Academic Requirements for the M Sc (DS) Program

(Effective from Autumn 2024-25)

This document describes the academic requirements for the Master of Science – Data Science (a.k.a. M Sc (DS)) — a two-year postgraduate program of DA-IICT, subject to amendments from time to time, per the needs and requirements. These rules deal only with the program's post-admission academic activities. Eligibility for admission, admission procedures, etc., for the program are outside the purview of this document.

The Dean (Academic Programs)/ Registrar may, from time to time, issue such instructions or directions as may be necessary to give effect to and carry out the provisions of these rules. As Chairman of the Academic Council, the director may relax/exempt some provision(s) of the rules in exceptional situations. All such cases shall be reported to the Academic Council in the next meeting.

Important terms/expressions used in the document have been defined in the GLOSSARY at the end.

1. REGISTRATION

1.1. Categories of Registration:

1.1.1. A student has to register in the resident registration category only.

1.1.2. To qualify for resident registration, the student must register for a duly approved course program and pay the prescribed tuition and other fees, including any outstanding dues.

1.1.3. New entrants to the program who are awaiting the results of the qualifying examination may be allowed ‘provisional’ registration. By the date given in the Academic Calendar (usually about 8 weeks from the date of registration), such candidates will be required to submit, for verification, the Original Certificates of having passed the qualifying examination. Original certificates will be returned to the students, and a self-attested copy will be kept for their records.

1.2. Late Registration:

1.2.1. In case of any compelling reason like illness, a student cannot register on the registration day; he/she will be allowed to register during the late registration period as specified in the Academic Calendar (about one week from the registration date). Any student registering late must pay the specified late registration fee.

1.2.2. In exceptional cases, the Dean (Academic Programs), on the recommendation of the Post-Graduate Committee (PGC), may consider registration beyond the late registration date.

1.3. Academic Advising:

1.3.1. A student will be advised in the selection of courses by the faculty adviser appointed by the Dean (Academic Programs) in consultation with the PGC.

1.3.2. A student may be permitted to repeat or substitute courses in which he/she has obtained ‘DD’ or ‘DE’ or ‘F’ grades. The guidelines in section 2.3 will govern permission to repeat/substitute a course.

1.4. Semester Load Requirements:

1.4.1. The M. Sc. (DS) semester load will be as prescribed from time to time in the approved program course structure document (see Appendix A).

1.5. Adding/Dropping of Courses and Withdrawal from a Semester

1.5.1. Adding and dropping courses is permitted during the Add/Drop period, but only if the course instructor and the Convener PGC endorse the student's request. The last dates to apply for adding and dropping courses are specified in the Academic Calendar.

1.5.2. A student who wishes to withdraw before registration for a semester must obtain formal approval from the Dean (Academic Programs) before the prescribed last date for late registration for the concerned semester. Withdrawal after registration for a semester is permitted only on medical grounds or for other exceptional reasons. Formal approval for such withdrawal must be obtained from the Dean (Academic Programs) before the commencement of the end-semester examination for the concerned semester. Withdrawal from a semester, before or after registration, is permitted for only one semester during the entire program. If a student does not register for a regular semester or withdraw with permission from the Dean (Academic Programs) as indicated above, his/her name is liable to be struck off from the rolls of the Institute.

1.5.3. A student who registers for a semester after having withdrawn in the previous semester(s) can register for the courses prescribed in the curriculum for that particular semester subject to prerequisites, if any.

1.5.4. The transcript of a student who has ‘withdrawn’ status would show the appropriate status for the concerned semester(s). The transcript of a student suspended for an academic or disciplinary reason would also show ‘withdrawn’ status.

1.5.5. The maximum period for program completion, as given in the appropriate subsection of Section 2, includes any semester in which the student has ‘withdrawn’ status.

2. ACADEMIC REQUIREMENTS

2.1. Minimum Credit Requirements and Maximum Duration:

2.1.1. The total course credits required in the M Sc (DS) programs will be at least 60. The credits will be as specified in the approved curriculum applicable to the concerned batch.

2.1.2. The maximum permissible duration for the completion of the programs is 3 years.

2.2. Audit Courses:

2.2.1. The students are permitted to audit courses. They will be given a 'P' grade, which will be entered in their grade card if they satisfy the requirements placed by the course instructor. If they do not meet the requirements, they will not get any grade, and no entry will be made in the transcript for that course.

2.3. Grades, Semester, and Cumulative Performance Index:

2.3.1. A student is awarded a letter grade in each course he/she is registered for, indicating his/her overall performance in that course. These letter grades are assigned points on a 10-point scale as described in the table below:

Letter Grade	Grade Points	Explanation
AA	10	
AB	9	
BB	8	
BC	7	
CC	6	
CD	5	
DD	4	
DE	3	
F	0	Fail
I	-	Incomplete
P*	-	Pass

*This is for Pass in Audit Courses only.

2.3.2. If a student does not complete all the requirements for a course for a genuine reason, the instructor may award a grade 'I' (Incomplete). An 'I' grade must be converted by the instructor to a regular letter grade by

the last date for such conversion specified in the Academic Calendar, failing which it is automatically converted to an ‘F’ grade.

2.3.3. A student getting an ‘ F’ grade in a core course must repeat it. An elective course must either be repeated or substituted, as suggested by PGC.

2.3.4. A student getting a ‘DD’ or ‘DE’ grade in an elective course may substitute it for another course, provided his/her CPI is less than the prescribed minimum for getting the Degree, and the student can continue in the program.

2.3.5. If a course is repeated or substituted, the old grade will also appear on the transcript, although it will not be considered while computing the CPI.

