INTRODUCTION

In less than two years, the number of training courses offered by SAS Institute has tripled. SAS® software and SYSTEM 2000® Data Management Software users can now select from more than forty-five courses delivered as computer-based, video-based, or instructor-based training. The Institute's Education Division is also offering new training options and new training locations.

- In addition to existing Institute training centers in Cary, North Carolina, Austin, Texas, and Rockville, Maryland, public instructor-based courses with hands-on computer workshops are offered in two new geographic areas. SAS Institute, in conjunction with Ryerson Polytechnical Institute, is offering institute training courses in Ryerson's Centre for Advanced Technology Education (CATE) in Toronto. A new Institute Training Center also opens in the Chicago area in July 1987.
- The Education Division has had many requests to conduct courses for specific groups of clients. These requests are now being met through a program we call "Consultation Training." SAS users active in a DP trainer's organization or a local SUGI group can join together and hold a SAS course. One company serves as host for the class. The Institute provides the instructor and the course materials and bills each participating company.
- The newest training media from the Institute is the SAS® Trainers Kit: Teaching New Users. The trainer's kit is a package that allows sites to teach beginning students using the instructional materials developed by the Education Division for the SAS® Programming for New Computer Users course.
- The Education Division continues to expand the curriculum in all media. Course developers have completed or are nearing completion of six instructor-based seminars/course modules, four instructor-based courses, three video-based training courses, one video-based tutorial, and five computer-based training courses.

INSTRUCTOR-BASED TRAINING

This is the fourth year the Institute has offered courses before the SUGI conference. This year many of the courses included computer workshops, and in addition to the courses we regularly offer, five seminars were offered for the first time. All of these seminars are short, specific, and task-oriented. The topics presented in the seminars may be available as add-on modules with on-site education and may be scheduled as public courses in the future. The Institute is also offering three new modules that deal exclusively with Version 5 enhancements. Also, four new instructor-based courses have been developed along with revisions and updates to courses in the existing curriculum.

New SUGI Seminars/Course Modules

Processing VSAM Files with SAS® Software is a half-day seminar on VSAM interfaces. It covers how to use SAS software to read and update VSAM files with both sequential and direct access. Reading VSAM files with skip-sequential access is also covered. Examples presented in the seminar concentrate on the use of VSAM key-sequenced data sets. The material assumes that seminar participants will work with existing VSAM data sets.

Advanced Annotate Applications is a half-day seminar that discusses using the SAS/GRAPH® annotate facility to label charts and plots and to generate customized pie charts. Course topics cover advanced features of the facility such as relative frames of reference, GROUP and SUBGRP variables, the stack mechanism (PUSH and POP functions), and the TXT2CNTL and CNTL2TXT functions that update values that monitor cursor positions.

Programming with SAS/IML™ Software is a one-day seminar describing the use of SAS/IML software on the personal computer for processing data, accessing external files, building tables and lists, developing user-friendly full-screen systems, and performing useful mathematical and statistical operations. The conversion of PROC MATRIX code to PROC IML is discussed. This seminar is designed for those who have completed an advanced course in statistics and have a working knowledge of matrix algebra. Although the course is designed for SAS/IML software on the personal computer, differences between this and mainframe SAS/IML software are discussed. Hands-on PC workshops are included.

Using DISPLAY and WINDOW Statements in the SAS® System for Personal Computers is a half-day seminar that expands on material taught in the Applying Your SAS® Software Skills on Personal Computers course. This seminar introduces the WINDOW and DISPLAY statements of the SAS System under PC DOS. Advanced applications including field validation, data selection, displaying multiple variables, direct access browsing, and cross field calculation are presented. A hands-on workshop is included, so students can practice new techniques.

Econometric Modeling and Simulation is a one-day seminar about the use of SAS/ETS® software for analyzing systems of simultaneous equations. This seminar includes discussions of four procedures: SIMLIN, SYSLIN, SYSLIN, and SIMNLIN. These procedures are used to estimate parameters in simultaneous systems and solve these systems for the purpose of simulation. Students attending this seminar should be familiar with regression methods applicable to econometric modeling.

These seminars were created in response to user requests from last year's SUGI conference and requests received at the Institute throughout the year. Please contact the Education Division if you have ideas about additional seminars.

