

MSc Programme in Mathematics (Two years) Course structure: Every semester has five courses, each worth 4 credits.

Semester wise course plan:

Semester I

| Course No. | Course Name | Credits |
|---------------|---|---------|
| MTH 301 | Group Theory | 4 |
| MTH 303 | Real Analysis-I | 4 |
| MTH* | Departmental Elective | 4 |
| MTH* | Departmental Elective | 4 |
| MTH 432/532 | Introduction to Probability and its Application | 4 |
| Total credits | | 20 |

Semester II

| Course No. | Course Name | Credits |
|----------------------|---------------------------------|---------|
| MTH 302 | Rings and Modules | 4 |
| MTH 304 | General Topology | 4 |
| MTH 306 | Ordinary Differential Equations | 4 |
| MTH 404 | Measure and integration | 4 |
| MTH* | Open Elective | 4 |
| Total credits | | 20 |

Semester III

| Course No. | Course Name | Credits |
|----------------------|--------------------------------|----------------|
| MTH 401 | Fields & Galois Theory | 4 |
| MTH 403 | Real Analysis-II | 4 |
| MTH 405 | Partial Differential Equations | 4 |
| MTH 407 | Complex Analysis-I | 4 |
| MTH* | Open Elective | 4 |
| Total credits | | 20 |

Semester IV

| Course No. | Course Name | Credits |
|----------------------|-----------------------|----------------|
| MTH 503 | Functional Analysis | 4 |
| MTH* | Departmental Elective | 4 |
| MTH* | Departmental Elective | 4 |
| MTH* | Open elective | 4 |
| MTH* | Open Elective | 4 |
| Total credits | | 20 |

*** Department Elective / Open Elective**

List of DEs in Semester I :

1. MTH 305 (Elementary number Theory)
2. MTH 311 (Advanced Linear Algebra)

List of DEs in Semester II :

1. MTH 308/412 (Combinatorics and Graph Theory)
2. MTH 408/522 (Numerical Analysis)
3. MTH 410/514 (Representation Theory)

List of DEs in Semester III

1. MTH 411 (Introduction to Lie Groups and Lie Algebras)
2. MTH 409 (Optimization Techniques)
3. MTH 507 (Algebraic Topology)
4. MTH 505/623 (Introduction to Ergodic Theory)
5. MTH 408/522 (Numerical Analysis II)

List of DEs in Semester IV

1. MTH 406 (Differential Geometry of Curves and Surfaces)
2. MTH 422/522 (Introduction to Analytic Number Theory)
3. MTH 518/618 (Commutative Algebra)
4. MTH 506/610 (Fourier Analysis on Real Line)
5. MTH 521/621 (Introduction to Wavelets)
6. MTH 524/624 (Advanced PDE)
7. MTH 508/608 (Introduction to Diff Manifolds and Lie Groups)
8. MTH 516/616 (Topology II)
9. MTH 520/622 (Introduction to Hyperbolic Geometry)
10. MTH 430/530 (Modern Cryptography)

Suggested OEs in odd Semesters :

| Course code | Name of the course | Department |
|--------------------|---|------------------------------|
| DSE 301/601 | Artificial Intelligence and its Scientific Applications | Data Science and Engineering |
| DSE 305 | Game Theory | Data Science and Engineering |

| | | |
|--------------|------------------------|---------|
| PHY 303 | Quantum Mechanics I | Physics |
| PHY 301 | Mathematical Methods I | Physics |
| PHY 415/615 | Quantum Field Theory I | Physics |
| PHY 306/6040 | Statistical Mechanics | Physics |

Suggested OEs in even Semesters:

| Course code | Name of the course | Department |
|--------------------|-----------------------------------|-------------------|
| HSS 219/309/609 | Logic | HSS |
| ECS 308/658 | Data Science and Machine Learning | EECS |
| ECS 310 | Algorithms | EECS |
| PHY 304 | Quantum Mechanics II | Physics |
| PHY 302 | Mathematical Methods II | Physics |
| PHY 621 | Quantum Field Theory II | Physics |

Note: Course contents are available at [IISERB:Course Content](#)