SAS Programming *Master Class*
- a focused way of learning SAS Programming

```sas
data work.season;
  set orion.customer_dim;
  length Promo2 $ 6;
  Quarter=qtr(Customer_BirthDate);
  if Quarter=1 then Promo='Winter';
  else if Quarter=2 then Promo='Spring';
  else if Quarter=3 then Promo='Summer';
  else if Quarter=4 then Promo='Fall';
  if Customer_Age>=18 and Customer_Age<=25 then Promo2='YA';
  else if Customer_Age>=65 then Promo2='Senior';
  keep Customer_FirstName Customer_LastName Customer_BirthDate
       Customer_Age Promo Promo2;
run;

proc print data=work.season;
  var Customer_FirstName Customer_LastName Customer_BirthDate Promo
       Customer_Age Promo2;
run;
Proc means data=work.season;
  class Promo;
  var Customer_Age;
run;
```
SAS Programming Master Class
- a focused way of learning SAS Programming

SAS Programming Master Class is a structured way of learning SAS. The program is divided in two parts. Foundation and Advanced.

The perfect starting point for those interested in a career as a SAS® professional

Successful candidates should have experience in programming and data management using SAS®9 and should be able to:
- Import and export raw data files.
- Manipulate and transform data.
- Combine SAS data sets.
- Create basic detail and summary reports using SAS procedures.
- Identify and correct data, syntax and programming logic errors.

SAS® Certified Advanced Programmer for SAS®9
Represents the upper echelon of SAS® programmers who demonstrate a high level of proficiency in SAS® programming expertise

Successful candidates should be skilled in tasks such as:
- Using advanced DATA step programming statements and efficiency techniques to solve complex problems.
- Writing and interpreting SAS SQL code.
- Creating and using the SAS MACRO facility.

Overview

In the program SAS Programming Master Class, you gain the skills that are needed to be a skilled SAS Programmer. Learn about how to write SAS codes, SAS programs, Macro programs and SQL. You will earn knowledge to pass 2 certifications. SAS Base programmer and SAS Advanced programmer certifications.

A learning and networking program over 6 months with focus on everything that is needed for a SAS Programmer in 5 sessions 2 days each. The program combines scheduled, instructor-led classroom courses with small-group discussion, presentations, and hands-on software demonstrations, for a highly engaging learning experience. The program combines Workshops, Online Training, Analytics LAB, Case Studies, Self-studies, Meet the expertise, Classroom sessions and Live-web. By using a combination of case studies and exercises the program anchor the analytics mind-set.

The program is delivered by SAS and our skilled teachers. The participants get the best possible training and have the option to get help from our SAS organization’s specialists on specific topics.

Learn how

- SAS Programmers create programs and work more efficiently with SAS
- Get immediate analytic insights and programming knowledge to support and impact your organization
- Write SAS-code from a beginner’s level to a more advanced level on a regular basis.
- Collect skills to get certified in SAS programming
- Solve your problems with SAS programming
Program Objectives

The program takes you through the fundamental to the advanced concepts of SAS Programming as well as the different components and techniques required to succeed and create real value with analytics. The program includes case studies with a range from a variety of fields. Those case studies bridge the gap between business message to technical code.

Overall objectives:
- Establish the Mindset for Programming using SAS.
- Expect the Real case learning situations, Hands on, Knowledge sharing, Meet the expertise.
- Get your individual critical SAS tool education (optionally).

This program focuses on comprehensive training using software products such as SAS Enterprise Guide, SAS Studio or SAS Foundation to complete class assignments. Prior knowledge of these software products is not required.

Strategic and tactical program outcomes

For the Organization
- Get your workforce into SAS Programming fast
- Organizational SAS Programming focus
- Talent Management for analytical talents
- Modern way of learning (cost efficiency)

For the individual
- Invest in your future
- Strengthens your daily work with SAS
- Get the knowledge of SAS programming fast
- Assure your secondary skills for success
- Network & skills sharing with compers
- Modern way of learning (flexible)

Target groups

The program is intended for people with an interest in Programming skills to work in the intersection between business and IT and has three target groups approaching common ground, all who want to make better use of their data:

Business Analysts / Business Managers
(Data Exploration, Data Visualization, Analytic Analysis, Report Creation, Report Consumer, Domain Expert)
They explore and examine countless rows of data, looking for patterns and insights. Analysts need solutions that help them work fast and see beneath the surface, such as visualization of analytics and statistics.

Data Scientists / Statisticians
(Exploratory Analysis, Descriptive Segmentation, Predictive Modeling)
They question, experiment and test. Data scientists need access to high-quality data so they can be creative and ask the right questions. Their tricks of the trade: data visualization, deep learning and other analytics solutions.

IT professionals
(Administrators, Hadoop/DBA, Security administrators, Enterprise metadata personnel, ETL personnel, Enterprise architects)
Coders. Architects. IT understands every aspect of deployment, from model registration to validation. Analytics enterprise ready technology is built for deployment efficiency.
Framework overview

The framework of SAS Programming Master Class Training is based in the model 60:10:30;

• 60 percent of time spending is based on theory and knowledge acquisition (Classroom, Online Training, Business Concepts).

• 10 percent of time spending of total learning is done through own reflection. Through discussion with other experts, people outside your own organization and colleagues in the corresponding business challenge / situation (Workshops, Group sessions, Analytics Lab).

• 30 percent of learning takes place in the workplace, in own project / business challenge (Use case, Presentations, Analytics Lab).

