

4 WEEK IIT MADRAS BS QUALIFIER PROGRAM

EXAM DATE 13 JULY 2025

SYLLABUS QUALIFIER EXAM



IIT MADRAS

BS DATA SCIENCE & APPLICATIONS

Admission to the BS Degree Program

Path-1 Regular entry: All candidates, irrespective of their backgrounds, can earn admission to the 4 Year BS Degree Program by successfully completing the qualifier process.

Path-1 Regular entry:

All regular entry applicants must go through the Qualifier Process to earn .

Qualifier Preparation: The qualifier process includes 4 weeks of coursework based on lecture videos, assignments, and live sessions of the four foundational level courses - English I, Mathematics for Data Science I, Statistics for Data Science I, and Computational Thinking - that will be provided through our online portal. Every week an assignment must be submitted for grading in each course.

Qualifier Exam: At the end of the 4 weeks, a qualifier exam will be conducted for eligible candidates based on the content covered in the 4 weeks of study.

Eligibility to appear for the qualifier exam (regular entry):

In each course, the average of the best 2 out of the first 3 assignment scores will be calculated. Sudo only those who get the minimum required average assignment scores in all four courses (as given below) will be allowed to appear for the Qualifier Exam.

Only learners who are eligible to appear for the qualifier exam will receive the hall ticket for it.

The in-person Qualifier Exam at the end of 4 weeks of coursework is of 4 hours duration and covers all 4 courses.

To pass the Qualifier Exam, the learner has to get a minimum Average Qualifier Exam Score and a minimum Qualifier Exam Score in each course individually.

Only those who pass the Qualifier Exam will be eligible to register for the BS Degree Program.

The syllabus of the qualifier exam is given in the next pages. (4 Papers)

MATHEMATICS FOR DATA SCIENCE -1

Course ID: **BSMA1001**

Course Credits: 4

Course Type: Foundational

Pre-requisites: None

Core-requisites: None



This course introduces functions (straight lines, polynomials, exponentials and logarithms) and discrete mathematics (basics, graphs) with many examples. The students will be exposed to the idea of using abstract mathematical structures to represent concrete real life situations.



Course Structure & Assessments

4 Weeks of Qualifier Coursework.

Qualifier Exam

WEEK 1

Set Theory - Number system, Sets and their operations, Relations and functions - Relations and their types, Functions and their types

WEEK 2

Rectangular coordinate system, Straight Lines - Slope of a line, Parallel and perpendicular lines, Representations of a Line, General equations of a line, Straight-line fit

WEEK 3

Quadratic Functions - Quadratic functions, Minima, maxima, vertex, and slope, Quadratic Equations

WEEK 4

Algebra of Polynomials - Addition, subtraction, multiplication, and division, Algorithms, Graphs of Polynomials - X-intercepts, multiplicities, end behavior, and turning points, Graphing & polynomial creation

STATISTICS FOR DATA SCIENCE 1

Course ID: **BSMA1002**

Course Credits: 4

Course Type: Foundational

Pre-requisites: None

Core-requisites: None



The students will be introduced to large datasets. Using this data, the students will be introduced to various insights one can glean from the data. Basic concepts of probability also will be introduced during the course leading to a discussion on Random variables.



Course Structure & Assessments

4 Weeks of Qualifier Coursework.

WEEK 1

Introduction and type of data, Types of data, Descriptive and Inferential statistics, Scales of measurement

WEEK 2

Describing categorical data Frequency distribution of categorical data, Best practices for graphing categorical data, Mode and median for categorical variable

WEEK 3

Describing numerical data Frequency tables for numerical data, Measures of central tendency - Mean, median and mode, Quartiles and percentiles, Measures of dispersion - Range, variance, standard deviation and IQR, Five number summary

WEEK 4

Association between two variables - Association between two categorical variables - Using relative frequencies in contingency tables, Association between two numerical variables - Scatterplot, covariance, Pearson correlation coefficient, Point bi-serial correlation coefficient

Qualifier Exam

COMPUTATIONAL THINKING

Course ID: **BSCS1001**

Course Credits: 4

Course Type: Foundational

Pre-requisites: None

Core-requisites: None



The students will be introduced to a number of programming concepts using illustrative examples which will be solved almost entirely manually. The manual execution of each solution allows for close inspection of the concepts being discussed.



Course Structure & Assessments

4 Weeks of Qualifier Coursework

WEEK 1

Variables, Initialization, Iterators, Filtering, Datatypes, Flowcharts, Sanity of data

WEEK 2

Iteration, Filtering, Selection, Pseudocode, Finding max and min, AND operator

WEEK 3

Multiple iterations (non-nested), Three prizes problem, Procedures, Parameters, Side effects, OR operator

WEEK 4

Nested iterations, Birthday paradox, Binning

Qualifier Exam

ENGLISH - 1

Course ID: **BSHS1001**

Course Credits: 4

Course Type: Foundational

Pre-requisites: None

Core-requisites: None



This course aims at achieving fluency and confidence in spoken and written English. This course will use insights from theories of learning and dominant methods of teaching language.



Course Structure & Assessments

4 Weeks of Qualifier Coursework.

WEEK 1

Sounds and Words (Vowel and Consonant sounds)

WEEK 2

Parts of Speech

WEEK 3

Sentences (Phrases and Idioms)

WEEK 4

Speaking Skills (Spoken English Preliminaries)

Qualifier Exam

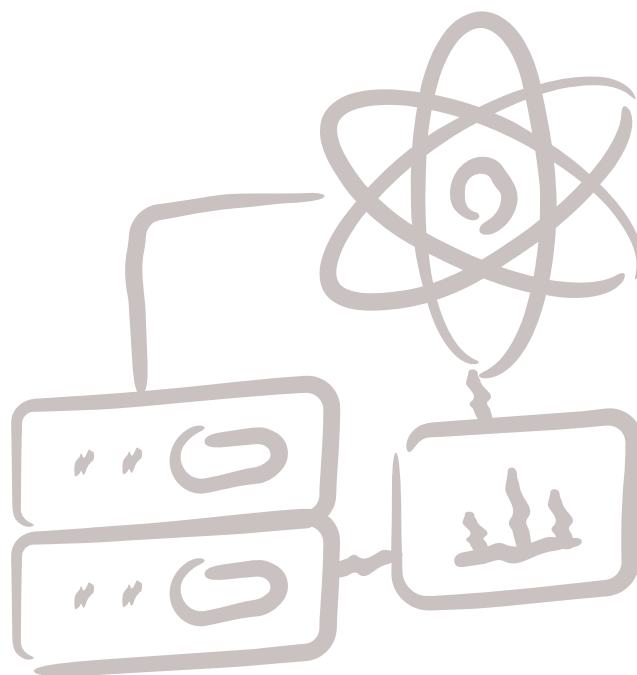
JEE-based Entry

Candidates qualified to appear for current year's JEE Advanced can directly join our program by following the steps below:

- Complete the application form found [here](#). Pay the admission fee of Rs 3000/-
- Once we verify your proof for JEE advanced, you are eligible to directly start the foundation level courses.
- Next, you have to register for courses (English 1, Maths 1, Statistics 1, Computational Thinking) by paying the course fees. You can register to 1/2/3/4 courses depending on the time you would have to study.
- We will inform you of when you can register for courses.
- Only after you register for courses, will you get access to content.
- Thereafter you continue the program as a regular student.



STUDENT EDUCATIONAL EMPOWERMENT PROGRAM
DESIGNING FUTURE-READY HUMAN RESOURCES



IIT MADRAS
BACHELOR OF SCIENCE IN DATA SCIENCE & APPLICATIONS

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