

Efficient Way to Learn SAS® with Virtually No Cost

Mirjana Stojanovic, Chapel Hill, NC

ABSTRACT

Often people ask how, "How can I learn SAS?" This paper is intended to help answer this question by providing an extensive list of web resources that I accumulated while I was unemployed and pursuing additional SAS training. I realize that it is not enough to just read about SAS programming. Experience with SAS software is necessary for a clear understanding of the material presented, especially the intermediate and advanced material. It is essential to have access to SAS software for practice and practical experience. The SAS Learning Edition is a great resource for this purpose and it is affordable. Information on the SAS Learning Edition can be found at <http://support.sas.com/rnd/le/index.html>. I hope that this list will be useful to all SAS users, both new users and those who are continuing their education.

INTRODUCTION

SAS training can be accomplished in many ways. Taking courses at SAS Institute or other reputable institutions is effective, but costly. Some of us cannot afford this type of training and are not affiliated with companies willing to cover the costs. In this presentation I will focus on how to learn SAS Software cheaply or for free by visiting numerous Web sites and choosing the sites best suited to your needs.

Some Internet sites are designed for self training and they charge a small fee. Other sites provide content that is free. Using SAS or the SAS Learning Edition is the best strategy for really learning and getting some practical experience. It is easy to copy code from these web sites and run it in SAS so that you gain a better understanding.

The web sites below are divided into several sections, but they concentrate on learning SAS Base Software. I hope you will find this list of sites useful, and that it will save you some time. This paper is available at <http://rtpnet.org/~rtsug/articles.html>. The easiest way to access these sites would be to download the paper so you do not have to type the addresses.

SITES FOR LEARNING SAS SOFTWARE

Tutorial for SAS 8.2, the University of Reading.	http://www.personal.rdg.ac.uk/~snqcolin/SAS82tutorial.pdf
Examples from SAS Programming by Example By Cody and Pass	http://www.geocities.com/statbookstore/sas/sasex/sasex.html
Efficient way to learn basics of SAS Base. Penn State University	http://www.stat.psu.edu/%7Ejianchu/STAT480.htm#Lecture%20Notes http://www.stat.psu.edu/%7Ejianchu/STAT480.htm#Lecture%20Notes
Data Management. West Virginia University	http://www.wvu.edu/~support/training/classmat/sas/datamgt.pdf
SAS Intermediate course. West Virginia University	http://www.wvu.edu/~support/training/classmat/sas/sas2.pdf
SAS in Research Data Management	http://www.rhoworld.com/index_services_biostats.htm
Intro to SAS Data Step. Inst. for Clinical and Epidemiologic Research	http://hsrd.durham.med.va.gov/Biostat/training/SAS%20presentation%20v10.pdf
Intro to SAS Procedures	http://hsrd.durham.med.va.gov/Biostat/training/presentation%20II%20v10.pdf
Several SAS courses in PDF format NIH, Maryland	http://support.cit.nih.gov/statsoft/training/classrm/courstmp.htm
Advanced SAS Courses and Tips	http://ifasstat.ufl.edu/sta4702/pdf/SASIntro.pdf
Department of Medical Epidemiology and Biostatistics Karolinska Institute	http://www.pauldickman.com/teaching/sas/index.html http://www.pauldickman.com/teaching/sas/sas_tips_cleaning8.pdf
Comprehensive SAS Sites Including Tutorial	http://www.firstobs.com