VERSION 5 ENHANCEMENT SEMINARS/COURSE MODULES

Three modules are available as update courses for experienced users. These modules can be added to on-site courses offered by the Institute.

SAS® Color Graphics Version 5 Enhancements is a one-day course for experienced SAS/GRAPH users and covers changes and new features that have been added to SAS/GRAPH software.

Version 5 Enhancements to Base SAS® Software is a half-day course for experienced SAS users who want a presentation of the differences between Version 5 and previous releases of base SAS software.
SAS® Display Manager System is a one- to three-hour course segment that can be added to any on-site course. It explains how to use the SAS Display Manager System, the full-screen facility that allows the user to interact with all parts of a SAS job. This course can benefit users at all levels.

New Courses

A new three-day statistics course will be available in the third quarter of this year. Advanced Forecasting Techniques is based on the textbook, SAS® System for Forecasting Time Series, 1986 Edition, by Dr. John Brocklebank and Dr. Dave Dickey, published by SAS Institute.

During October, five days of advanced statistical training will be offered at the Institute Training Center in Cary. The three-day Advanced Forecasting Techniques course will be offered followed by a two-day Econometric Modeling and Simulation course.

In August, the Education Division will begin offering a new course on the use of SAS/FSP® software. Designing SAS/FSP® Software Applications is a two-day course presented in two modules. The first module is designed to teach users how to browse and edit SAS data sets and use the FSLETTER procedure. The second module is designed to teach SAS applications developers how to use the FSBROWSE, FSEDIT, FSLETTER, FSPRINT, and FSLIST procedures to build full-screen applications. SAS data set maintenance, profile libraries, concurrent access of data, SAS/FSP applications and methods of invoking SAS/FSP applications are also discussed.

A new 2-day course, SAS® Color Graphics II will also begin in July. The course will cover material in the Advanced Annotate Applications seminar as well as other material not related to the annotate facility. Use of the GREPLAY procedure in batch and presentation mode will be presented along with advanced topics for using the G PLOT, GCHART, and GMAP procedures. The course emphasizes computer workshops and is oriented toward advanced applications.

Development is currently under way to add a follow-up course to the SAS® Basics for Personal Computers course. The SAS® Basics II for Personal Computers course is scheduled to begin in August and covers more information on date and time functions, user-defined formats, program efficiency, the micro-to-host link, and methods of running the SAS System for Personal Computers.

Course Revisions

Major revisions are now complete for most instructor-based courses. The revisions update the courses to include Version 5 enhancements. Much of the course material is now written to apply to all operating systems for which the course content is applicable.

Instructional Revisions

The SAS® Processing course has been rewritten to involve additional work in applications areas. The new course places more emphasis on the use of the SAS System as a programming language.

The SAS® Color Graphics course is significantly changed to cover enhancements available in Version 5. New topics include a discussion of the annotate facility as well as PROC GREPLAY. There is information throughout the course about the many new features of SAS/GRAPH procedures.

SAS® Report Writing has been rewritten to include more advanced topics of customized SAS report writing techniques. The course presents more advanced examples of PROC TABULATE and places more emphasis on DATA step considerations when designing reports.

Spreadsheet Analysis with the FSCALC Procedure is now more end-user oriented. The course has been redesigned to be more task-oriented, practical, and systematic in approaching PROC FSCALC. The new course emphasizes the practical applications of the FSCALC procedure and presents powerful capabilities available within a SAS spreadsheet.

The Experimental Design and Response Surface Analysis course has been rewritten to include a variety of new topics such as using the DATA step to compute cells for fractional factorial design, using the estimable functions in GLM to assess confounding in a given design, testing coefficients for a saturated design, and using normal plots.

Course Views and Course Notes Revisions

In addition, the Institute’s course developers have written new Views or Course Notes for the following courses:

- SAS® Programming for New Computer Users
- SAS® Basics
- SAS® Report Writing
- SAS® Processing
- SAS® Color Graphics
- Spreadsheet Analysis with the FSCALC Procedure
- SAS® Macro Language
- Introduction to Statistics Using the SAS® System
- SAS/AP® Software for Applications Programmers
- Applying Your SAS® Software Skills on Personal Computers

Consortium Training

Many SAS installations are interested in instructor-based training from SAS Institute but there are too few trainees in the company to justify an on-site course. These sites may benefit by working with other companies to form a training consortium. The consortium may be an organized group, such as a local area SUGI, or simply several companies with similar training needs who agree to hold a SAS course at a host company. The Education Division will work with the consortium through a host company to provide SAS training courses for fifteen to forty students per course. The host company receives training for two students at no charge provided the fifteen-student minimum is met.

