# Applicable from 2025 Batch
# CHEMISTRY
# PhD

**Coursework for PhD program:** Total 24 credits*

**Total credits for comprehensive examination**: 22 credits

**Semester 1:** 3 x 4 credit courses

**Semester 2:** 2 x 4 credit courses

In addition, the following two mandatory courses whenever offered (in Semester 1 or 2)

CHM634: Research methodology (2 credits, grade-based)

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CHM635: Research and publication ethics course (2 credits, pass/fail)**

- Upon successful completion of 22 credits of coursework with a CPI of 7.0 or above, students will be eligible to take the comprehensive examination.
- After passing the comprehensive examination, students will be eligible to select a supervisor.
- Following two years of work as a Junior Research Fellow (JRF), students may become eligible for the Senior Research Fellow (SRF) position, subject to a positive recommendation from the monitoring committee.

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*May include lab rotations.

**This course can be completed any time before the SRF promotion.

# Applicable from 2025 Batch
# CHEMISTRY
# Int. Ph.D.

**Course structure:**

**Semester 1:**

| Number | Title | Credits |
|---|---|---|
| CHM301 | Quantum chemistry-1 | 4 |
| CHM302 | Organic chemistry | 4 |
| CHM311 | Organic chemistry lab | 4 |
| CHM601 | Advanced inorganic chemistry | 4 |
| ****** | Chemistry elective I | 4 |
| CHM634 | Research methodology | 2 |

**Semester 2:**

| Number | Title | Credits |
|---|---|---|
| CHM304 | Quantum chemistry-2 | 4 |
| CHM305 | Physical organic chemistry | 4 |
| CHM312 | Inorganic chemistry lab | 4 |
| ****** | Chemistry elective II | 4 |
| CHM604 | Advanced organic chemistry | 4 |

**Semester 3:**

| Number | Title | Credits |
|---|---|---|
| CHM401 | Molecular spectroscopy | 4 |
| CHM411 | Physical chemistry lab | 4 |
| ****** | Open elective I | 4 |
| ****** | Open elective II | 4 |

plus

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|---|---|---|
| PRJ406 | One semester project | 6 |

*or*

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|---|---|---|
| ******* | Open elective III | 4 |
| PRJ401 | One semester project | 2 |

**Semester 4:**

| Number | Title | Credits |
|---|---|---|
| CHM403 | Analytical chemistry | 4 |
| CHM412 | Analytical chemistry lab | 4 |
| ****** | Open elective IV | 4 |
| ****** | Open elective V | 4 |
| PRJ408 | One semester project | 8 |

CHM635: Research and publication ethics course (2 credit mandatory, pass/fail course, as an **overload** course), before SRF.

# Applicable from 2025 Batch
# PHYSICS
# Ph.D.

**Coursework for Ph.D. program:** Total 26 credits*

**Total credits for comprehensive examination**: 24 credits

**Semester 1:**

3 x 4 credit courses + IDC601 (2 credits, grade-based)

**Semester 2:**

2 x 4 credit courses + PHY672: Research methodology (2 credits, grade-based)

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PHY673: Research and publication ethics course (2 credits mandatory, pass/fail, as an **overload** course), before SRF.

*May include lab rotations and involve lab work as a project course

At the end of successful completion of 24 credits of coursework, with CPI = 7.0 and above, students are eligible for the comprehensive exam.

After successful completion of the comprehensive exam, one is eligible to choose a supervisor. After two years, one is eligible for SRF (subject to recommendation by the monitoring committee).

**Mandatory courses for Ph.D. students of PHY Department:**

**PHY601:** Review of classical mechanics,

**PHY602:** Review of electrodynamics,

**PHY603:** Review of statistical mechanics and

**PHY604:** Review of quantum mechanics

# Applicable from 2025 Batch
# PHYSICS
# Int. Ph.D.

## Course structure:

**Semester 1:**

| Number | Title | Credits |
|---|---|---|
| PHY301 | Classical mechanics | 4 |
| PHY302 | Quantum mechanics | 4 |
| PHY303 | Electrodynamics | 4 |
| PHY311 | Advanced optics and spectroscopy lab | 4 |
| PHY*** | Physics elective I | 4 |
| IDC451 | Seminar (delivering) | 1 |