Getting Familiar with SAS Data Sets. by Mike Hardin Univ. of Alabama	http://www.cba.ua.edu/~mhardin/Lecture_3_and_6_6per_page.pdf
Fundamentals of SAS and Data Management. Univ. of California, Academic Tech. Services	http://www.ats.ucla.edu/stat/sas/modules/default.htm
SAS Data Preparation: SAS PC Tutorial. University of Manitoba	http://www.umanitoba.ca/centres/mchp/teaching/sasmanual/data_types.html
Biostatistical Computing using SAS. VA Commonwealth Univ.	http://www.people.vcu.edu/~rjohnson/bios524/Cody%20Notes/index.html
Practical Data Management and Statistical Computing using SAS.	http://www-unix.oit.umass.edu/~bepi691f/outline.html
Computing with SAS Software. DePaul CTI	http://facweb.cs.depaul.edu/rsettimi/328/Week1/SASlecture1.ppt
Intermediate SAS Course.	http://www.itc.virginia.edu/research/sas/training/v8/
SAS Help Virginia Tech	http://filebox.vt.edu/users/awaymack/marini/
PROC TABULATE and much more. by Lauren Haworth	http://www.laurenhaworth.com/pubs_current.htm#ODStheBasics
SAS in 60 minutes. East Carolina University , Greenville, NC	http://core.ecu.edu/econ/holmesg/econ6302/sasin60.pdf
Tutorial on Base SAS. Texas Medical Center, Houston, Texas	http://condor.bcm.tmc.edu/Statistics/SAS_Guidelines.html#top
SAS Online Tutorials- Beg. SAS Programming. University of California - Santa Cruz	http://www.datainflowworks.com/beginsas/beginsas.html
Additional SAS Topics. University of Louisiana	http://helpdesk.louisiana.edu/Guides/Statistics/add_sas_topics.html
Links to SAS Resources. Cornell University	http://www.ciser.cornell.edu/computing/
SAS Sample Programs. VA Commonwealth Univ.	http://www.people.vcu.edu/~rjohnson/bios524/sample_programs.htm
Adv. Data Manipulation by Greg Jenkins	http://oregonstate.edu/dept/statistics/software/sas/2002seminar/advanced_data_manipulation.pdf
Introduction to the SAS System. Phil Spector Univ. of Texas at Arlington	http://www.uta.edu/depken/grad/5336/general/sas.pdf
SAS Programming Workshop. By Doug Hemken	http://www.dacc.wisc.edu/seminars/SAS%20programming%20Outline.htm#S1
Proc MEANS, SUMMAR.Y by Andrew Karp	http://www.hasug.org/HASUG%20PROC_MEANS_Enhancements.pdf http://www2.sas.com/proceedings/sugi27/p018-27.pdf http://www.dasconsultants.com/papers/CarpMcQProcMeans.pdf
SAS for Windows - The Data Step.	http://www.utexas.edu/cc/stat/tutorials/sasWds/
Basic SAS Dataset Management by R. Yaffe	http://www.nyu.edu/its/socsci/Docs/sasintro.htm
SAS Basics. Yale University	http://statlab.stat.yale.edu/help/doco/sas_intro.jsp#P6

Base SAS. Penn State, Population Research Institute	http://www.pop.psu.edu/help/cacpri/base/index.htm
SAS Talk - By Ian Whitlock INTERNET and Web Resources	http://www.prochelp.com/
TS 486 – Quick Reference – Functions, Formats and Informats	http://www.albany.edu/~msz03/epi514/papers/ts486.pdf
An Introduction to the SAS System for MAC. Trinity College	http://www.trincoll.edu/depts/cc/acad/documents/stats/SASdoc.html
SAS Examples: programs, files and results. Univ. of Western Ontario, Ontario Canada	http://www.ssc.uwo.ca/ssci/statsexamples/sas/datafiles.html
Using SAS to analyze statistical data. Univ. of Waterloo, Canada	http://ist.uwaterloo.ca/ec/courses/sasunix/uwsas.htm
SAS Programming. Carolina Population Ctr. UNC at Chapel Hill	http://www.cpc.unc.edu/services/computer/presentations/sasclass99/
SAS Information Guides. Loyola University Chicago	http://www.luc.edu/infotech/research/saswin/
Sample SAS programs, Step by Step. Univ. of Washington	http://depts.washington.edu/sasclass/index.html
Error Diagnostics. Virginia Tech	http://filebox.vt.edu/cc/sas/errormsg.html
SAS Code examples, Tutorials, SAS topics. University of Michigan	http://www.umich.edu/~cscar/software/sas.html
Gentle Intro. to SAS by Frank Dilorio	http://homepages.nyu.edu/~taf2/diiorio.htm
SAS Workshops, Common Errors. College of Agriculture, University of Idaho	http://www.uidaho.edu/ag/statprog/sas/sas.htm
SAS Training: Seminar Handouts and Info. Univ. of Illinois at Chicago	http://www.uic.edu/depts/accc/stats/seminars.html#3
SAS Statistical Links. Dr. Wuensch's East Carolina University.	http://core.ecu.edu/psyc/wuenschk/sas.htm
Introduction to SAS. University of North Texas	http://www.unt.edu/rss/class/sas1/
Take a look at 'downloads'	http://www.spikeware.com/
SAS Companion for the Microsoft Windows Environment.	http://jeff-lab.queensu.ca/stat/sas/sasman/sashtml/win/index.htm
SAS language and Procedure. Queens University, CA	http://jeff-lab.queensu.ca/stat/sas/
DATA Step Functions	http://www.geocities.com/statbookstore/sas/saslang/function.html
Applied Statistics with SAS lectures. Stanford University	http://www.stanford.edu/class/stats212/lectures/

