

# MS4262: ADVANCED ANALYTICS USING SAS

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## Effective Term

Semester B 2024/25

## Part I Course Overview

### Course Title

Advanced Analytics using SAS

### Subject Code

MS - Department of Decision Analytics and Operations

### Course Number

4262

### Academic Unit

Department of Decision Analytics and Operations (DAOS)

### College/School

College of Business (CB)

### Course Duration

One Semester

### Credit Units

3

### Level

B1, B2, B3, B4 - Bachelor's Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

MS3251 Analytics using SAS

### Precursors

Nil

### Equivalent Courses

MS3218 Advanced SAS Programming

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

This course provides the concepts and knowledge of advanced SAS data analytics techniques for solving complex business and finance problems. Students can use the knowledge learned from this course to manipulate data tables, query data tables, generate sophisticated reports, and automate data manipulation processes within the SAS environment.

### Course Intended Learning Outcomes (CILOs)

| CILOs |                                                                                                                                                                            | Weighting (if app.) | DEC-A1 | DEC-A2 | DEC-A3 |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------|--------|--------|
| 1     | Perform advanced SAS techniques, including using arrays, hash objects, data sampling, table lookup, vertical data handling, and advanced SAS functions for data analytics. | 25                  | x      | x      | x      |
| 2     | Use Structure Query Language in SAS to manipulate data tables and generate reports.                                                                                        | 25                  | x      | x      | x      |
| 3     | Create simple and highly customized tabular reports using SAS.                                                                                                             | 25                  | x      | x      | x      |
| 4     | Create and use user-defined and automatic macro variables within the SAS Macro Language to extend and customise SAS.                                                       | 25                  | x      | x      | x      |

#### A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

#### A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

#### A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

### Learning and Teaching Activities (LTAs)

| LTAs |                    | Brief Description                                                                                                                                                                                 | CILO No.   | Hours/week (if applicable) |
|------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------|
| 1    | Lecture            | Students will learn the concepts and general knowledge of various advanced SAS techniques in data preparation, including enhanced statistical reporting, structured query and SAS macro language. | 1, 2, 3, 4 |                            |
| 2    | In-class exercises | Students will perform in-class hands-on exercises so that learning difficulties can be identified and tackled.                                                                                    | 1, 2, 3, 4 |                            |

### Assessment Tasks / Activities (ATs)

| ATs |               | CILO No.   | Weighting (%) | Remarks (e.g. Parameter for GenAI use) |
|-----|---------------|------------|---------------|----------------------------------------|
| 1   | Assignment    | 1, 2, 3, 4 | 20            |                                        |
| 2   | Mid-term Test | 1, 2, 3, 4 | 30            |                                        |

**Continuous Assessment (%)**  
50

**Examination (%)**  
50

**Examination Duration (Hours)**  
3

**Assessment Rubrics (AR)**

**Assessment Task**  
Assignment

**Criterion**  
Ability to understand and implement the knowledge of advanced data analytics using SAS.

**Excellent (A+, A, A-)**  
High

**Good (B+, B, B-)**  
Significant

**Fair (C+, C, C-)**  
Moderate

**Marginal (D)**  
Basic

**Failure (F)**  
Not even reaching marginal levels

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**Assessment Task**  
Mid-term Test

**Criterion**  
Ability to explain the key concepts and algorithms of advanced analytics using SAS.

**Excellent (A+, A, A-)**  
High

**Good (B+, B, B-)**  
Significant

**Fair (C+, C, C-)**  
Moderate

**Marginal (D)**  
Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

Written Examination

**Criterion**

Demonstrate knowledge of advanced SAS techniques needed for data analytics, including SAS data table manipulations, customised reports, query language, and macro variables.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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## Part III Other Information

**Keyword Syllabus****Review of Analytics using SAS**

Refreshing concepts and general knowledge of analytics using SAS.

**Advanced Techniques and Efficiencies**

Improve efficiency and performance by performing table lookup, data sampling, variable selection, grouping processing, and sorting.

**Enhanced Reporting**

Producing descriptive statistics tables with multi-dimensions; Accumulating statistics and percentages by one or more stratifying variables; Formatting report layout; Formatting report items.

**Structured Query by SAS**

Variable selection; Missing data handling; data modification; Outlier handling; Summarizing data; Data merging; Report generation;

**Automate and Customize SAS Applications**

Introducing basic concepts of SAS Macro facility; Creating and using SAS Macro variable; Creating and using SAS Macro functions; Interfacing DATA step and Procedure step; Creating customize and automating regular statistical report;

**Reading List****Compulsory Readings**

| Title |                                                                  |
|-------|------------------------------------------------------------------|
| 1     | Sunil Gupta 2016. Sharpening Your Advanced SAS Skills. CRC Press |

**Additional Readings**

| Title |                                                                                                                                                      |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Haworth, Lauren E. 1999, PROC TABULATE by Example. Cary, NC: SAS Institute Inc.                                                                      |
| 2     | Burlew, Michele M. 2006. SAS Macro Programming Made Easy, Second Edition. Cary, NC: SAS Institute Inc.                                               |
| 3     | Carpenter, Art. 2016. Carpenter's Complete Guide to the SAS Macro Language, Third Edition. Cary, NC: SAS Institute Inc.                              |
| 4     | Lafler, Kirk Paul. 2013. PROC SQL: Beyond the Basics Using SAS, Second Edition. Cary, NC: SAS Institute Inc.                                         |
| 5     | Farmer, Susan and Lampton, Marjorie. 2007. SAS Programming III: Advanced Techniques and Efficiencies, SAS Course Notes. Cary, NC: SAS Institute Inc. |