<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analytics Lab Case 1</th>
<th>Analytics Lab Case 2</th>
<th>Analytics Lab Case 3</th>
<th>Analytics Lab Case 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS Base Certification</td>
<td>SAS Advanced Certification</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Content

• SAS Programming 1
• SAS Programming 2
• SAS Macro programming
• SAS SQL programming
• SAS Advanced Programming
• SAS Certification (Base and Advanced)
• Case Studies
• Analytic Lab
• E-Learning

1. Programming SAS and Analytics, Business Value and Communication session

In 5 sessions 2 days each (10 days), the program fulfills Foundation, Advanced, Deployment and Use Case in the most critical skills set for a SAS Programmer. Those days are program mandatory and interlock the program during the period of 6 month. The program contains two certifications. One after 2 months and one at the end of the program.
2. Additional SAS tool and solution training

In addition to the SAS programming mandatory classes, each participant has an opportunity to go deeper into tool and solution technics. The most common SAS tool and solution courses are scheduled as classroom courses, and some are offered as Live Web or e-Learning courses. Individual course plan with additional +200 Euro/course day for specific tool education (individual 2 up to 10 days).


**For Business Analysts:** SAS Visual Analytics, SAS Enterprise Guide, Machine Learning Hands On, Accessing SAS add in to MS Office, SAS Enterprise Miner

**For IT professionals:** SAS Visual Analytics, SAS Enterprise Guide, Machine Learning Hands On, SAS Data Integration Studio, Programming Base 1, Macro, SQL, SAS to Hadoop, SAS Admin.

**Live web:** Gives you opportunity of SAS training without travel, ask questions and get answers in real-time, virtually in your office, connected classroom: enjoy a live web experience connected to a traditional, full day class.

**Free E-learning:** The individual course plan with specific SAS tool education will include recommendations from free e-learning courses; SAS Programming 1, Statistics 1, SAS Programming for R Users, SAS Platform Administration: Getting Started SAS Viya Enablement.

3. Analytics Lab and Case Studies

The participants use the Analytics Lab to practice Case studies, build their own POC on a business issue, understand the tools to use in your assignment/daily work, create basis for decision into the next degree of advanced analytics, meet the expertise and compeers.

The case studies include a range from Basic SAS programs to more advanced programs. The cases contain a variety of different program examples useful for an everyday work as a SAS Programmer. The case studies bridge the gap between high-level business message and technical code with no business context.
## Program plan 6 month

<table>
<thead>
<tr>
<th>Day</th>
<th>Session 1</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1 + 2 | SAS programming 1 | Introduction, Program and Accessing Data  
Creating Reports and format data values  
Manipulating data and combine data |
| 3 + 4 | SAS Programming 2 | Control SAS data set in and output  
Summarize, read and write different types of data  
Perform DO loop and SAS array processing  
Transform character, numeric and date variables |
| Self-study | Homework | Practice Programming |
| Tool Courses | | Critical tool/SAS skills |
| Analytics Lab | | Case Study 1+2 |
| Cert Prep | | Preparation for certification E-learning |
| Certification | | SAS Certification Base |

<table>
<thead>
<tr>
<th>Day</th>
<th>Session 2</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 5 + 6 | SAS Macro programming | Perform text substitution in SAS code  
Automate and customize the production of SAS code  
Conditionally or iteratively construct SAS code  
Use macro variable and macro functions |
| 7 + 8 | SAS SQL | Query and subset data  
Summarize and present data  
Combine tables, including complex joins and merges  
Replace multiple DATA and PROC steps with one SQL query |
| 9 + 10 | SAS Advanced Programming | Control memory, I/O, and CPU resources  
Create and use indexes  
Combine data horizontally  
Create user-defined functions and informats |
| Self-study | Homework | Practice Programming |
| Tool Courses | | Critical tool/SAS skills |
| Analytics Lab | | Case Study 3+4+5+6 |
| Cert Prep | | Preparation for certification E-learning |
| Certification | | SAS Certification Advanced |

### Nordics User Group

As a participant in the program SAS Programming Master Class you get a personal membership in FANS (SAS Nordics user group) during the period of 12 month. This is an excellent opportunity to share knowledge and experience, including local network groups that meet at a regular basis, online offerings like in-depth live webinars, a Nordic online Community and access to presentations from network meetings across the borders, access to a larger pool of peers and experts. Whether you are a seasoned SAS software user with experiences to share or a newcomer who would like to learn, this is an excellent way to help you get the most value from SAS technology.
The recommended study hours per week over the 6 months study period.

<table>
<thead>
<tr>
<th>SAS programming Master Class</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Programming Classes</td>
<td>3</td>
</tr>
<tr>
<td>• Analytics LAB (optionally)</td>
<td>(2)</td>
</tr>
</tbody>
</table>

### Price

Price for the program including exam: 4.000 Euro/pers

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom training</td>
<td>10 days</td>
</tr>
<tr>
<td>Case Studies/Real Case learning</td>
<td>4 days</td>
</tr>
<tr>
<td>Analytics LAB (optionally)</td>
<td>10 Halfdays</td>
</tr>
<tr>
<td>E-learning (optionally)</td>
<td>5</td>
</tr>
<tr>
<td>Personal FANS membership</td>
<td>6 month</td>
</tr>
<tr>
<td>Certification</td>
<td>2</td>
</tr>
</tbody>
</table>

Additional SAS tool training up to 9 days, +200 Euro/day.

### Dates

- Copenhagen 1st October 2108
- Stockholm 8th October 2018
- Oslo 9th October 2018

### More information

For more information contact Marie Lienzén, marie.lienzen@sas.com