The courses are conducted similarly to Institute public courses. The Institute provides the instructor and course materials, and the Education Division handles the invoicing for participating companies. The host company provides classroom facilities and, optionally, terminals and computer time for computer workshops.

There are now at least forty DP training consortium groups in the United States. The development of this consortium training option is in response to requests from training groups around the country.

VIDEO-BASED TRAINING

The Education Division at SAS Institute has expanded the SAS video-based training library to include nine video-based training courses and two video-based tutorials. A video training course consists of several topics designed to cover a specific aspect of the SAS System. A full video training course usually includes several instructional hours. The Institute licenses video training
courses to SAS sites. A video tutorial is a short, task-oriented presentation of a single topic within the SAS System. Tutorials contain one hour of instruction. Companies may purchase video tutorials from the Institute.

Three new short courses and one tutorial expand the video library for both end users and programmers. Video courses now encompass topics that range from executing SAS software for the first time through using macro variables and PROC FSCALC.

New Courses and Tutorials

Simple Spreadsheets Using the FSCALC Procedure is a four-module course designed for end users who want to create and analyze custom spreadsheets using the FSCALC procedure. The course begins by defining the spreadsheet concept and discusses where and how to use spreadsheets. Components of the spreadsheet and the concepts of array-style processing are introduced. Students learn to use the FSCALC parameter screen and the spreadsheet definition screen to create and store a simple spreadsheet. The course covers procedure programming statements and shows how to control spreadsheet calculations. The last module covers customizing and printing a spreadsheet using titles, subtitles, formats, and descriptive row and column headings. This course is designed for quick results. After a short period of viewing the video segments and completing the workbook and computer exercises, the student can begin creating spreadsheet applications.

The PC SAS® System for New Users is designed for end users with limited computer experience. It assumes students have no SAS software knowledge and no PC experience other than familiarity with the keyboard. The video modules follow a task-oriented approach to problem solving, showing how the SAS System for personal computers is used to solve common business problems and how students can use these solutions for their own situations. After completing this course, the students should be able to create a personal subdirectory in PC DOS, create and store SAS data sets, build DATA step programming statements, sort and print data by groups including totals when desired, create charts, perform simple statistics, and tailor reports with formatted values, labels, titles, and footnotes. Practice exercises in the workbook reinforce the video instruction. Computer exercises are included as part of the course, and the data sets for the exercises are delivered on a diskette.

Using SAS® Macro Variables is a one-hour tutorial designed for experienced SAS users as an introduction to SAS macro variables. No previous knowledge of the macro language is needed to benefit from this tutorial. However, students should have a basic knowledge of the SAS language. The tutorial introduces the concept of text substitution using macro variables. It shows how the SAS System processes macro variables, how to use both automatic and user-defined macro variables, and how to assign the values of a DATA step variable to a macro variable using the CALL SYMPUT routine. The tutorial is designed to get the user started with simple macro language concepts that can be learned quickly and used immediately to write more efficient and powerful SAS programs.

Producing Effective Graphics with SAS/GRAPH® Software is for end users with minimal SAS software skills. The course explains how to use SAS/GRAPH software to transform data into interesting and effective graphics. A wide range of fundamental SAS/GRAPH capabilities is presented such as creating slides, plots, and charts.

Video-based Training Course Updates and Revisions

Our first video course, SAS® Basics, has undergone a second revision intended to keep the course current with the latest release of the SAS System. A new module describes different methods of running SAS programs and includes a discussion of the SAS Display Manager System. New video enhancements have been used to aid the learning process.

The video course, Introduction to the SAS® System: Your First SAS Job is now available for OS, CMS, and VMS users with data tapes and student workbooks for each operating system.

The SAS® Color Graphics course has a supplemental document and computer tape for VMS and PRIMOS users.

Any updated version of the System 2000® Quest Language course is complete and includes a course coordinator's guide and three-volume student workbook. The course is designed for students with little or no data processing skills and no previous knowledge of data base concepts.