3. ACADEMIC PERFORMANCE REQUIREMENT

3.1. Semester Performance Index (SPI) and Cumulative Performance Index (CPI):

The SPI is an indicator of a student's academic performance in all the courses he/she has registered during a given semester. It is computed by taking the weighted average of the grades obtained in that semester. The CPI indicates the cumulative academic performance in all the courses taken, including those in the current semester. CPI is computed by taking the cumulative weighted average of the grades earned till that semester. The SPI and CPI are calculated up to two decimal places.

3.2. Minimum CPI requirements for graduation in the program:

Program	CPI for Graduation
M Sc (DS)	6.0

3.3. Academic Probation and Dismissal:

A student whose CPI falls below the minimum required for graduation at the end of any semester will be placed on Academic Probation for the next semester with written intimation. For every student placed on Academic Probation for a semester, the PGC will prescribe a specified course load in the concerned semester and may also prescribe a minimum SPI the student must attain in the semester. The PGC will keep a watch on the progress of every student placed on probation, and if the performance of a student is poor so that he/she is not likely to benefit from continuing in the program any further, will recommend to the Director that he/she should leave the Institute. If a student's continuation in the program is terminated, the appropriate authority will issue a letter of termination.

GLOSSARY

- **Academic Probation:** Academic Probation indicates that a student's academic performance is not up to the expected level. Over and above the academic consequences described in section 3.3, a student placed on probation may be subjected to other restrictions related to financial support, award of medals and prizes, etc., at any time.
- **Cumulative Performance Index (CPI)**: CPI indicates the cumulative academic performance in all courses, including those taken in the current semester. CPI is computed by taking the cumulative weighted average of the grades earned till that semester.
- **Grade Points**: Product of the credits and points of a letter grade awarded to the course.
- **Postgraduate Committee (PGC):** Committee of the Institute responsible for Policy Guidelines and Implementation Strategies covering the Postgraduate Programs.
- **Semester:** Approximately 16 weeks duration each, the first (Autumn Semester) extending from July to November and the second (Winter Semester) from December/ January to April.
- **Semester Credits:** The sum of credits of courses the student registers in a semester.
- **Semester Grade Points:** The sum of the products of credits and points for each course a student registers in a semester.
- **Semester Performance Index (SPI):** SPI is an indicator of a student's academic performance in all the courses he/she has registered for a given semester. It is computed by taking the weighted average of the grades obtained in that semester.

DA-IICT, Gandhinagar
Updated as of October 2024.

Appendix A

Master of Science (Data Science) Curriculum Structure

Course Code	Course Name	Credits (L-T-P)
DS601	Mathematical Foundations for Data Science	4 Credits (3-1-0)
DS602	Statistical Methods	4 Credits (3-0-2)
DS603	Data Structures and Algorithms in Python	4 Credits (3-0-2)
DS604	Introduction to Data Management	4 Credits (3-0-2)
DS605	Fundamentals of Machine Learning	4 Credits (3-0-2)
	Total Semester Credits	**20 Credits (15-1-8)**

Semester I (Autumn I): Foundation Courses

Semester II (Winter I): Advanced Courses

Course Code	Course Name	Credits (L-T-P)
DS611	Numerical Optimization	3 Credits (2-0-2)
DS612	Interactive Data Visualization	4 Credits (3-0-2)
DS614	Big Data Engineering	4 Credits (3-0-2)
DS615	Neural Networks & Deep Learning	4 Credits (3-0-2)
XXXXX	Technical Elective - 1	4 Credits (3-0-2)
	Total Semester Credits	**19 Credits (14-0-10)**

Summer Semester: Fostering-for-Industry

Course Code	Value-Added Courses* (compulsory) Minimum 60 hrs.	Credits (L-T-P)
DS620	• LLM Operations • Data Science in Industry: Case Studies • Communication Skills for Data Professionals	4 Credits (1-0-6)
DS629	Minor Project**	2 Credits (0-0-4)
	Total Semester Credits	**6 Credits (1-0-10)**

*The students must have a Pass grade for Value Added Courses (1-0-6-4), which would be offered in the Summer Semester after their second semester. The Value Added courses can have multiple modules with a minimum of 60 hrs of training covered from different modules.

**The Minor Project completed during the summer and the third semester must be supervised by the same supervisor. The evaluation mechanism may be similar to BMP.

Semester III (Autumn II): Specialized Courses

Course Code	Course Name	Credits (L-T-P)
DS635	Machine Learning Systems Engineering	4 Credits (3-0-2)
DS636	Data Science Ethics	3 Credits (3-0-0)
XXXXX	Technical Elective - 2	4 Credits (3-0-2)
DS639	Minor Project (Continued…)	4 Credits (0-0-8)
	Total Semester Credits	**15 Credits (9-0-12)**

Semester IV (Winter II): Training/ Research

Course Code	Course Name	Credits (L-T-P)
DS649	Industrial Training/ Major Project (Pass/ Fail)	16 Credits (0-0-32)
	Total Semester Credits	**16 Credits (0-0-32)**

Tentative List of Electives

Mathematics

- Operational Research
- Numerical Methods for Data Science

Statistics

- Advanced Statistical Tools for Data Science
- Time Series Forecasting
- Applied Forecasting Methods

Data Engineering

- Knowledge Graphs and Analytics

Machine Learning

- Neural Natural Language Processing
- Computer Vision
- Digital Image Processing
- Deep Reinforcement Learning
- Multimodal Machine Learning
- Generative AI
- Federated Learning

Domain Specific Applications

- Information Retrieval
- Recommendation Systems
- Health Informatics
- Bioinformatics
- Econometrics
- Information Systems Security
- Speech Communication
- Policy Analysis