange views on the defects, pursue the real causes and take remedial actions to correct the defects. These quality control activities are carried on in our organization under the name of software quality control, SWQC.

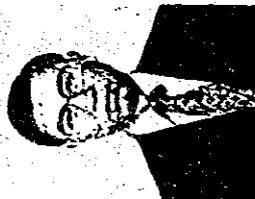
SPEAKERS



Professor Tatsuo Moto-Oka

He received a B Eng in 1952 and Doctorate of Engineering in 1958, both in Electrical Engineering from the University of Tokyo. Since joining the Faculty of Engineering at Tokyo University in 1957, he has conducted varied research into

digital computers: logic circuits, logic design automation and memory systems. He was Visiting Research Assistant Professor at the University of Illinois and Visiting Professor at Washington University in St. Louis. He is currently a Professor in the Electrical Engineering Department at the University of Tokyo and leader of both the Fifth Generation Computer Project and the National Project of Scientific Supercomputers. He is also Chairman of the Japanese National Committee of TC 97/SC16 (OSI).



Mr Tohru Uehara

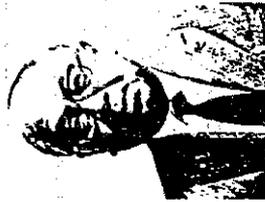
After graduating from the University of Electro-Communications, Faculty of Wireless Communications in 1955, he joined the Nippon Telegraph and Telephone Public Corporation (NTT). Initially he was engaged in research and development on exchange systems in the Chief

Engineer's office. Later, as Chief of Switching Service Systems, Application Division, Musashino Electric Communication Laboratory, he was responsible for research and development of electric switching systems. He was also engaged in technical cooperation work with overseas centres.

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As Director, NTT New York office, from 1976 to 1980, he was responsible for the study and cooperation of telecommunication activities with the North American centres. He returned to Japan in 1981 and until 1983, as Director, Fourth Data Communication Department, Data Communication Bureau, was responsible for software development of NTT Data Communications Systems. In July 1983 he was promoted to Deputy Director General of the Data Communication Bureau. Mr Uehara is a member of the Institute of Electronics and Communication of Japan and Information Processing Society of Japan.

Dr Yukio Mizuno



He graduated from the Tokyo Institute of Technology, Faculty of Engineering in 1953 and has ever since been with the NEC. In 1962 he received his doctorate degree in Engineering from Tokyo Institute of Technology. In 1975 he was made General Manager of the Basic Software Development Division and

Assistant General Manager of EDP Market Planning and Products Planning Division. In 1976 he was promoted to Vice-President of the corporation. In 1978 he was also made Senior Vice-President and Director of NEC Toshiba Information System Company. For his contribution to development of basic software and software production technology, Dr Mizuno was given a Science Technology Agency Award in 1982. In mid 1983 he was promoted to Senior Vice-President and Director of NEC Corporation.

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SEMINAR PROGRAMME

1983 Nov 10
THURSDAY

- 8.30 * Registration/
- 9.30 * Opening Address by His Excellency Mr Hiromu Fukuda, Ambassador of Japan
- * Address by Mr Hiwang Peng Yuan, Chairman, Singapore Economic Development Board
- * Reception
- * Future Prospects for On-line Systems
Mr Tohru Uehara
Nippon Telegraph and Telephone Public Corporation
- * Panel Discussion
- * Lunch
- * Improving Software Productivity & Quality through Software Management
Dr Yukio Mizuno, NEC Corporation
- * Panel Discussion
- * Tea/Coffee

1983 Nov 11
FRIDAY

- 10.30 * Overview and Introduction to the Fifth Generation
Professor Tatsuo Moto-Oka, University of Tokyo
- * Panel Discussion
- * Lunch

All guests and participants to be seated by 9.15 am.

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SEMINAR
ON

FUTURE INFORMATION TECHNOLOGY IN JAPAN

Registration Form

Name: (Prof/Dr/Mr/Mrs/Miss) _____

Company/Organization: _____

Designation: _____

Mailing Address: _____

Telephone: _____ Telex: _____

_____ Date _____ Signature _____