**Semester 2:**

| Number | Title | Credits |
|---|---|---|
| PHY304 | Statistical mechanics | 4 |
| PHY306 | Advanced quantum mechanics | 4 |
| PHY312 | Advanced electronics & instrumentation lab | 4 |
| PHY*** | Physics elective II | 4 |
| ****** | Open elective I | 4 |
| IDC452 | Seminar (delivering) | 1 |

**Semester 3:**

| Number | Title | Credits |
|---|---|---|
| PHY401 | Nuclear and particle physics | 4 |
| PHY402 | Solid state physics | 4 |
| PHY403 | Atomic and molecular physics | 4 |
| PHY411 | Nuclear physics lab | 4 |
| ****** | Open elective II | 4 |

plus

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|---|---|---|
| ****** | Open elective III | 4 |

or

| | | |
|---|---|---|
| PRJ404 | One semester project | 4 |

**Semester 4:**

| Number | Title | Credits |
|---|---|---|
| PHY412 | Condensed matter physics lab | 4 |
| PHY*** | Physics elective III | 4 |
| PHY*** | Physics elective IV | 4 |
| ****** | Open elective IV | 4 |
| PRJ406 | One semester project | 4 |
| PHY672 | Research methodology | 2 |

PHY673: Research and Publication ethics course (2 credits mandatory, pass/fail, as an **overload** course), before SRF.

# Applicable from 2025 Batch
# MATHMATICS
# Ph.D.

**Coursework for Ph.D. program:** Total 26 credits*

**Total credits for comprehensive examination**: 24 credits

**Semester 1:**

3 x 4 credit courses + IDC601 (2 credits, grade-based)

**Semester 2:**

2 x 4 credit courses + MTH610: Research methodology (2 credits, grade-based)

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MTH611: Research and Publication ethics course (2 credits mandatory, pass/fail as an **overload** course), before SRF.

*May include lab rotations and involve lab work as a project course

At the end of successful completion of 24 credits coursework, with CPI = 7.0 and above eligible for comprehensive exam.

After successful completion of the comprehensive exam eligible for choosing supervisor
After two years eligible for SRF (subject to recommendation by the monitoring committee)

Mandatory Courses for PhD: Topical Courses:

MTH601: **Topics in algebra**

MTH602: **Topics in topology**

MTH605: **Topics in analysis**

Students must take a reading project each semester during their first year of course work and have to obtain a 'satisfactory grade' in both the reading projects in order to appear for the comprehensive examination.

# Applicable from 2025 Batch
# MATHMATICS
# Int. Ph.D.

**Course structure:**

**Semester 1:**

| Number | Title | Credits |
|---|---|---|
| MTH301 | Real analysis | 4 |
| MTH302 | Linear algebra | 4 |
| MTH303 | Set theory and logic | 4 |
| MTH304 | Group theory | 4 |
| ****** | Open elective | 4 |
| IDC451 | Seminar (delivery) | 1 |

**Semester 2:**

| Number | Title | Credits |
|---|---|---|
| MTH305 | Complex analysis | 4 |
| MTH306 | Lebesgue measure and integration yheory | 4 |
| MTH307 | Topology | 4 |
| MTH308 | Rings and modules | 4 |
| ****** | Open elective | 4 |
| IDC452 | Seminar (delivery) | 1 |

**Semester 3:**

| Number | Title | Credits |
|---|---|---|
| MTH401 | Ordinary differential equations | 4 |
| MTH402 | Functional analysis | 4 |
| MTH403 | Fields and Galois theory | 4 |
| **Department elective, at least 1 out of the following** | | |
| -MTH404 | Commutative and homological algebra | 4 |
| -MTH405 | Probability theory | |
| -MTH406 | Manifolds | |
| ****** | Open elective III | 4 |
| ****** | Open elective IV | 4 |

**Semester 4:**

| Number | Title | Credits |
|---|---|---|
| ****** | Department Elective | 4 |
| ****** | Department Elective | 4 |
| ****** | Department Elective | 4 |
| **Department elective, at least 1 out of the following** | | |
| -MTH407 | Partial differential equations | 4 |
| -MTH408 | Algebraic topology | |
| -MTH409 | Discrete mathematics | |

plus

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|---|---|---|
| ****** | Open elective V | 4 |
| MTH610 | Research methodology | 2 |

or

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|---|---|---|
| PRJ406 | One semester Project | 4 |
| MTH610 | Research methodology | 2 |

MTH611: Research and Publication ethics course (2 credits mandatory, pass/fail as an **overload** course), before SRF..