- Module 1, Information Processing with the System 2000 QUEST Language, consists of five learning units that introduce students to basic data processing concepts and to the role of System 2000 Data Management Software in an information-processing environment.
- Module 2, User Types and Quest Language Syntax, consists of six learning units and covers organizing data within a System 2000 data base, retrieving and updating the data, and using strings.
- Module 3, Problem Solving with the System 2000 QUEST Language, consists of five learning units. The module shows how System 2000 software processes data records, how to approach solving your information needs with System 2000 Data Management Software, and how to correct errors.

Please note that some versions of System 2000 Data Management Software refer to the Quest Language as ACCESS. The words QUEST and ACCESS may be used interchangeably.

COMPUTER-BASED TRAINING

The production release of Version 5 SAS/AF® software has made possible the release of mainframe computer-based training (CBT) courses for both the OS and CMS operating systems. The five courses in our current mainframe library offer a range of topics from beginning subjects for new users through specialized SAS applications using SAS/FSP software.

Fundamentals of the SAS® Software System introduces a new user to the SAS System and offers practice writing DATA and PROC steps. In practice sessions, the user learns to execute SAS statements and recognize and correct errors. This CBT course is being made available for the VMS operating system with the 5.16 release of base SAS software.

Expanding Your Base SAS® Software Skill builds on the topics covered in the Fundamentals CBT course. It develops skills for more complex data analysis and explains additional techniques for reading data from external files, computing new data values, and managing SAS data sets.

Report Writing with Base SAS® Software teaches users with minimal SAS software experience how to present data effectively with tables and bar charts. The course explains the components of business reports and teaches how to get data in the desired form for reporting.
Using the SAS® Display Manager System explains how to use the full-screen facility that allows users to interact with all parts of a SAS job. An optional series of lessons presents more advanced display manager commands and features that show how to customize a user profile and how to establish a series of commands that are executed automatically when display manager is invoked.

Data Entry, Retrieval, and Business Writing Using SAS/FSP® Software is designed for both end users and applications developers. End users can choose an instructional path that explains how to enter and edit data from existing formatted SAS/FSP screens. Applications developers follow a path that explains how to create customized full-screen applications. This course covers the FSEDIT, FSBROWSE, and FSLetter procedures.

THE SAS® TRAINER'S KIT

A popular request from SAS users during the last year has involved the need for a SAS trainer's package. As a result of this interest, the Education Division now offers a training option called the SAS® Trainer’s Kit: Teaching New Users.

The new trainer's kit provides all the materials needed to teach the three-day SAS® Programming for New Computer Users course at your site. This course is an integral part of the curriculum offered by the Institute and is designed for users with minimal computer experience. Your instructor begins this course by explaining how data are collected, entered, and stored in a computer. Students learn how to write SAS programs that read column-aligned data, calculate new data values, conditionally select data for subsequent processing, and invoke SAS procedures to analyze their data.

Available for OS and CMS sites, the trainer’s kit is licensed on an annual basis and includes

- a kit containing a set of transparencies of the SAS® Views®: SAS Programming for New Computer Users, pens, pointer, and other training aids
- a trainer’s seminar held at SAS Institute — three days of classroom instruction on how to present the course effectively
- an instructor’s guide that is a complete discussion of each page in the SAS® Views®: SAS Programming for New Computer Users
- 20 copies of SAS® Views®: SAS Programming for New Computer Users and 20 copies of the SAS® Introductory Guide
- a magnetic tape of sample data for hands-on workshops.

The same Institute instructors who developed and teach the SAS® Programming for New Computer Users course conduct the three-day trainer’s seminar. They cover the annotated instructor’s guide in detail, explain what questions to expect from students and how to best answer them, and talk about how to customize the course for your site.

CONCLUSION

The Education Division is aware of the difference in training needs among users with varying applications and experience levels. We are continuing to develop courses to meet the needs of the growing number of end users while maintaining a complete curriculum for the experienced SAS programmer.

The end user’s approach to the computer is usually task-oriented. They want training that is very specific to their applications. The new instructional material under development is designed to be practical and allow easy location of individual topics. The Education Division will continue development of wide-ranging SAS training materials in different media, so each SAS user and training coordinator can formulate the most flexible and economical training programs.

It is the objective of the Education Division at SAS Institute to maximize user productivity at all SAS sites through programs of high-quality, efficient, and economical SAS training. This year’s new instructional offerings are part of the continuing effort to support this goal.