An Intro. to Exporting SAS/Graph Output to Microsoft Office	http://ftp.sas.com/techsup/download/technote/ts674/ts674.html
Quick description of SAS Graphing Technique.	http://www.unc.edu/atn/statistical/classes/handouts/sas_graphing.pdf
Getting started with SAS for Windows. University of Arkansas	http://www.uark.edu/compserv/training/shortcrs/handouts/sas_handout.ppt
Windows SAS Tutorial Univ. Texas, Austin	http://www.utexas.edu/cc/stat/tutorials/sas8/sas8.html
Technical support resources	http://support.sas.com/techsup/intro.html
SAS-L Archives University of Georgia	http://www.listserv.uga.edu/archives/sas-l.html
SAS Customer Support	http://support.sas.com/
SAS Online Samples	http://support.sas.com/documentation/onlinedoc/code.samples.html
SAS Online Resources	http://www.sas.com/misc/tutor/resources.html
Shaping Your Data in SAS. Univ. of Pennsylvania	http://www.pop.upenn.edu/cores/computing/help/faqs/sas/lecture.html
SAS® Online Programming Guide University of Houston	http://nas.cl.uh.edu/spears/sas/guide/guide.html

SAS TRAINING ON THE WEB

Self-Paced e-Learning from SAS Institute	http://support.sas.com/training/elearn/selfpaced.html
Self-Paced Computer Training for SAS	http://www.staffkit.com/training/index.htm
SAS Online Training Courses	http://www.e-learningcenter.com/sas.htm
Web based SAS training	http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&cat2=26
SAS Tutorial Online	http://computer-training.8m.com/sas.html
Set of 9 SAS courses	http://www.mindleaders.com/products/tgen.html
SAS online courses	http://www.trainingcenter.com/
SAS online training	http://www.tutorgig.com/showurls.jsp?group=4189&index=0
SAS online training	http://www.tutorialusa.com/sas.html
SAS online training	http://www.online-course.net/
SAS online training (7 courses)	http://www.inforingpress.com/recommendations/computertraining.htm
Audio-visual SAS online training	http://distancelearning.ksi.edu/demo/ma377/lecture.htm
Certifications from SAS Institute Inc.	http://gocertify.com/vendors/SASInstituteInc.shtml

SAS FAQs

SAS	http://support.sas.com/techsup/faq/products.html
SAS	http://support.sas.com/techsup/faq/gen_sas.html
Univ. of Southern CA	http://www.usc.edu/isd/doc/statistics/sas/faq/
Cornell	http://www.ciser.cornell.edu/FAQ/SAS/ http://www.ciser.cornell.edu/computing/online.shtml#sas http://www.ciser.cornell.edu/computing/_derived/SASQA.html_sourcecontrol http://www.ciser.cornell.edu/computing/SASQA.shtml
Univ. of Texas	http://www.utexas.edu/cc/faqs/stat/
Univ. of Kentucky	http://www.uky.edu/ArtsSciences/PoliSci/tutorials/sas_faq.html
Holland Numerics	http://www.hollandnumerics.co.uk/sasfaq/SASFAQ.HTM
Univ. of Pennsylvania	http://www.pop.upenn.edu/cores/computing/help/faqs/sasfaq.html
UCLA	http://www.ats.ucla.edu/stat/sas/faq/
NC State University	http://www.stat.ncsu.edu/sas/faq/