# Applicable from 2025 Batch
# BIOLOGY
# Ph.D.

**Coursework for Ph.D. program:** Total 20 credits*

**Total credits for comprehensive examination**: 18 credits

**Semester 1:**

3 x 4 credit courses = 12 credits

**Semester 2:**

IDC601 (2 credits) and BIO637**: Research methodology (4 credits)

BIO638: Research and publication ethics (2 credits mandatory pass/fail as an **overload** course) (semester III/IV) before SRF.

*For PMRF applicants, an additional course of 4 credits needed.

At the end of successful completion of 18 credits of coursework, with CPI = 7.0 and above, students are eligible for the comprehensive exam.

After successful completion of the comprehensive exam, you are eligible to choose a supervisor. After two years eligible for SRF (subject to recommendation by the monitoring committee)

BIO637**: Research methodology (4 credit) is applicable only to PhD and not for Int-Phd)

# Applicable from 2025 Batch
# BIOLOGY
# Int. Ph.D.

## Course Structure:

**Semester 1:**

| Number | Title | Credits |
|---|---|---|
| BIO** | Biology elective I | 4 |
| BIO** | Biology elective II | 4 |
| BIO303 | Experimental design and hypothesis testing | 4 |
| BIO411 | Bioinformatics lab | 4 |
| ****** | Open Elective I | 4 |
| IDC451 | Seminar (delivering) | 1 |

**Semester 2:**

| Number | Title | Credits |
|---|---|---|
| BIO** | Biology elective III | 4 |
| BIO** | Biology elective IV | 4 |
| BIO313 | Experimental biology lab | 4 |
| ****** | Open elective II | 4 |
| ****** | Open elective III | 4 |
| IDC452 | Seminar (delivering) | 1 |

**Semester 3:**

| Number | Title | Credits |
|---|---|---|
| BIO** | Biology elective V | 4 |
| BIO** | Biology elective VI | 4 |
| BIO** | Biology elective VII | 4 |
| ****** | Open elective IV | 4 |
| PRJ406 | One semester project | 6 |

**Semester 4:**

| Number | Title | Credits |
|---|---|---|
| BIO639* | Research methodology | 2 |
| BIO*** | Biology elective VIII | 4 |

plus

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|---|---|---|
| ****** | Open elective V | 4 |
| PRJ416 | One semester Project | 14 |

or

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|---|---|---|
| BIO412 | Lab on biophysical and spectroscopic tools | 4 |
| PRJ416 | One semester Project | 14 |

BIO638: Research and publication ethics (2 credits mandatory pass/fail as an **overload** course), before SRF. BIO639* Research methodology (2 credit) is applicable to only Int-PhD.

# Applicable from 2025 Batch
# Earth and Environment Sciences
# Ph.D.

**Coursework for Ph.D. program:** Total 24 credits*

**Total credits for comprehensive**: 22 credits

**Semester 1:**

3 x 4 credit courses

**Semester 2:**

2 x 4 credit courses (over semester 1 and 2)

CHM634: Research methodology (2 credits, grade-based)

Or

EES647: Research methodology (2 credits, grade-based)

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CHM635: Research and publication ethics course (2 credits mandatory, pass/fail), before SRF.

Or

EES648: Research and publication ethics course (2 credits mandatory, pass/fail), before SRF.

Or

BIO638: Research and publication ethics (2 credits mandatory pass/fail), before SRF.

*May include lab rotations and involve lab work as a project course

At the end of successful completion of 22 credits coursework, with CPI = 7.0 and above eligible for comprehensive exam.

After successful completion of the comprehensive exam eligible for choosing supervisor
After two years eligible for SRF (subject to recommendation by the monitoring committee)

# Applicable from 2025 Batch
# Humanities and Social Sciences
# Ph.D.

**Coursework for Ph.D. program:** Total 24 credits*

**Total credits for comprehensive**: 24 credits

**Semester 1:**

3 x 4 credit courses

**Semester 2:**

2 x 4 credit courses

**Mandatory**

HSS641: Research methodology (4 credits, grade-based).

Research and publication ethics course – yet to be added.