M.Tech. (Computer Science) : Orientation

Mentor Committee

Indian Statistical Institute

21 July, 2025

Most important takeaways

- **Home page:** `https://www.isical.ac.in/~mtcs-mentor-comm`
  - contains a link to the **current, official** version of the Students' Brochure (the "rule book") for the MTech(CS) program
  - *Please do not refer to any other versions* that may be found via Web searches; they may be outdated.
- **Email:** mtcs-mentor-comm@isical.ac.in
  - *Please do not send email to individual members.*
- **Google group:**
  `https://groups.google.com/g/isi-mtech-cs-2025`
  Please sign up **NOW**.
- **Student Information Portal (SIP):**
  `https://sip.isical.ac.in/isierp`

Streams: CS / non-CS

- Each student belongs to one of the following streams (categories):
  - **CS stream**: if you qualified based on your performance in the *CS section* of GATE / the ISI admission test

    Your prior degree **does not** matter.
  - **non-CS stream**: if you qualified based on your performance in the *Math section* of the ISI admission test, or in a non-CS GATE

    Sub-categories : based on your degree
    - **non-CS stream, Math background**
    - **non-CS stream, non-Math background**
- Course requirements, options, etc. depend on your stream.

Basic structure: CS stream

1. Each course is evaluated out of 100 marks.
2. **Compulsory, full-semester, non-credit:** Introduction to Programming
   - May be waived if you pass a programming test to be conducted on July 25 (this Friday) 16:30–18:30.
3. **Two compulsory courses:**
   - Design and Analysis of Algorithms
   - Discrete Mathematics
4. **Five formative courses**
5. **Eight elective courses**
6. **Two more courses** (formative or elective) OR **minor project** (equivalent to *two* courses)
7. **Dissertation** (equivalent to *three* courses)
   - spans two consecutive semesters (usually 3rd, 4th)

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Total graduating score out of **2000** marks.

CS stream: formative courses

Pool A

- Elements of Algebraic Structures
- Linear Algebra
- Probability and Stochastic Processes
- Statistical Methods

Pool B

- Automata Theory, Languages and Computation
- Compiler Construction
- Computer Architecture
- Computer Networks
- Computing Laboratory
- Data and File Structures
- Database Management Systems
- Operating Systems
- Principles of Programming Languages

CS stream: formative courses

Pool A

- Elements of Algebraic Structures
- Linear Algebra
- Probability and Stochastic Processes
- Statistical Methods

You need to pass **FIVE**, with *at least TWO from pool A*.

Pool B

- Automata Theory, Languages and Computation
- Compiler Construction
- Computer Architecture
- Computer Networks
- Computing Laboratory
- Data and File Structures
- Database Management Systems
- Operating Systems
- Principles of Programming Languages

Basic structure: non-CS stream

1. Each course is evaluated out of 100 marks.
2. **Compulsory, full-semester, non-credit:** Introduction to Programming (as for CS stream)
3. **Five compulsory courses:**
   - Computing Laboratory
   - Data Structures
   - Design and Analysis of Algorithms.
   - Discrete Mathematics
   - Operating Systems
4. **Four formative courses**
5. **Eight elective courses**
6. **Dissertation** (equivalent to *three* courses)
   - spans two consecutive semesters (usually 3rd, 4th)

Basic structure: non-CS stream

1. Each course is evaluated out of 100 marks.
2. **Compulsory, full-semester, non-credit:** Introduction to Programming (as for CS stream)
3. **Five compulsory courses:**
   - Computing Laboratory
   - Data Structures
   - Design and Analysis of Algorithms.
   - Discrete Mathematics
   - Operating Systems
4. **Four formative courses**
5. **Eight elective courses**
6. **Dissertation** (equivalent to *three* courses)
   - spans two consecutive semesters (usually 3rd, 4th)

Total graduating score out of **2000** marks.

No option of minor project

Non-CS stream: formative courses

Pool A

- Elements of Algebraic Structures
- Linear Algebra
- Probability and Stochastic Processes
- Statistical Methods

Pool B

- Automata Theory, Languages and Computation
- Compiler Construction
- Computer Architecture
- Computer Networks
- Computer Organization
- Database Management Systems
- Principles of Programming Languages

Non-CS stream: formative courses

Pool A

- Elements of Algebraic Structures
- Linear Algebra
- Probability and Stochastic Processes
- Statistical Methods

You need to pass **FOUR**.

- **Students with Master's degree in Mathematics or Statistics:** at least THREE from Pool B
- **All other students in non-CS stream:** at least TWO from Pool A and at least ONE from Pool B

Pool B

- Automata Theory, Languages and Computation
- Compiler Construction
- Computer Architecture
- Computer Networks
- Computer Organization
- Database Management Systems
- Principles of Programming Languages

Minor project (CS Stream only)

- Duration: one semester (either third or fourth).
- Eligibility: a student has to pass 10 (or more) courses in the first year, and obtain an aggregate score of 75% or more in the best 10 courses
- A student who does not or cannot undertake a Minor Project has to pass two more (formative or elective) courses instead.

Electives

Electives are classified into four tracks:

- Theory
- Systems
- Cryptology and Security
- Data Science.

- One elective can belong to multiple tracks.
- Completing a certain number of electives in a specific track will enable a student to obtain a specialization.
- Refer to the *Brochure* for the list of elective courses and their respective track(s).

Tracks and specialization

- Can choose a track for specialization from these four tracks: Theory, Data Science, Systems, and Cryptology and Security
- Can also graduate without a specialization
- Option of double specialisation for CS-stream students

Requirements for a specialization in a track T

- At least FIVE of the EIGHT elective courses in track T.
- Dissertation topic in track T.

Tracks and specialization

- Can choose a track for specialization from these four tracks: Theory, Data Science, Systems, and Cryptology and Security
- Can also graduate without a specialization
- Option of double specialisation for CS-stream students

Requirements for **double specialization** in tracks T_1 and T_2

- For students in CS stream only
- At least TEN electives with at least FIVE each in the two separate tracks T_1 and T_2. One elective course cannot be counted for two different specializations.
- Completes a minor project.
- The minor project and the dissertation are in two different tracks T_1 and T_2.

Other frequently asked questions

- **Registering for courses:** via the SIP, *within two weeks* of the start of a semester
  - Recommended no. of courses: 5-6
    (Recall: total requirement = 17 courses + dissertation in 4 semesters)
- **Course prerequisites:** please discuss with the teacher concerned.
- **Repeating courses:**
  - required if you fail
  - may be permitted by MC if you would like to improve your score
- **Duration of the M.Tech. (CS) degree programme :**
  - Typically TWO years
  - May be at most THREE years
    (no stipends, hostels etc. beyond two years)

The Programming Test (July 25, 2025)

Time: 16:30 to 18:30, Venue: CSSC Lab (SN Bose Bhavan, 4th floor)

- **Prerequisite**: Basic algorithmic thinking + comfortable with programming in C
  - arrays will be enough
  - no complicated data structures / algorithms will be required
- Language: C
- Duration: 2 hours
- Passing criterion: you have to correctly solve 2 out of 3 problems
- If you do not pass:
  - you have to take a non-credit course on Introduction to Programming;
  - you will not be permitted to take Computing Lab this semester.

You may take Automata Theory, Languages and Computation if you like.