CODING TIPS AND TRICKS

Code Samples and Technical Tips	http://support.sas.com/sassamples/index.html http://support.sas.com/sassamples/quicktips/index.html
How to Write Efficient Programs By Frank Dilorio	http://www.aimsco.com/pdf/efficiency.ppt
Counting the number of missing values of a variable.	http://homepages.nyu.edu/~taf2/missfmt.txt
News, hints, and tips	http://www.views-uk.demon.co.uk/index.htm
Phil Mason's Site	http://homepage.ntlworld.com/philipmason/
TIPS from various sources	http://members.tripod.com/~schick/sas_tips.html
Dating tips from SAS by David Hopkins	http://www.dc-sug.org/dcmr97.pdf
SAS Tips	http://www.depts.washington.edu/sasclass/index.html
SAS bits and bytes	http://support.sas.com/sassamples/bitsandbytes/index.html
TIPS	http://support.sas.com/sassamples/quicktips/index.html
Various tips	http://www.sys-seminar.com/SASNewsletter.htm
SAS code, tips, jobs and much more	http://www.sconsig.com
Tips, tricks and more from PW Consulting	http://tips.pwcons.com/
Tips and more from CompuCraft	http://homepage.mac.com/magdelina/.Public/utl.html
The best samples from various SAS BBUs	http://support.sas.com/publishing/pdf/
Various topics from York University, ON, Canada	http://www.psych.yorku.ca/lab/psy3030/programs.htm
Tips & Techniques by Phil Mason	http://homepage.ntlworld.com/philipmason/
Hints and Tips in the RTSL e-Newsletter	http://www.ratcliffe.co.uk/note_colon/index.htm
SAS Tips	http://seamonkey.ed.asu.edu/~alex/computer/sas/sas.html
New SAS User Group	http://www.techieindex.com/sas/faq/faq_home.asp?type=GENERAL
Tips from Hardy Consulting Services, Canada	http://www.schardy.qc.ca/en/trucs.html

WHERE TO LOOK FOR JOBS

	http://www.jobvertise.com/
	http://www.centerwatch.com/careers/jwads.html
	http://www.philasug.org/
	http://www.dice.com
	http://www.medzilla.com
	http://www.hirehealth.com/
	http://www.monster.com
	http://chronicle.com/jobs/
	http://airweb.org/jobs.html
	http://www.statisticsjobs.com/events.htm
	http://www.sas-jobs.com/list.asp

RECOMMENDED BOOKS AND MAGAZINES

Magazines	http://support.sas.com/documentation/periodicals/index.html
Books by users	http://support.sas.com/publishing/bbu/authorline_archive.html
Geometry Online Learning Center	http://www.geometry.net/computer_bk/unix.html
Preparation for the SAS Certification Exams	http://sas.certifiedprogrammer.com/
The SAS Certified Professional Program	http://www.certmag.com/issues/dec00/dept_specialtycert.cfm
Book selections by InterVelopers	http://www.wargaming.net/Programming/75/Statistical_Computing_index.htm
Books on the Web	http://books.ontheweb.com/shop/sas.html
SAS Magazines and Newsletter	http://support.sas.com/documentation/periodicals/
Global Statements by Rick Aster	http://www.globalstatements.com
SAS Users' Bookstore	http://www.sasusers.com/bookstore/default.htm
A! Apress bookstore	http://www.apress.com/book/bookDisplay.html?bID=126
SAS Com Magazine	http://www.sas.com/news/sascom/
SAS Publishing	http://support.sas.com/publishing/index.html

COMPUTER DICTIONARY FOR SAS PROGRAMMERS

Rick Aster	http://www.globalstatements.com/d/index.html
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CONCLUSION

There are many different ways to learn to program with SAS software. What is best for you may depend on your budget, your training needs and the way you prefer to learn. I have chosen to take full advantage of the SAS programming information on the web. Many people have spent a great deal of time creating sites that explain SAS Software and provide coding examples. I am convinced that it is possible to learn the basics about SAS software this way. It is not necessary to spend a lot of money if you are persistent in searching the web and practicing with the SAS software. After almost four years of studying and working with SAS Software, I am able to compare various methods of learning SAS, and I recommend this method, especially for beginners.

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AUTHOR CONTACT INFORMATION

Mirjana Stojanovic
91A Weaver Dairy Road
Chapel Hill, NC 27514
(919) 360-0618 mstojanovic@nc.rr.com

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